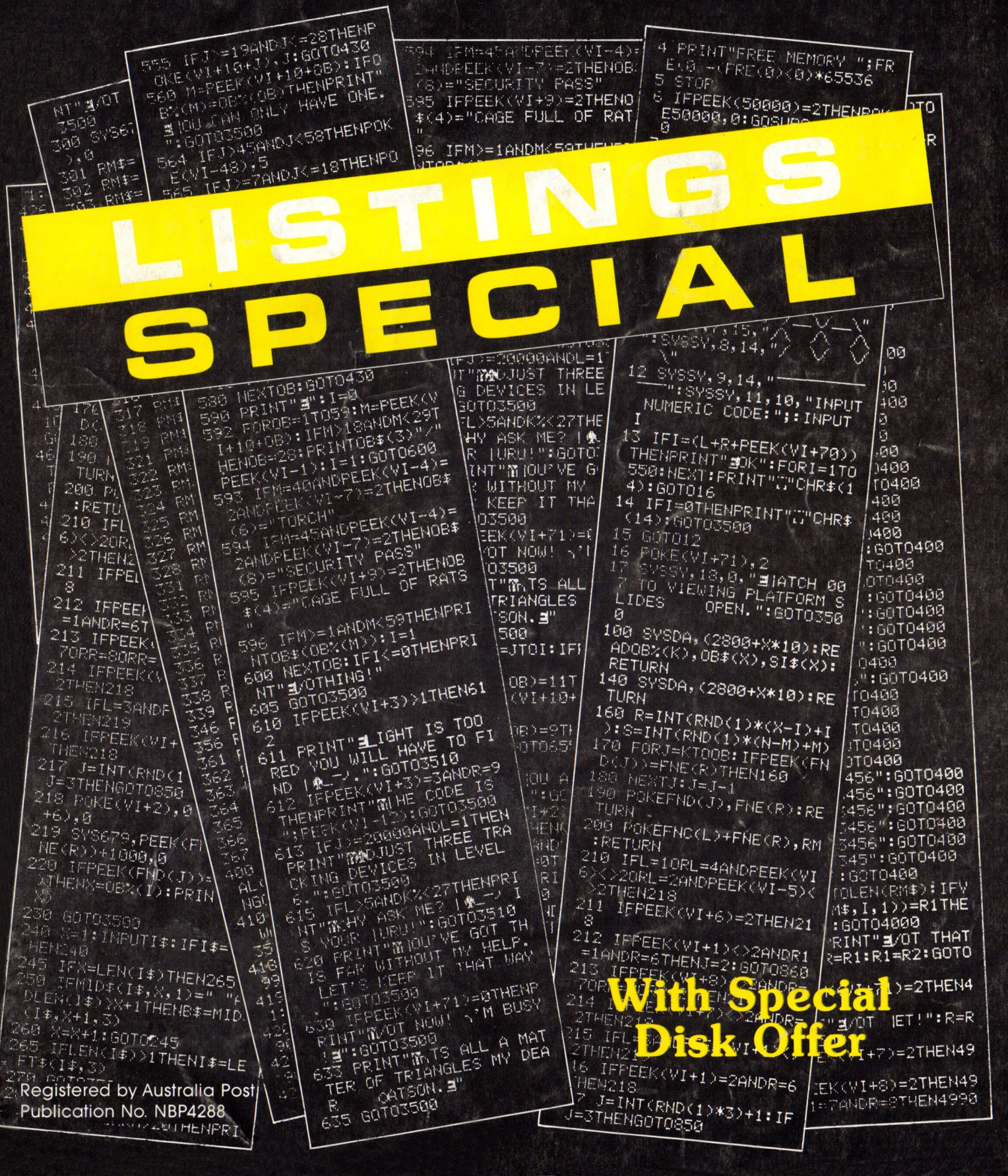
COMMODORE MAGAZINE

VOL 4 ISSUE 2

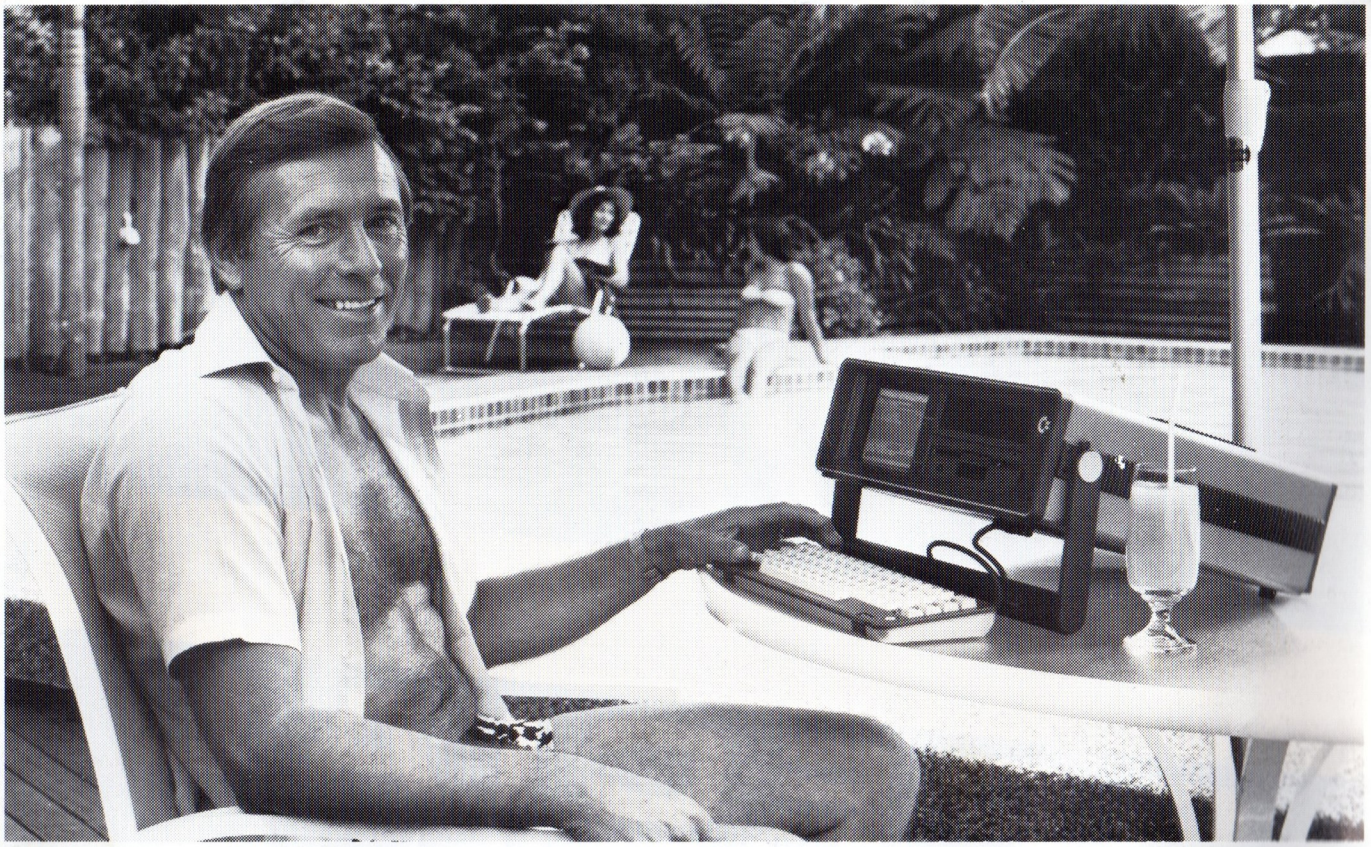
AUGUST 1984



LISTINGS SPECIAL

With Special Disk Offer

Registered by Australia Post
Publication No. NBP4288



Who's keeping up with Commodore?

The Commodore EXECUTIVE 64. A personal, portable computer with outstanding graphics, colour, music and astonishing computing capability, all in an easy-to-carry case.

The Commodore EXECUTIVE 64 is designed for the movers of this world. Designed to give you the power. Power at your fingertips. The power of 64K memory. The power to keep up. In the office. At home. Or in your home away from home.

commodore COMPUTER

Keeping up with you.

Commodore Business Machines Pty. Ltd.
5 Orion Road, Lane Cove NSW. 2066. (02) 427 4888.
Please send me more information on the Commodore Executive 64™

Name _____

Address _____

_____

Postcode _____ Phone _____ CM

BMS CC152

COMMODORE MAGAZINE

AUSTRALIAN COMMODORE USERS MAGAZINE VOLUME 4 NUMBER 2 JUNE 84

The objective of this magazine is to disseminate information to all users of Commodore computer products. This magazine contains a variety of information collected from Australian and New Zealand authors and other Commodore publications.

Contributions from all Commodore User Groups and individual users are encouraged. All copy and advertising should be addressed to the editor.

Commodore Magazine is published 6 time a year. Produced by Mervyn Beamish Graphics Pty Ltd., 82 Alexander Street, Crows Nest 2065, NSW. The cost of annual subscription is $A30 postage paid within Australia and $A38 overseas postage paid. Subscriptions available from your local Commodore Dealer or the Publisher.

PUBLISHER
Kim Books

EDITOR
Mervyn Beamish
Source No TCY6299

PRODUCTION & DESIGN
Harry Perlich

PRINTER
Langbridge Press

TECHNICAL EDITORS
Greg Perry
Paul Blair

EDITORIAL ASSISTANCE
Michael Spiretti

KIM BOOKS
82 Alexander Street,
Crows Nest 2065 N.S.W.
Phone: (02) 439 1827

LANGBRIDGE PRESS
Unit 2/27 Dickson Avenue
Artarmon 2064 N.S.W.
Phone: (02) 437 6089

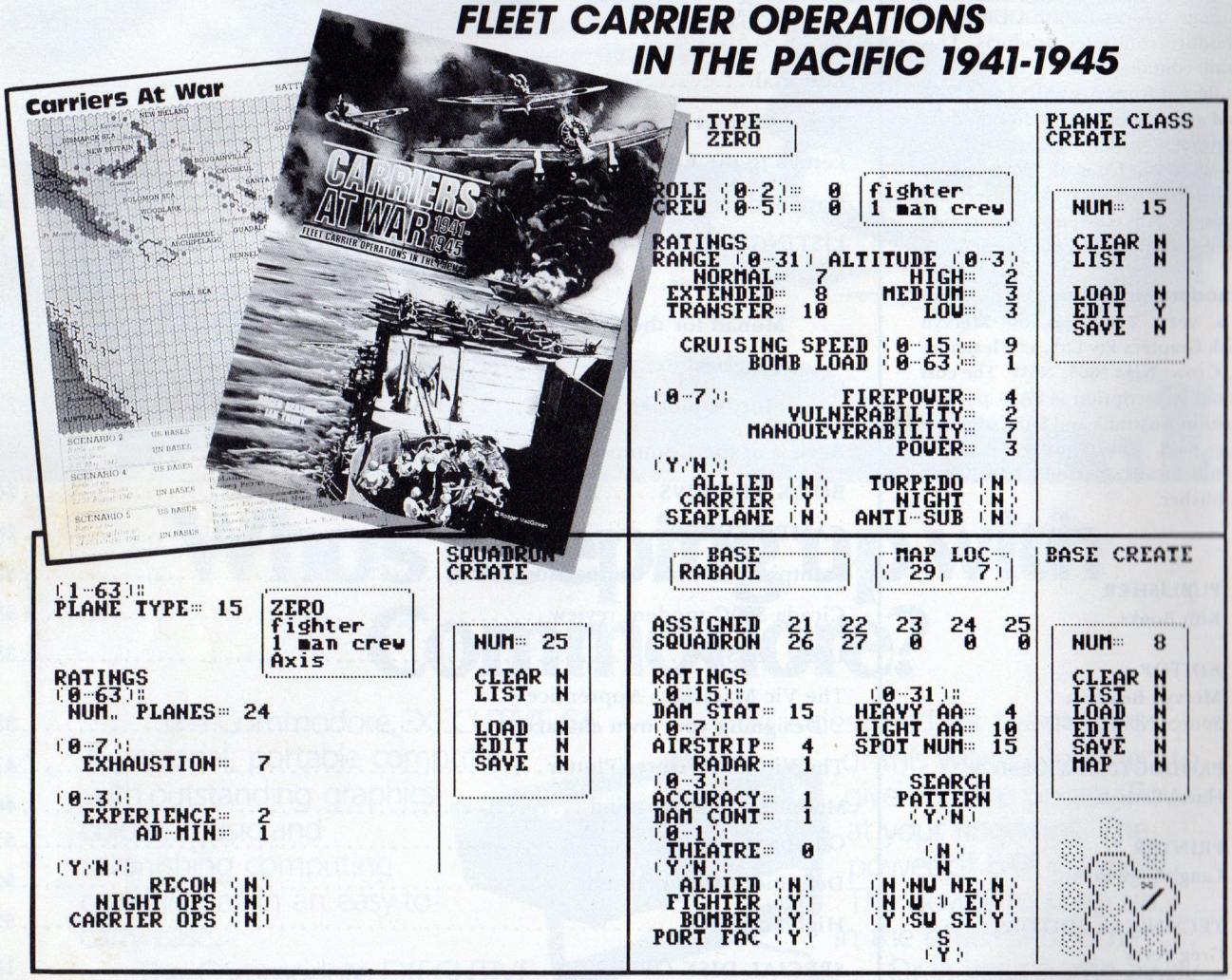
CONTENTS PAGE

ADVERTISERS PAGE

STRATEGIC STUDIES GROUP PROUDLY ANNOUNCES THE RELEASE OF ROGER KEATING AND IAN TROUT'S GREATEST GAMING ACHIEVEMENT . . .

Carriers At War

FLEET CARRIER OPERATIONS IN THE PACIFIC 1941-1945



'CARRIERS AT WAR' **will recreate for you the 5 crucial carrier battles which shaped the course of the Pacific War. Up to six players per side can take the roles of, amongst others, Yamamoto, Ozawa, Nagumo and Mikawa or Nimitz, MacArthur, Halsey and Fletcher. In addition, an introductory scenario simulating the destruction of the US Pacific Fleet at Pearl Harbour will gently introduce new gamers to a satisfying and rewarding experience.**

The complex interactions between air and naval operations which characterized this period are faithfully presented in the style only Roger Keating's swift and precise machine coding can reproduce. Driven by an easy to use order menu, the game systems encourage players to concentrate upon the developing conflagration; not upon the game mechanics necessary to implement their strategic decisions.

'CARRIERS AT WAR' is an exacting historical simulation, a programming masterpiece and, above all, a delight to play.

BUT THAT'S NOT ALL . . . Every creative gamer with even a passing interest in the Pacific War will appreciate the comprehensive GAME DESIGN KIT which complements the historical scenarios. You can use this kit to create simple or complex variations to the historical scenarios . . . or you can create entirely new scenarios set in any theatre of WWII. At your disposal for each scenario are . . . ★ an 84 by 72 hex-grid at 20 nautical miles per hex which reproduces an area in excess of 3 million square miles ★ 63 individual aircraft types ★ 127 air squadrons which can accommodate over 4000 aircraft ★ 24 land bases ★ 63 ship classes ★ 48 task groups into which are allocated up to 32 carriers and 215 other ships ★ 2 land and 4 naval command positions per side ★ detailed weather creation and forecasting routines ★ national doctrine and scenario briefing routines ★ . . . ***You really can do it yourself.*** **To prove it, and to show how easy it is to use, the design routines are graphically illustrated with an entirely new scenario recreating the Japanese carrier raid on Ceylon, April 1942.**

Available August 1984 for the **Apple II Family (64K)** and the **Commodore 64** only **$50.00** at all good software and game retailers or direct from Strategic Studies Group, 336 Pitt St., Sydney 2000 Australia – (02) 264-7560. Customers in the United States can send their cheque or money order to Strategic Studies Group (US), 1747 Orleans Ct., Walnut Creek, Ca. 94598

EDITORIAL

MERVYN BEAMISH

All the ripples associated with a change of publisher have not yet subsided but it was very welcome to receive so many positive and encouraging letters and comments despite it. Even more than that, to see the speedy growth in subscriber numbers.

Of course there were a few less positive letters but even in this department we received more than a 65% subscription renewal. – Thanks very much for your support!

In this issue you will see that we have commenced a few new items; First a series of projects – major software items which will give the reader a library of inexpensive but top quality software primarily in the area of Utilities. We start with MONAD written by Paul Blair. This issue we publish the program and disk; Next issue the operations manual. Secondly we've published Greg Perry's NICE LISTER, also on disk. This program will be published in a number of Australian magazines as it is an attempt to develop a standard for BASIC program listings within Australia. Making software easier to enter off the printed page. Thirdly, the Vic Magician has hired an Aprentice – Mike Spiretti. His collumn starts in this issue.

There are a number of other changes that you will note within the magazine. In this issue we've featured LISTINGS and next issue will be EDUCATION.

We hope to bring you a comprehensive guide to educational software available for Commodore computers as well as articles, reviews, and listings based on the education theme.

Bye the way! User groups, please get in touch with us, as we have something coming up that you should know about.

MERVYN BEAMISH
Editor

Mervyn Beamish – Editor (standing)
Harry Perlich – Production & Design

News

News Releases

PERSONAL COMPUTER SHOW '84

Between the 18th July and 21st July the WORLD TRADE CENTRE in Melbourne displayed hundreds of different computers in the national Personal Computer Show. The whole exhibition was crammed into three large floors with over 90 exhibitors. There were all types of computers at the show, from a $150 Vic-20 to a $40 000 business system.

Commodore was there displaying its oldest and newest computers available. Commodore displayed two new machines that will be available before Christmas, – the first was the VIC-16, this machine was the same as the Vic-20 but with an inbuilt SUPER EXPANDER, 40 Column screen, slightly more memory and a darker casing, as well as a few other features. The VIC-16 will cost around $200. The other new computer was the CBM 364, this had a new structured design and inbuilt software, more of a follow up of the CBM 64. No Price available yet.

As well as computers, there were booksellers, computer stationers, software & hardware displays and there was about five different makes of disk on show. There were also robots who drew maps and diagrams. Another thing I noticed at the show was the variety of computer club representatives. The show had its bad points. The isles between each stand were not very wide, especially when thousands of people were among them. I was also annoyed when I reached each floor of displays as I had to show my ticket which was small and could easily be lost. If you got hungry you were pretty much by yourself unless you were rich because the food available was small snacks that cost a bomb – no meat pie or hot dog in sight! Other than these minor faults the show was a great success and I can agree with the organisers that there was a computer for everyone.

The entrance fee was $4, though discount tickets were available. Also included in the price was a descriptive catalogue and entry into some large competitions. The thing I liked about the show was that you could operate the computers for yourself – even some of the large machines, without 'DONT TOUCH UNLESS YOU BUY' yelled at you. The salespeople were extremely helpful and tried to quote the lowest possible price. Of course there were show specials and in every stand you went to you were likely to leave with about eight leaflets – I myself collected about two-hundred.

Another very good extra at the show was the free courses. You could book yourself for a small course on using the Commodore 64 if you wished, or the Spectrum or even a large business machine for no cost at all!!

It's a pity the show was only on for three days, as a lot of time and trouble had gone to set the show up and many people missed out because the show was only on one non-working day (Saturday), the other two were working days. This was the third PERSONAL COMPUTER exhibition and if future exhibitions are as good as this years one, then I would not hesitate in recommending anyone to attend.

Michael Spireti

COMPUTERMATE PRODUCTS

Computermate Products (Australia) Pty. Ltd. (CMP) is a newly formed Australian company whose objectives are to secure, from both local and overseas sources, the best available range of software and accessories compatible with the leading brands of Personal Computers sold in Australia.

Presently there are over 300,000 Personal Computers installed in Australia homes, schools and small businesses, thus creating an enormous market for high quality, easy to use and dependable software and accessories. Ray Firth of Sydney and John Payne of Canberra recognised the potential for growth in the software and accessories market and in May 1984 set up the manufacturing and distributing company, CMP, to cater for these ever increasing consumer needs and demands.

Ray has been largely responsible for introducing and establishing Commodore's VIC 20 and C64 computers and a range of 3rd party software into Electrical Retailers in N.S.W. and the A.C.T. John has a retail background and owns the electrical retail stores "Electricland" in the Canberra suburbs of Phillip and Belconnen, together with a wholesale company that services Electrical Retailers in the A.C.T., the South Coast, the Riverina and Albury/Wodonga areas of N.S.W.

CMP have secured the Sales Agency for CBS Electronics' Adam Computer, Colecovision Videogames Computer and their entire range of osftware for these two machines and the Commodore 64, Atari, Apple and IBM Personal Computers.

Amongst other products that CMP will distribute nationally, are a range of high quality Blank Diskettes from Wabash, together with a new series of Audio/Visual Training and Self-teaching tapes on Personal Computers, Peripherals and Application Software.

Manufacturing, distribution and administration facilities for CMP are located in Sydney at 9 High Street, Mt. Kuring-Gai. N.S.W. 2080. Telephone; 02-457-8118.

News Releases

COMMODORE LAUNCHES 'VIC'S" BROTHER

An advanced home computer with expanded capabilities has been released in Australia by Commodore.

The new Commodore 16 micro-computer, which was released at the Personal Computer Show (PC '84) in Melbourne, is aimed at first-time users, but carries features normally found on computers in higher price brackets.

It will carry a recommended retail price of around $199 – similar to the VIC-20.

However the VIC-20 won't be discontinued. The Commodore 16 just provides an alternative computer for buyers in this popular price bracket".

It is not fully compatible with the VIC-20 or the Commodore 64 in terms of software, so an entirely new machine was developed to meet the demands of first-time computer users who are demanding a wider variety of computers in this price bracket.

It has been termed "the brother of the VIC-20."

The Commodore 16 features the full-size professional keyboard which has become familar to computer purchasers through the Commodore 64 and VIC-20.

But there the similarities begin to end, because the Commodore 16 has a very advanced BASIC programming language (version 3.5), which has more than 75 programming commands, including full graphics plotting and program editing.

It also features a new "Help" key which will be a boon to learner programmers.

The "Help" key locates syntax errors in programs.

The Commodore 16 has 16K of Random Access Memory (RAM) with 12K available for Basic programs.

Commodore supplies comprehensive manuals for the Commodore 16, each written in the form of a training course.

Like the VIC-20, the Commodore 16 can be linked to a Commodore datassette, a Commodore dot matrix printer, the new Commodore daisy wheel printer, Commodore disk drive and a colour monitor from Commodore or through the UHF channel of a normal television set.

The Commodore 16 should provide a real alternative for home users seeking a low cost introduction to computers and this unit will be supported by a comprehensive range of entertainment and educational software.

COMMODORE'S NEW DAISY WHEEL PRINTER RELEASED

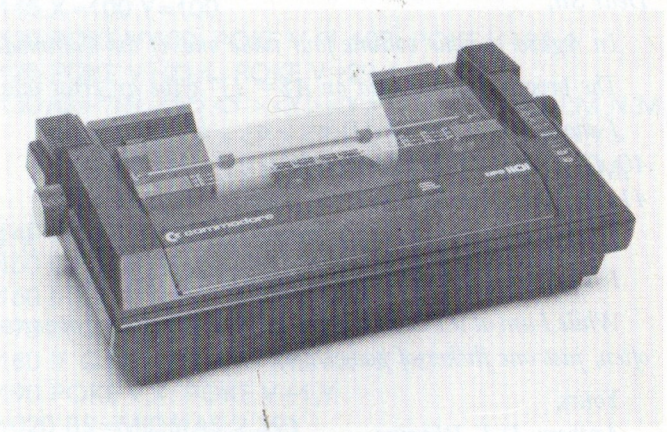
A new bi-directional printer which is compatible with Commodore's range of home and personal micro-computers, has just been released.

It is the DPS 1101 Daisy Wheel Printer, which was released by Commodore at the Personal Computer Show (PC '84) in Melbourne.

The daisy wheel printer is the first letter-quality printer produced by Commodore for its home computer range, including the Commodore 64, VIC-20 and new machines Commodore 16 and Commodore Plus/4.

The printer features a friction feed for letter heads and standard paper and its 100-character print wheel contains upper and lower case, numerals and symbols.

Print wheels are compatible with Triumph-Adler wheels, providing a wide range of type faces and styles, including italics, gothic and pica.



The 1101 printer will print at the rate of 18 characters per second and has a variety of special print features which can be used simultaneously, including underlining, bold print, shadow print, proportional spacing, horizontal and vertical tabulation.

Continued on page 44

Letters to the Editor

Dear Mervyn,

I was most excited this morning to receive my first edition of the "Commodore Magazine" since paying my annual subscription of thirty dollars on 21.1.84. I must admit I had almost given up hope, and was feeling most disillusioned with your firm.

I am impressed with the magazine but find myself in quite a dilemma. Does my annual subscription begin from this (June 84) issue, or am I going to receive back-issues or compensation for the issues I have missed?

Yours faithfully, (Mrs) Lynda Lenne
Tatura, Victoria

ED.

Your subscription covers Vol. 4, Nos. 1–6. December/January issue of the magazine was the last put out by the previous publisher. It was Vol. 3, No. 6 and was the last issue for 1983 subscriptions.

We will be running the Commodore Magazine on the financial year from now on. That is; Vol.4, No. 1 is June '84 to Vol.4, No.6 in April '85. Volume 5 commencing in June '85.

Dear Editor,

After previously using the VIC-20, I have found an annoying aspect on using the Commodore 64. This aspect concerns the screen going blank on tape access. Is there a machine code subroutine or any other command (perhaps a POKE) to prevent this from happening?

Hope you can assist.

C. Spence
Northcote, Victoria *P.S. We are interested in completing our set of Commodore magazines.*

ED.

1. No!

2. We do not, at present, hold back issues prior to Volume 4 (current volume). You could try computer Reference Guide. c/o – McGraw Hill

It is our intention to publish an index for volumes 1–3 in later issues.

Dear Sir,

In regard to your volume four issue one, of the Commodore Magazine on page 25, the Hi-Resolution Graphics;

The program when used on A$="1)" gave an error message at line 220.

I changed line 40 & 41;

```
40 IF Y<=0 THEN Y=Y+199
41 IF Y>=200 THEN Y=Y-200
```

Direction and Instruction left out how to go down *X = DOWN*

I hope I did the right adjustments to this program.

While I am at it I would like to get hold of a battery operated power supply to operate my C64 as we have power problems quite often, just one flicker of power and she dies on me.

Yours,
Anthony D.T. Wiggins
Deer Park, VIC

ED.

Strange as it may seem we've had a number of line alterations for this program. On my computer the program runs well as is. However we've published this alteration in case others are having trouble. They do seem to be quite genuine corrections.

Cannot help yet with the battery power unit.

COMMODORE DOCTOR

Edited by Greg Perry

Welcome to the Commodore Magazine's new question and answer column. As one of the new technical editors, I have volunteered myself for the front line. If you have any queries about the operation of the C64, VIC, or 3000/4000/8000 Commodore computers, please send them to

Commodore Doctor,
The Commodore Magazine,
82 Alexander Street,
Crows Nest, NSW 2065.

Most of my experience is with the C64 and 4000/8000 series, but VIC users are also welcome to send queries and we will pass them on to our VIC expert.

Because of the time factor, we cannot solve your hardware problems, but, hopefully, we can shed some light on the programming side and technical aspects of your Commodore computer.

We also thrive on feedback. If you have any comments or favourite niffty routines for doing smart things, we would love to hear about them.

Being the first edition of this new feature, I obviously do not have any 'real' questions to answer. This makes life easy for me, no difficult questions to struggle over this month! What follows are some of the often asked or more difficult questions which have been asked at recent user group meetings. For future issues, we hope you will support the magazine with your feedback.

Q. I would like a program to provide a direct hardcopy of the screen on my C64. Is one available?

A. There are several available. A harcopy facility of the normal character screen is relatively easy. A dump of a high resolution screen and sprites is considerably more involved. High resolution screen dumps require 1000 specific characters to be created and output to the printer, and the different makes of printers will give unpredictable results. The following program will work on any printer connected to the serial IEEE bus of the C64 with any interface with device number 4 and secondary address 0.

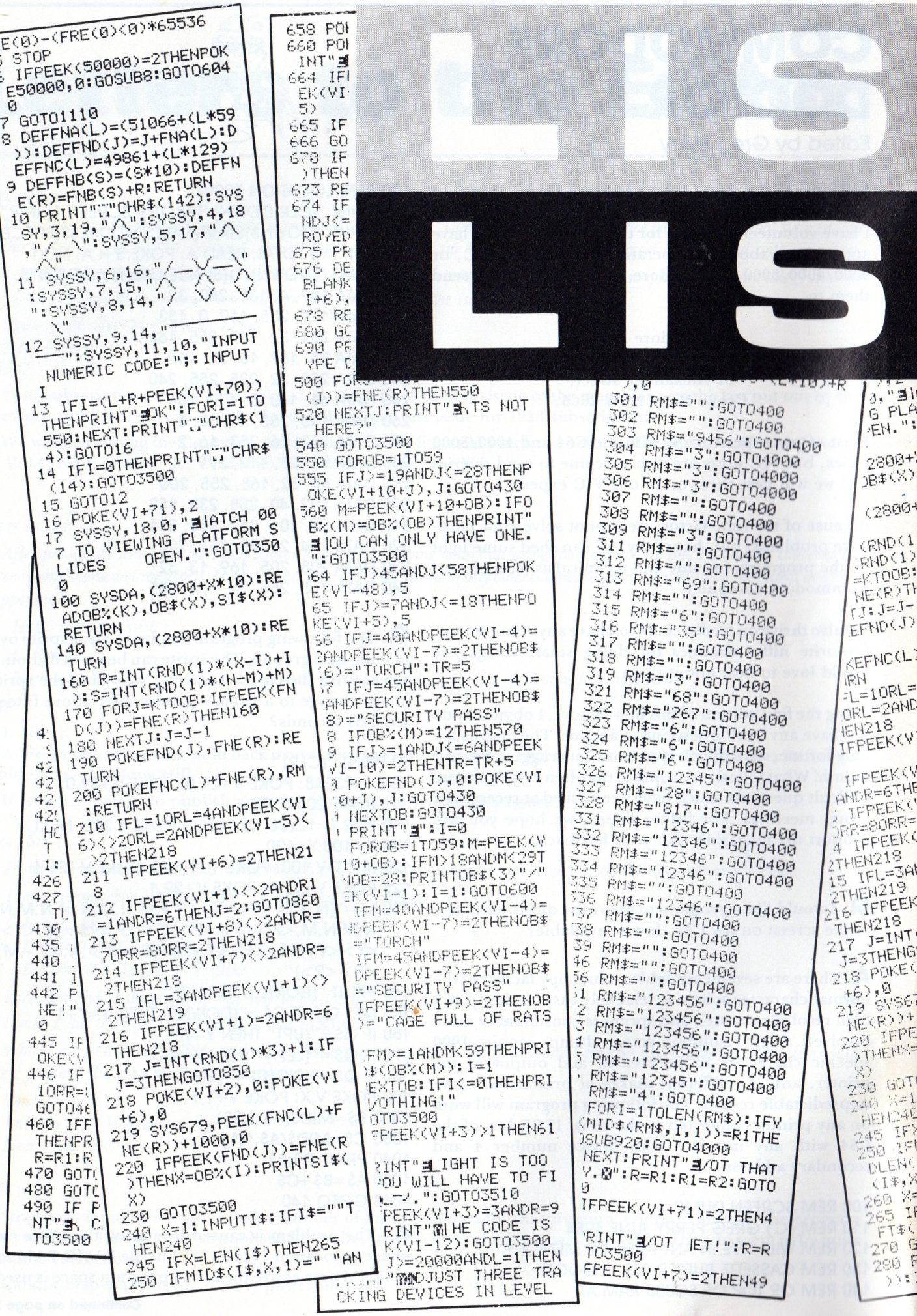
```
100 REM SCREEN DUMP
110 REM (C) GREG PERRY JUNE 1984
120 REM WILL LIVE IN ANY AREA OF MEMORY
130 REM CASSETTE BUFFER 828 IS GOOD.
140 REM OR TOP OF $C000 RAM AT
150 REM LOCATION 52992
160 PRINT "(CLR,DOWN)"TAB(10)"SCREEN DUMP"
170 INPUT "(DOWN3)START(SPACE)ADDRESS(SPACE)";S
180 FOR I=0 TO 74: READ A: POKE S+I,A: NEXT
190 PRINT "(DOWN)TO(SPACE)USE(SPACE)SYS"S
200 DATA 169, 4, 133, 252, 32
210 DATA 177, 255, 169, 0, 133
220 DATA 251, 32, 147, 255, 162
230 DATA 25, 169, 13, 32, 168
240 DATA 255, 32, 225, 255, 240
250 DATA 46, 160, 0, 177, 251
260 DATA 133, 253, 41, 63, 6
270 DATA 253, 36, 253, 16, 2
280 DATA 9, 128, 112, 2, 9
290 DATA 64, 32, 168, 255, 200
300 DATA 192, 40, 208, 230, 152
310 DATA 24, 101, 251, 133, 251
320 DATA 144, 2, 230, 252, 202
330 DATA 208, 205, 169, 13, 32
340 DATA 168, 255, 76, 174, 255
```

Q. The following program displays a clear sprite over a moving background. The sprite can be moved about the screen with the cursor controls. Why does the sprite image change to a strance pattern after about fifteen seconds seconds?

```
10 PRINT "(CLR)"
100 V=53248: POKE V+21,0: POKE V+39,0:
    POKE 2040,192
110 FOR T=12288 TO 12352: POKE T,255: NEXT
115 X=100:Y=100
120 POKE V,100: POKE V+1,100: POKE V+21,1
125 POKE V+23,1: POKE V+29,1
130 A$="(N,<Y><Y><Y><Y>,M,N,M,N,M,N,M,N,M,
    N,M,N,M,<P><P><P><P><P><P>,N,<Y>
    <Y><Y><Y><Y><Y>,M,<P><P>,N,<Y>,M,
    <P><P>)"
140 PRINT "(HOME,DOWN12)"
150 GET Q$: IF Q$="(DOWN)" THEN Y=Y+1
160 IF Q$="(UP)" THEN Y=Y-1
170 IF Q$="(LEFT)" THEN X=X-1
180 IF Q$="(RIGHT)" THEN X=X+1
190 POKE V,X: POKE V+1,Y
1020 B$=MID$(A$,2,39)
1030 C$=MID$(A$,1,1)
1040 PRINT C$;B$
1050 A$=B$+C$
1060 GOTO 140
```

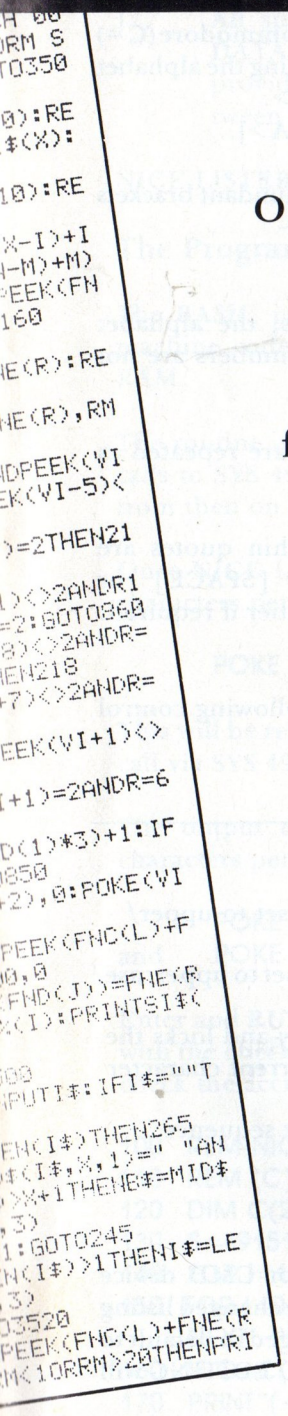
A. The problem is caused by storing the sprite data image at location 12288-12352 in the BASIC RAM area. All RAM area above the actual program space is used by

Continued on page 50


LIS
LIS

TINGS

TINGS



One of the most exciting aspects of reading computer magazines is the listings section. Computerists can become addicted to them and some collect so many listings while only ever entering and running a few.

Some utilize listings as learning tool to see how the other fellow has tackled various problems, while others adapt them to their own needs.

We have set out on a path of assisting our readers in getting the most out of the Commodore Magazine listings.

First by adopting an easy to read listing standard – refer NICE LISTER.

Secondly by embarking on a number of 'Major' software listings to act as tools and extensions that will give readers greater flexibility with their Commodore and the ability to interchange programs using standard extended BASIC (later issues) – refer MONAD.

Thirdly by making some of our longer listings available on inexpensive disks – refer DISK OFFER.

Good Computing!!

NICE LISTER

by Greg Perry

Introduction

How many times have you struggled, in a not always successfull attempt, to decipher a listing of a Commodore program in a book or magazine? I've given up counting!

There are four problems which stem from Commodore's unique set of graphics, colour, cursor, and other control characters.

First, control characters appear clearly in reverse field on the screen, but often appear as indecipherable 'blobs' on paper.

Second, most non-Commodore printers will not print these characters anyway! (Although the newer interfaces generally provide some form of conversion.)

Third, it was ok in the early days with the PETS, when there were only 10 control characters, but, with the VIC and C64 and their associated colours, there are now more than 30 control characters as well as shifted and Commodore key graphics and function keys!

And fourth, everyone seems to be using a different system to represent the different symbols. COMPUTE! magazine started out with a fairly sensible system, then, along came RUN magazine with a different system. On top of this, we, in Australia, end up with an outrageous mixture of listing conventions depending on which magazine the particular program has been lifted from.

Without a few tries on the keyboard, I can not remember what all the normal symbols represent, let alone the different conventions which are used.

The NICE LISTER was borne out of a desire by a few of us to attempt to set a default standard for ALL Commodore listings which are published in Australian magazines and books (yes – probably a utopian ideal I admit, but I do live in Queensland), and to provide a standard, transportable, public domain program for users of non-Commodore printers.

After several months of trials and minor alterations, the 'final' version is presented below. The listings it produces do take some getting used to but most of the symbols are easily understood.

Conventions

1. All control, colour, function, and shifted and Commodore key graphics are converted to 'words' (or the abbreviations as represented on the keyboard) enclosed in square brackets []. For example, [DOWN], [CLR] and so on.

2. Multiple cursor controls are represented by one word plus a number. For example, [DOWN15].

3. Shifted graphics (right-hand symbol on key) are converted to the corresponding alphabet character enclosed in square brackets. A shifted 'S' heart character becomes [S].

4. Any character accessed by the Commodore (C=) key is indicated by further enclosing the alphabet character inside the symbols <>.
A Commodore 'A' becomes [<A>].

5. With multiple characters, the redundant brackets][are replaced by a comma as:–
[CLR,DOWN5,WHT,<A>]

6. With multiple shifted graphics, the alphabet character is simply repeated, numbers are not used as [AAAAAAAAAA].

7. Mutiple Commodore graphics are repeated as [<A>,<A>,<A>,<A>].

8. Spaces and shifted spaces within quotes are represented by the words [SPACE] or [SHSPACE] followed by a number if required. For example, [SPACE15].

9. Extra words are used for the following control characters.

Keyword	CHR$	
DEL (CRTL-T)	20	
INS	148	
TEXT (CTRL-N)	14	converts character set to upper/lowercase mode.
GRAPH	142	converts character set to uppercase/graphics mode.
LOCK (CTRL-H)	8	disables the C= key and locks the keyboard in the current character mode.
UNLOCK (CTRL-I)	9	enables the C= key sequence.

10. The routine normally checks for CMD device number 4 and ONLY outputs the changed listing to the printer. This may be changed to default to screen (device number 3, but NO EDITING will

then be possible), or disk (device number 8) for printing sequential files of listings to take into a wordpro.

(This may be done by OPEN 4,8,4:CMD4:LIST etc.)

11. Printed output is monitored and line breaks inserted after approximately 75 characters. The subsequent lines indents 6 spaces.

12. All spaces, except within quotes or REM or DATA lines, are ignored and NICE LISTER provides standardised output of one space between each BASIC keyword.

NICE LISTER will NOT change any other characters.

The Program

The BASIC program "NICEBOOT" will transfer the machine code routine out of the way into the $C000 RAM.

The routine is enabled or disabled by alternate system calls to SYS 49152. Only one call is required initially, from then on all listed output will be converted.

Once NICE LISTER has been enabled the number of characters per line may be changed by

POKE 251,line length.

This will be reset to the default value of 75 on every new call via SYS 49152.

The output device number and default number of characters per line may be changed with care by

POKE 49187,line length
and POKE 49201,device no.

Enter and RUN the following program. Take great care with the checksums in Lines 260-280. These are used to check the accuracy of each DATA block of 50 bytes.

```
100 REM NICE LISTER BOOT
110 REM (C) GREG PERRY 1984
120 DIM C(20): FOR I=1 TO 17: READ C(I): NEXT
130 S=49151
140 FOR I=1 TO 16:C=0: PRINT I,
150 FOR J=0 TO 49: READ A;C=C+A:S=S+1: POKE S,A:
    NEXT : PRINT C,
160 IF C=C(I) THEN PRINT "(BLK)OK": GOTO 180
170 PRINT"(<RED>)CHECKSUM(SPACE)ERROR":STOP
180 NEXT : PRINT I,
190 C=0: FOR J=0 TO 32: READ A:C=C+A:S=S+1:
    POKE S,A: NEXT : PRINT C,
200 IF C=C(I) THEN PRINT "OK": GOTO 220
210 PRINT"(<RED>)CHECKSUM(SPACE)ERROR":STOP
220 PRINT "(CLR,DOWN10)CONGRATULATIONS
    (SPACE)YOU'VE(SPACE)MADE(SPACE)IT!"
230 SYS 49152
240 :
250 REM BLOCK CHECKSUMS
260 DATA 5607,6595,6832,6182,5882,6573
270 DATA 6736,7102,5765,7565,8563,5348
280 DATA 5873,6224,5617,3247,2097
290 :
300 REM DATA BLOCK 1
310 DATA 173, 7, 3, 201, 192
320 DATA 208, 17, 169, 26, 141
330 DATA 6, 3, 169, 167, 141
340 DATA 7, 3, 169, 43, 160
350 DATA 195, 76, 30, 171, 169
360 DATA 45, 141, 6, 3, 169
370 DATA 192, 141, 7, 3, 169
380 DATA 75, 133, 251, 169, 206
390 DATA 160, 194, 76, 30, 171
400 DATA 72, 166, 154, 224, 4
410 :
420 REM DATA BLOCK 2
430 DATA 240, 4, 104, 76, 26
440 DATA 167, 192, 4, 208, 2
450 DATA 132, 249, 104, 16, 98
460 DATA 201, 255, 208, 8, 133
470 DATA 252, 32, 134, 193, 76
480 DATA 246, 166, 36, 15, 48
490 DATA 82, 56, 233, 127, 162
500 DATA 255, 134, 254, 201, 16
510 DATA 240, 4, 201, 4, 208
520 DATA 3, 232, 134, 254, 170
530 :
540 REM DATA BLOCK 3
550 DATA 132, 73, 160, 255, 202
560 DATA 240, 8, 200, 185, 158
570 DATA 160, 16, 250, 48, 245
580 DATA 165, 73, 201, 4, 240
590 DATA 18, 200, 185, 158, 160
600 DATA 41, 127, 136, 166, 158
610 DATA 133, 158, 224, 61, 240
620 DATA 3, 32, 165, 193, 200
630 DATA 185, 158, 160, 16, 13
640 DATA 41, 127, 32, 134, 193
650 :
660 REM DATA BLOCK 4
670 DATA 32, 169, 193, 164, 73
680 DATA 76, 246, 166, 32, 134
```

```
690  DATA 193, 208, 232, 162, 255
700  DATA 134, 252, 201, 32, 208
710  DATA 14, 36, 15, 48, 10
720  DATA 36, 254, 48, 3, 32
730  DATA 134, 193, 76, 246, 166
740  DATA 132, 73, 72, 197, 158
750  DATA 208, 2, 169, 0, 133
760  DATA 158, 104, 32, 78, 193
770  :
780  REM DATA BLOCK 5
790  DATA 240, 6, 32, 134, 193
800  DATA 76, 246, 166, 32, 89
810  DATA 193, 169, 91, 32, 134
820  DATA 193, 36, 250, 48, 5
830  DATA 169, 60, 32, 134, 193
840  DATA 200, 185, 29, 194, 48
850  DATA 5, 32, 134, 193, 208
860  DATA 245, 41, 127, 32, 134
870  DATA 193, 36, 250, 48, 5
880  DATA 169, 62, 32, 134, 193
890  :
900  REM DATA BLOCK 6
910  DATA 164, 73, 200, 177, 95
920  DATA 240, 43, 197, 158, 208
930  DATA 8, 36, 253, 16, 23
940  DATA 230, 2, 208, 239, 166
950  DATA 2, 240, 15, 232, 136
960  DATA 132, 73, 169, 0, 133
970  DATA 2, 133, 158, 32, 205
980  DATA 189, 230, 249, 164, 73
990  DATA 200, 177, 95, 240, 5
1000 DATA 32, 78, 193, 240, 10
1010 :
1020 REM DATA BLOCK 7
1030 DATA 169, 93, 32, 134, 193
1040 DATA 164, 73, 76, 246, 166
1050 DATA 197, 158, 8, 133, 158
1060 DATA 132, 73, 32, 89, 193
1070 DATA 40, 208, 4, 36, 253
1080 DATA 16, 145, 169, 44, 32
1090 DATA 134, 193, 208, 138, 162
1100 DATA 101, 221, 183, 193, 240
1110 DATA 3, 202, 16, 248, 96
1120 DATA 160, 255, 132, 253, 132
1130 :
1140 REM DATA BLOCK 8
1150 DATA 250, 138, 201, 71, 144
1160 DATA 8, 56, 233, 31, 170
1170 DATA 169, 0, 133, 250, 202
1180 DATA 48, 8, 200, 185, 29
1190 DATA 194, 16, 250, 48, 245
1200 DATA 192, 255, 240, 8, 192
1210 DATA 145, 144, 4, 169, 0
1220 DATA 133, 253, 96, 169, 32
1230 DATA 32, 71, 171, 230, 249
1240 DATA 166, 249, 228, 251, 144
1250 :
1260 REM DATA BLOCK 9
1270 DATA 19, 72, 32, 215, 170
1280 DATA 162, 0, 169, 32, 32
1290 DATA 71, 171, 232, 224, 5
1300 DATA 208, 248, 134, 249, 104
1310 DATA 96, 166, 252, 16, 13
1320 DATA 201, 94, 240, 9, 201
1330 DATA 63, 144, 5, 32, 132
1340 DATA 193, 133, 252, 96, 19
1350 DATA 147, 17, 145, 29, 157
1360 DATA 18, 146, 20, 148, 32
1370 :
1380 REM DATA BLOCK 10
1390 DATA 160, 142, 14, 8, 9
1400 DATA 133, 137, 134, 138, 135
1410 DATA 139, 136, 140, 144, 5
1420 DATA 28, 159, 156, 30, 31
1430 DATA 158, 129, 149, 150, 151
1440 DATA 152, 153, 154, 155, 186
1450 DATA 193, 194, 195, 196, 197
1460 DATA 198, 199, 200, 201, 202
1470 DATA 203, 204, 205, 206, 207
1480 DATA 208, 209, 210, 211, 212
1490 :
1500 REM DATA BLOCK 11
1510 DATA 213, 214, 215, 216, 217
1520 DATA 218, 219, 221, 169, 192
1530 DATA 164, 176, 191, 188, 172
1540 DATA 177, 187, 165, 180, 162
1550 DATA 181, 161, 182, 167, 170
1560 DATA 185, 175, 171, 178, 174
1570 DATA 163, 184, 190, 179, 189
1580 DATA 183, 173, 166, 220, 168
1590 DATA 223, 72, 79, 77, 197
1600 DATA 67, 76, 210, 68, 79
1610 :
1620 REM DATA BLOCK 12
1630 DATA 87, 206, 85, 208, 82
1640 DATA 73, 71, 72, 212, 76
1650 DATA 69, 70, 212, 82, 86
1660 DATA 211, 79, 70, 198, 68
1670 DATA 69, 204, 73, 78, 83
1680 DATA 212, 83, 80, 65, 67
1690 DATA 197, 83, 72, 83, 80
1700 DATA 65, 67, 197, 71, 82
1710 DATA 65, 80, 200, 84, 69
1720 DATA 88, 212, 76, 79, 67
1730 :
1740 REM DATA BLOCK 13
```

```
1750 DATA 203, 85, 78, 76, 79
1760 DATA 67, 203, 70, 177, 70
1770 DATA 178, 70, 179, 70, 180
1780 DATA 70, 181, 70, 182, 70
1790 DATA 183, 70, 184, 66, 76
1800 DATA 203, 87, 72, 212, 82
1810 DATA 69, 196, 67, 89, 206
1820 DATA 80, 85, 210, 71, 82
1830 DATA 206, 66, 76, 213, 89
1840 DATA 69, 204, 60, 66, 76
1850 :
1860 REM DATA BLOCK 14
1870 DATA 75, 190, 60, 87, 72
1880 DATA 84, 190, 60, 82, 69
1890 DATA 68, 190, 60, 67, 89
1900 DATA 78, 190, 60, 80, 85
1910 DATA 82, 190, 60, 71, 82
1920 DATA 78, 190, 60, 66, 76
1930 DATA 85, 190, 60, 89, 69
1940 DATA 76, 190, 192, 193, 194
1950 DATA 195, 196, 197, 198, 199
1960 DATA 200, 201, 202, 203, 204
1970 :
1980 REM DATA BLOCK 15
1990 DATA 205, 206, 207, 208, 209
2000 DATA 210, 211, 212, 213, 214
2010 DATA 215, 216, 217, 218, 171
2020 DATA 173, 220, 170, 17, 78
2030 DATA 73, 67, 69, 32, 76
2040 DATA 73, 83, 84, 69, 82
2050 DATA 32, 86, 46, 49, 53
2060 DATA 48, 54, 56, 52, 32
2070 DATA 69, 78, 65, 66, 76
2080 DATA 69, 68, 13, 40, 67
2090 :
2100 REM DATA BLOCK 16
2110 DATA 41, 32, 49, 57, 56
2120 DATA 52, 32, 71, 46, 74
2130 DATA 46, 80, 69, 82, 82
2140 DATA 89, 44, 32, 66, 82
2150 DATA 73, 83, 66, 65, 78
2160 DATA 69, 13, 80, 69, 82
2170 DATA 77, 73, 83, 83, 73
2180 DATA 79, 78, 32, 84, 79
2190 DATA 32, 85, 83, 69, 32
2200 DATA 66, 85, 84, 32, 78
2210 :
2220 REM DATA BLOCK 17
2230 DATA 79, 84, 32, 84, 79
2240 DATA 32, 83, 69, 76, 76
2250 DATA 0, 17, 78, 73, 67
2260 DATA 69, 32, 76, 73, 83
2270 DATA 84, 69, 82, 32, 68
2280 DATA 73, 83, 65, 66, 76
2290 DATA 69, 68, 0
```

MONAD FOR THE C64 (PROJECT 1)

by Paul Blair

A machine code monitor is essential if you plan any form of excursion into machine code programming, or even if you only want to know more about the vitals of your computer. Sadly, in trying to do so many other good things with the Commodore 64, there wasn't enough space to build even a bare bones monitor into the machine itself.

This left no option but to soft-load (i.e., load a program into memory when the computer is first turned on) a monitor program. By now, there have been a number of commercial and public domain monitors available, but somehow they either didn't get it quite right, or (horrors!) were so bug-ridden as to be a threat to health. With an increasing interest in machine code programming, it was thought that the time was ripe to provide a well-thought out monitor for all to have. And so MONAD came into being.

MONAD is 4K (4096 bytes) of machine code that (in this version anyway) loads into the C64 at address $8000 (decimal 32768). This particular location was chosen for the base program so that it may be relocated from there either up or down in memory without too many tears. The program that follows is in the form of a BASIC self-loading program, with checksums to help you get the program entered correctly.

A full set of instructions on each of the monitor commands will also be provided in the next issue of the Commodore Magazine. You will probably be familiar with some of the commands provided in the monitor, but nevertheless read the instructions carefully, as there are some very nice features in MONAD that you might miss if you don't.

OK. Here comes MONAD. Don't try and type it all in one session – take it steadily and carefully. Enter 32 lines of DATA, then use the checksum lines at the top to check that each block of 512 bytes is correct before going on to the next block. Errors are more easily detected if the task is broken into smaller parts, I find.

If it all seems too much, refer our disk offer in this issue.

```
1000 REM: MONAD.A BASIC LOADER
1001 REM: LOCATION $8000
1002 :
1003 PRINT CHR$(147):PRINT"LOADING....":SR=32768:
     FH=36863:GOTO1028
1004 :
1005 REM: CHECKSUMS=RUN 1007
1006 :
1007 FORI=SRTOSR+511:READA:P1=P1+A:NEXT
1008 FORI=SR+512TOSR+1023:READA:P2=P2+:NEXT
1009 FORI=SR+1024TOSR+1535:READA:P3=P3+A:NEXT
1010 FORI=SR+1536TOSR+2047:READA:P4=P4+A:NEXT
1011 FORI=SR+2048TOSR+2559:READA:P5=P5+A:NEXT
1012 FORI=SR+2560TOSR+3071:READA:P6=P6+A:NEXT
1013 FORI=SR+3072TOSR+3583:READA:P7=P7+A:NEXT
1014 FORI=SR+3584TOSR+4095:READA:P8=P8+A:NEXT
1015 IFP1<>62892THENX=1:GOTO1024
1016 IFP2<>64238THENX=2:GOTO1024
1017 IFP3<>58905THENX=3:GOTO1024
1018 IFP4<>54359THENX=4:GOTO1024
1019 IFP5<>62181THENX=5:GOTO1024
1020 IFP6<>62210THEN X=6:GOTO1024
1021 IFP7{}65559THENX=7:GOTO1024
1022 IFP8<>51586THENX=8:GOTO1024
1023 PRINT"DATA CHECKS OK":END
1024 PRINT"DATA ERROR IN BLOCK"X:END
1025 :
1026 REM: LOADER PROGRAM
1027 :
1028 FORY=SRTOFH:READA:POKE Y,A:NEXT
1029 PRINT"SYS"SR"TO ACTIVATE 'MONAD.A'"
1030 NEW
1031 :
1032 DATA 173,23,3,201,128,240,51,169,189,162,137,
     141,52,3,142,53
1033 DATA 3,169,78,162,128,141,22,3,142,23,3,169,
     128,141,138,2
1034 DATA 173,36,3,172,37,3,192,141,240,16,141,254,
     2,140,255,2
1035 DATA 169,65,160,141,141,36,3,140,37,3,169,0,
     162,128,134,56
1036 DATA 133,55,32,89,166,162,253,154,169,67,133,
     254,208,18,32,204
1037 DATA 255,169,66,133,254,216,74,162,3,104,157,
     2,2,202,16,249
1038 DATA 104,105,255,141,1,2,104,105,255,141,0,2,
     186,142,6,2
1039 DATA 88,166,254,32,27,137,169,42,32,90,136,
     76,183,128,169,0
1040 DATA 141,22,2,162,255,154,162,13,169,46,32,90,
     136,32,89,137
1041 DATA 201,46,240,249,201,32,240,245,162,26,221,
     198,142,208,18,133
1042 DATA 251,138,10,170,189,202,143,133,193,189,
     203,143,133,194,108,193
1043 DATA 0,202,16,230,76,189,137,162,35,189,162,
     142,32,250,140,202
1044 DATA 208,247,160,59,32,47,137,32,56,140,32,10,
     137,32,224,136 1045
1045 DATA 76,126,128,32,130,136,176,248,32,213,136,32,
     10,137,133,254
```

```
1046 DATA 32,89,137,32,244,136,208,248,240,230,169,
     0,44,169,255,133
1047 DATA 255,32,207,136,240,8,32,135,136,176,53,
     32,213,136,32,38
1048 DATA 141,174,6,2,154,165,255,48,6,169,137,72,
     169,101,72,120
1049 DATA 173,0,2,72,173,1,2,72,173,2,2,72,173,3,2,
     174
1050 DATA 4,2,172,5,2,64,32,38,141,174,6,2,154,76,
     116,164
1051 DATA 76,189,137,169,4,197,154,240,18,133,184,
     133,186,169,0,133
1052 DATA 183,133,185,32,192,255,162,4,32,201,255,
     76,126,128,32,38
1053 DATA 141,76,126,128,169,0,44,169,1,133,147,
     169,0,240,6,169
1054 DATA 3,133,147,169,128,133,253,32,38,141,32,
     147,252,160,2,132
1055 DATA 36,132,186,136,132,183,132,185,132,144,
     32,207,136,240,52
1056 DATA 201,32,240,247,201,34,208,24,169,48,133,
     187,169,2,133,188
1057 DATA 32,207,136,240,31,201,34,240,10,145,187,
     230,183,200,208,240
1058 DATA 76,189,137,32,207,136,240,12,32,160,136,
     176,243,133,186,32
1059 DATA 207,136,208,3,76,88,130,36,253,16,20,32,
     115,136,176,224
1060 DATA 32,99,136,32,179,137,133,174,134,175,32,
     207,136,240,11,32
1061 DATA 115,136,176,204,165,253,9,64,133,253,32,
     99,136,36,253,16
1062 DATA 211,165,186,240,187,201,3,240,183,144,51,
     169,97,133,185,164
1063 DATA 183,240,173,32,213,243,165,186,32,12,237,
     165,185,32,185,237
1064 DATA 32,142,251,165,193,164,194,36,253,80,4,
     165,195,164,196,32
1065 DATA 221,237,152,160,0,32,33,246,76,126,128,
     76,189,137,74,144
1066 DATA 250,32,208,247,144,245,32,27,137,32,56,
     248,176,237,162,2
1067 DATA 181,173,72,181,
     192,72,202,208,247,36,253,80,3,32,71,140
1068 DATA 165,147,32,106,247,162,0,104,149,193,104,
     149,174,232,224,2
1069 DATA 208,245,32,124,246,76,126,128,36,253,
     48,85,165,186,240,81
1070 DATA 201,3,240,77,144,53,169,96,133,185,164,
     183,240,67,32,213
1071 DATA 43,165,186,32,9,237,165,185,32,199,237,
     32,19,238,133,193
1072 DATA 165,144,74,74,176,43,32,19,238,133,194,
     36,253,112,3,32
1073 DATA 99,136,32,232,244,165,147,208,77,240,85,
     74,144,19,32,208
1074 DATA 247,144,14,32,23,248,176,9,165,183,240,8,
     32,234,247,144
1075 DATA 8,76,189,137,32,44,247,240,248,165,144,
     41,16,208,242,224
1076 DATA 1,240,4,224,3,208,225,160,1,177,178,133,
     193,200,177,178
1077 DATA 133,194,200,177,178,133,174,200,177,178,
     133,175,36,253,80,3
1078 DATA 32,71,140,32,162,245,165,147,240,6,165,
     144,41,16,208,193
1079 DATA 76,126,128,169,0,44,169,1,133,255,32,30,
     140,32,27,137
1080 DATA 32,148,137,32,99,136,144,21,32,141,137,
     144,227,32,239,137
1081 DATA 32,118,137,32,35,137,172,22,2,208,213,
     240,235,32,141,137
1082 DATA 24,173,19,2,101,195,133,195,152,101,196,
     133,196,32,125,137
1083 DATA 32,141,137,240,2,176,57,32,239,137,32,
     54,137,32,73,137
1084 DATA 172,22,2,208,43,240,233,32,216,139,32,
     179,137,32,99,136
1085 DATA 32,95,137,32,160,136,176,21,133,254,174,
     22,2,208,17,32
1086 DATA 148,137,144,12,165,254,129,193,32,35,137,
     208,237,76,189,137
1087 DATA 76,126,128,169,255,133,255,32,216,139,
     32,179,137,32,99,136
1088 DATA 32,95,137,32,10,138,32,27,137,160,0,177,
     193,217,40,2
1089 DATA 208,8,200,196,253,208,244,32,253,137,32,
     35,137,172,22,2
1090 DATA 208,206,32,148,137,176,226,144,199,32,
     168,139,240,5,32,148
1091 DATA 137,144,13,160,44,32,101,137,32,164,138,
     32,96,140,208,238
1092 DATA 32,3,140,208,219,32,168,139,240,10,174,
     22,2,208,13,32
1093 DATA 148,137,144,8,32,90,139,32,96,140,208,
     238,76,192,131,32
1094 DATA 216,139,162,0,142,32,2,32,89,137,201,32,
     240,244,157,15
1095 DATA 2,232,224,3,208,241,202,48,20,189,15,2,56,
     233,63,160
1096 DATA 5,74,110,32,2,110,31,2,136,208,246,240,
     233,162,2,32
1097 DATA 207,136,240,34,201,58,240,30,201,32,
     240,243,72,32,148,136
1098 DATA 168,104,176,12,165,193,133,194,132,193,
     169,48,157,31,2,232
```

```
1099 DATA 157,31,2,232,208,217,134,140,162,0,142, 22,2,162,0,134
1100 DATA 254,173,22,2,32,188,138,166,255,134,141, 170,189,138,143,32
1101 DATA 227,139,189,74,143,32,227,139,162,6,224, 3,208,19,172,12
1102 DATA 2,240,14,165,255,201,232,169,48,176,29, 32,224,139,136,208
1103 DATA 242,6,255,144,14,189,61,143,32,227,139,189,67,143,240,3
1104 DATA,227,139,202,208,212,240,6,32,224,139,32,224,139,165,140
1105 DATA 40,3,76,238,139,32,99,136,172,12,2,240,49,165
1106 DATA 141,201,157,208,35,32,32,137,32,148,137,32,70,137,144,10
1107 DATA 152,208,89,174,19,2,48,84,16,8,200,208,79,174,19,2
1108 DATA 16,74,138,172,12,2,208,3,185,194,0,145,193,136,208,248
1109 DATA 173,22,2,145,193,169,65,168,141,119,2,32,3,140,32,101
1110 DATA 137,32,164,138,169,32,141,120,2,141,121,2,141,126,2,165
1111 DATA 194,32,8,140,142,122,2,141,123,2,165,193,32,8,140,142
1112 DATA 124,2,141,125,2,169,8,133,198,76,126,128,76,189,137,32
1113 DATA 130,136,169,3,32,73,139,169,44,168,76,216,132,32,130,136
1114 DATA 169,8,32,73,139,32,3,140,32,90,139,140,119,2,140,120
1115 DATA 2,169,58,141,121,2,169,32,76,236,132,173,27,2,174,28
1116 DATA 2,141,29,2,142,30,2,169,0,240,2,169,255,141,9,2
1117 DATA 32,207,136,240,8,32,135,136,176,178,32,213,136,32,27,137
1118 DATA 162,6,189,156,142,157,42,2,202,208,247,174,6,2,154,172
1119 DATA 9,2,240,58,32,27,137,32,10,137,133,254,160,0,32,231
1120 DATA 136,32,45,140,32,24,137,169,36,141,14,2,32,75,138,165
1121 DATA 139,41,191,133,139,32,26,141,201,239,240,249,201,253,240,245
1122 DATA 32,26,141,208,3,76,126,128,201,255,240,244,208,25,32,45
1123 DATA 140,32,126,140,177,193,153,40,2,204,12,2,200,144,245,192
1124 DATA 3,176,4,169,234,208,239,201,253,208,6,169,64,5,139,133
1125 DATA 139,172,8,2,185,74,143,240,8,173,40,2,208,12,162,66
1126 DATA 44,162,45,169,0,133,198,76,115,128,201,32,208,29,36,139
1127 DATA 112,100,24,165,193,105,2,170,165,194,105,0,72,138,72,174
1128 DATA 41,2,173,42,2,32,217,136,76,165,134,201,76,240,240,201
1129 DATA 108,208,21,174,41,2,173,42,2,134,193,133,194,160,0,177
1130 DATA 193,170,200,177,193,76,5,134,201,64,208,21,104,186,240,177
1131 DATA 141,2,2,24,104,186,240,246,105,1,170,104,105,0,76,5
1132 DATA 134,201,96,240,238,165,255,201,232,208,11,173,41,2,141,13
1133 DATA 2,169,4,141,41,2,173,2,2,72,173,3,2,174,4,2
1134 DATA 172,5,2,40,7 6,40,2,8,141,3,2,169,0,141,13,2
1135 DATA 240,4,8,141,3,2,216,88,56,173,1,2,109,12,2,141
1136 DATA 1,2,144,3,238,0,2,24,173,13,2,16,3,206,0,2
1137 DATA 109,1,2,141,1,2,144,3,238,0,2,140,5,2,142,4
1138 DATA 2,104,141,2,2,186,240,134,142,6,2,173,9,2,208,66
1139 DATA 165,145,201,127,208,5,32,117,140,208,52,201,239,208,22,32
1140 DATA 56,140,32,24,137,173,29,2,174,30,2,32,62,140,162,145
1141 DATA 169,13,32,90,136,173,0,2,205,26,2,208,21,173,1,2
1142 DATA 205,25,2,208,13,173,29,2,208,14,173,30,2,208,6,206
1143 DATA 9,2,76,111,133,206,30,2,206,29,2,76,242,134,32,168
1144 DATA 139,165,193,166,194,141,25,2,142,26,2,165,195,166,196,201
1145 DATA 255,208,6,224,255,208,2,232,138,141,27,2,142,28,2,76
1146 DATA 126,128,32,30,140,133,187,134,188,32,179,137,141,15,2,142
1147 DATA 16,2,32,179,137,141,17,2,142,18,2,32,207,136,240,10
1148 DATA 32,207,255,201,87,208,3,238,14,2,32,27,137,32,99,136
1149 DATA 174,22,2,208,202,32,141,137,144,197,172,14,2,208,58,32
1150 DATA 126,140,170,189,74,143,208,5,32,101,137,240,178,172,12,2
1151 DATA 192,2,240,40,165,255,201,232,208,58,165,193,166,194,32,165
```

```
1152 DATA 140,144,11,32,138,140,176,44,32,192,140,76,180,135,32,138
1153 DATA 140,144,33,32,205,140,76,180,135,140,12,2,177,193,170,136
1154 DATA 177,193,32,165,140,200,144,12,136,24,101,187,145,193,200,138
1155 DATA 101,188,145,193,32,35,137,136,16,250,48,148,165,251,9,128
1156 DATA 44,165,251,133,196,169,0,133,193,133,194,32,89,137,201,32
1157 DATA 240,249,208,5,32,207,136,240,62,32,186,136,176,57,36,196
1158 DATA 48,4,201,10,176,49,72,36,196,48,29,32,61,136,165,194
1159 DATA 133,195,165,193,10,38,195,10,38,195,24,101,193,133,193,165
1160 DATA 195,101,194,133,194,76,11,136,32,55,136,24,104,101,193,133
1161 DATA 193,144,193,230,194,176,189,32,24,137,165,196,8,41,127,73
1162 DATA 7,32,250,140,40,48,6,32,76,136,76,126,128,166,193,165
1163 DATA 194,32,205,189,76,126,128,32,58,136,32,61,136,6,193,38
1164 DATA 194,96,72,32,27,137,104,162,46,76,90,136,162,1,181,192
1165 DATA 72,181,193,32,87,136,104,32,8,140,72,138,32,250,140,104
1166 DATA 76,250,140,162,2,181,192,72,181,194,149,192,104,149,194,202
1167 DATA 208,243,96,32,160,136,176,85,133,194,32,160,136,176,78,133
1168 DATA 193,96,32,207,136,240,70,32,148,136,176,66,76,120,136,32
1169 DATA 207,136,240,57,201,32,240,247,32,186,136,176,49,76,165,136
1170 DATA 32,181,136,176,40,10,10,10,10,141,24,2,32,181,136,176
1171 DATA 28,13,24,2,96,32,207,136,240,19,56,233,48,144,14,201
1172 DATA 10,144,11,233,7,201,10,144,4,201,16,144,1,56,96,32
1173 DATA 207,255,201,13,96,166,193,165,194,142,1,2,141,0,2,96
1174 DATA 133,254,160,0,32,24,137,177,193,32,87,136,32,35,137,198
1175 DATA 254,208,241,96,32,160,136,176,11,162,0,129,193,193,193,240
1176 DATA 3,76,189,137,32,35,137,198,254,96,169,2,133,193,169,2
1177 DATA 133,194,169,5,96,32,24,137,169,32,44,169,13,76,250,140
1178 DATA 32,35,137,230,193,208,7,230,194,208,3,238,22,2,96,152
1179 DATA 32,66,136,76,21,137,165,195,208,9,165,196,208,3,238,22
1180 DATA 2,198,196,198,195,96,32,73,137,165,193,208,9,165,194,208
1181 DATA 3,238,22,2,198,194,198,193,96,32,207,136,240,100,96,32
1182 DATA 207,136,240,89,96,169,0,141,14,2,32,72,138,162,9,32
1183 DATA 24,137,202,208,250,96,230,195,208,2,230,196,96,162,2,181
1184 DATA 192,72,181,139,149,192,104,149,139,202,208,243,96,165,140,164
1185 DATA 141,76,165,137,165,195,41,255,201,255,208,5,169,23,197,214
1186 DATA 96,165,195,164,196,56,229,193,141,19,2,152,229,194,168,13
1187 DATA 19,2,96,32,95,137,32,115,136,166,194,144,245,169,63,32
1188 DATA 250,140,76,126,128,32,168,139,24,165,193,101,195,170,165,194
1189 DATA 101,196,168,138,76,227,137,32,168,139,32,99,136,32,161,137
1190 DATA 173,19,2,32,170,138,32,21,137,32,76,136,76,126,128,162
1191 DATA 0,161,193,164,255,240,2,129,195,193,195,240,181,32,76,136
1192 DATA 32,24,137,32,26,141,208,170,240,184,162,0,32,95,137,201
1193 DATA 32,240,249,160,0,201,39,208,14,32,207,136,240,33,32,66
1194 DATA 138,192,20,208,244,240,24,32,148,136,176,145,144,10,32,207
1195 DATA 136,240,12,32,160,136,176,7,32,66,138,192,20,208,239,132
1196 DATA 253,96,157,40,2,232,200,96,32,47,137,32,76,136,32,24
1197 DATA 137,162,0,161,193,32,188,138,72,32,6,139,104,32,39,139
1198 DATA 162,6,224,3,208,19,172,12,2,240,14,165,255,201,232,177
1199 DATA 193,176,28,32,156,138,136,208,242,6,255,144,14,189,61,143
1200 DATA 32,252,139,189,67,143,240,3,32,252,139,202,208,212,96,32
1201 DATA 176,138,170,232,208,1,200,152,32,156,138,138,134,253,32,87
1202 DATA 136,166,253,96,173,12,2,32,175,138,133,193,132,194,96,56
1203 DATA 164,194,170,16,1,136,101,193,144,1,200,96,168,74,144,11
1204 DATA 74,176,23,201,34,240,19,41,7,9,128,74,170,189,236,142
```

```
1205 DATA 176,4,74,74,74,74,41,15,208,4,160,128,169,0,170,189
1206 DATA 48,143,133,255,41,3,141,12,2,152,41,143,170,152,160,3
1207 DATA 224,138,240,11,74,144,8,74,74,9,32,136,208,250,200,136
1208 DATA 208,242,141,8,2,96,177,193,153,40,2,32,156,138,162,1
1209 DATA 32,111,137,204,12,2,200,144,237,162,3,192,3,176,7,169
1210 DATA 234,153,40,2,208,234,96,168,185,74,143,133,140,185,138,143
1211 DATA 133,141,169,0,160,5,6,141,38,140,42,136,208,248,105,63
1212 DATA 32,250,140,202,208,236,76,24,137,133,254,72,32,89,137,32
1213 DATA 244,136,208,248,104,73,255,76,167,138,169,58,32,66,136,32
1214 DATA 76,136,169,8,72,32,224,136,104,32,85,139,32,24,137,169
1215 DATA 18,32,250,140,160,8,162,0,161,193,32,139,139,32,150,139
1216 DATA 32,35,137,136,208,242,169,146,76,250,140,41,127,201,32,176
1217 DATA 2,169,46,76,250,140,201,34,240,4,201,226,208,93,169,20
1218 DATA 32,250,140,169,34,76,250,140,32,130,136,176,40,133,195,165
1219 DATA 194,133,196,32,99,136,32,207,136,240,9,201,46,240,11,32
1220 DATA 115,136,144,6,169,255,133,193,133,194,32,99,136,32,27,137
1221 DATA 169,24,197,214,96,76,189,137,32,130,136,176,248,76,99,136
1222 DATA 32,227,139,134,253,166,254,221,31,2,240,10,104,104,238,22
1223 DATA 2,240,226,76,61,132,232,134,254,166,253,96,205,14,2,240
1224 DATA 250,208,2,169,145,76,250,140,72,74,74,74,74,32,20,140
1225 DATA 170,104,41,15,24,105,246,144,2,105,6,105,58,96,32,216
1226 DATA 139,142,14,2,32,179,137,32,125,137,76,179,137,173,1,2
1227 DATA 174,0,2,133,193,134,194,96,174,0,2,173,1,2,72,138
1228 DATA 32,87,136,104,76,87,136,56,165,174,229,193,170,165,175,229
1229 DATA 194,168,24,138,101,195,133,174,152,101,196,133,175,76,99,136
1230 DATA 32,26,141,240,24,201,239,208,18,32,117,140,32,26,141,240
1231 DATA 12,201,239,208,247,165,145,201,255,208,250,169,255,96,177,193
1232 DATA 32,188,138,6,255,6,255,6,255,96,24,177,193,72,32,32
1233 DATA 137,166,194,104,16,1,202,101,193,144,1,232,32,165,140,32
1234 DATA 70,137,166,194,96,72,133,253,56,237,15,2,138,237,16,2
1235 DATA 144,12,173,17,2,229,253,134,253,173,18,2,229,253,104,96
1236 DATA 56,177,193,229,187,32,239,140,229,188,76,215,140,24,177,193
1237 DATA 101,187,32,239,140,101,188,240,10,201,255,208,9,138,16,6
1238 DATA 145,193,96,138,16,250,138,145,193,32,76,136,76,24,137,170
1239 DATA 177,193,48,3,169,0,44,169,255,96,72,165,154,201,4,208
1240 DATA 21,138,72,32,204,255,104,170,104,32,210,255,72,138,72,162
1241 DATA 4,32,201,255,104,170,104,76,210,255,165,145,201,127,208,5
1242 DATA 8,32,38,141,40,96,165,154,201,4,208,15,169,13,32,210
1243 DATA 255,32,204,255,133,198,169,4,76,195,255,32,204,255,133,198
1244 DATA 96,165,153,240,3,108,254,2,165,211,133,202,165,214,133,201
1245 DATA 152,72,138,72,165,208,240,6,76,58,230,32,22,231,165,198
1246 DATA 133,204,240,250,120,165,207,240,12,165,206,174,135,2,160,0
1247 DATA 132,207,32,19,234,32,180,229,201,136,240,76,201,140,240,69
1248 DATA 201,134,240,32,201,135,240,41,201,133,208,50,198,214,32,101
1249 DATA 233,166,214,232,181,217,9,128,149,217,134,214,133,213,32,108
1250 DATA 229,76,94,141,174,33,208,232,138,41,15,141,33,208,76,126
1251 DATA 128,174,134,2,232,138,41,15,141,134,2,76,126,128,201,13
1252 DATA 208,153,76,2,230,169,145,44,169,17,72,160,1,177,209,201
1253 DATA 58,240,46,201,44,240,3,104,208,129,32,101,142,176,248,104
1254 DATA 48,55,162,0,161,193,32,188,138,56,165,193,109,12,2,133
1255 DATA 193,144,2,230,194,160,44,32,101,137,160,1,132,211,76,94
1256 DATA 141,32,101,142,176,209,104,48,69,165,193,105,8,133,193,144
1257 DATA 2,230,194,32,90,139,76,250,141,160,224,198,194,132,195,177
```

```
1258 DATA 193,32,188,138,56,165,195,109,12,2,168,144,240,24,165,195
1259 DATA 101,193,133,193,144,2,230,194,198,214,16,3,32,68,142,198
1260 DATA 214,76,245,141,32,101,233,169,128,133,217,230,214,96,56,165
1261 DATA 193,233,8,133,193,176,2,198,194,198,214,16,3,32,68,142
1262 DATA 198,214,76,19,142,200,192,40,208,3,56,176,16,177,209,201
1263 DATA 32,240,242,32,126,142,176,5,133,194,32,126,142,96,32,145
1264 DATA 142,176,13,10,10,10,10,133,193,32,145,142,5,193,133,193
1265 DATA 96,177,209,200,201,32,176,2,9,64,76,186,136,76,103,134
1266 DATA 76,114,134,80,83,32,82,89,32,82,88,32,67,65,32,82
1267 DATA 83,32,32,67,80,32,32,32,32,32,13,65,46,68,65,78
1268 DATA 79,77,32,32,32,32,65,66,67,68,69,70,71,72,76,77
1269 DATA 78,79,80,81,82,83,84,86,87,88,58,59,44,36,35,43
1270 DATA 45,80,70,66,80,65,70,49,57,53,56,52,64,2,69,3
1271 DATA 208,8,64,9,48,34,69,51,208,8,64,9,64,2,69,51
1272 DATA 208,8,64,9,64,2,69,179,208,8,64,9,0,34,68,51
1273 DATA 208,140,68,0,17,34,68,51,208,140,68,154,16,34,68,51
1274 DATA 208,8,64,9,16,34,68,51,208,8,64,9,98,19,120,169
1275 DATA 0,33,129,130,0,0,89,77,145,146,134,74,133,157,44,41
1276 DATA 44,35,40,36,89,0,88,36,36,0,28,138,28,35,93,139
1277 DATA 27,161,157,138,29,35,157,139,29,161,0,41,25,174,105,168
1278 DATA 25,35,36,83,27,35,36,83,25,161,0,26,91,91,165,105
1279 DATA 36,36,174,174,168,173,41,0,124,0,21,156,109,156,165,105
1280 DATA 41,83,132,19,52,17,165,105,35,160,216,98,90,72,38,98
1281 DATA 148,136,84,68,200,84,104,68,232,148,0,180,8,132,116,180
1282 DATA 40,110,116,244,204,74,114,242,164,138,0,170,162,162,116,116
1283 DATA 116,114,68,104,178,50,178,0,34,0,26,26,38,38,114,114
1284 DATA 136,200,196,202,38,72,68,68,162,200,223,131,254,134,243,130
1285 DATA 169,131,234,128,71,131,237,128,115,131,84,129,197,131,34,135
1286 DATA 78,129,51,129,59,133,183,128,95,129,246,130,87,129,75,133
1287 DATA 38,129,29,133,211,128,15,133,188,135,193,135,197,137,215,137
```

SAVING THE PROGRAM

The BASIC loader program can be used at any time to reload MONAD into your computer. There is a faster method, using a file that contains only the machine code bytes, and which will load the program directly to memory for you. The technique is simple, and we may use MONAD to do the work for us.

Load the BASIC program, and run it. When READY appears on the screen, type SYS 32768. This will activate MONAD, so we may use the '.S' (Save) command to capture a machine code file.

"Well folks, that's MONAD, Version A. Now that you have entered and checked the data, SAVE it all to disk or tape without any further ado. Many a hard night's work at the keyboard has been ruined because this simple precaution has not been followed.

Data checksums have been built into the program to help accurate entry. The 4096 bytes have been divided into 8 blocks for convenience. If you RUN107, the program will start checking Block 1 for errors. If that block is OK, it will check Block 2. If any block does not check, the program will stop and tell you the block number. Each block occupies 32 lines in the listing, so Block 1 is from lines 1032 to 1063, Block 2 from lines 1064 to 1095 and so on.

If you have any difficulties, help is readily to hand. The entire listing is available on diskette, so that you may merely load and run the entire program. Refer page 13 of this issue.

After the '.' prompt, type–

S"8MONAD.A.BIN" 0X 8000 9000

where X is the device number (1 for cassette, 8 for disk), then press RETURN. MONAD will now save itself as a binary file, which may be reloaded by–

LOAD"8MONAD.A.BIN",X,1

using the appropriate value for X.

If you want to relocate MONAD, refer to the documentation for complete instructions which will be published next issue.

NEXT ISSUE: MONAD Operator's Manual.

QUICKIES!

With Paul Blair

APPEND PROGRAMS

```
100 REM: APPEND PROGRAMS
110 REM: USES SINGLE DRIVE
120 REM: REWRITES FIRST PROGRAM TO DISK
130 REM: AND JOINS SECOND PROGRAM TO IT
140 REM: ENSURE LINE NUMBERS IN APPEND
150 REM: PROGRAM ARE HIGHER THAN IN
160 REM: BASE PROGRAM!!
170 :
180 PRINTCHR$(147):PRINT:PRINT"APPEND PROGRAMS"
190 PRINT:INPUT"1ST PROGRAM NAME";F1$
200 PRINT:INPUT"APPEND PROGRAM NAME";F2$
210 OPEN15,8,15:PRINT#15,"I0"
220 OPEN5,8,5,"0:"+F1$+",P,R":GOSUB380
230 PRINT:INPUT"DESTINATION FILE NAME";F3$
240 OPEN6,8,6,"0:"+F3$+",P,W":GOSUB380
250 GET#5,X$:IFST<>0THEN290:REM END F3$
260 IFX$=""THENX$=CHR$(0)
270 IF F THEN PRINT#6,Y$;
280 F=-1:Y$=X$:GOTO250
290 CLOSE5
300 OPEN5,8,5,"0:"+F2$+",P,R":GOSUB380
310 GET#5,A$:GET#5,A$
320 GET#5,X$:T=ST
330 IFX$=""THENX$=CHR$(0)
340 PRINT#6,X$;
350 IFT=0THEN320
360 CLOSE5:CLOSE6:CLOSE15:END
370 :
380 INPUT#15,EN,EM$,ET,ES:IFEN=THENRETURN
390 PRINT"FILE ERROR"EN;EM$;ET;ES:CLOSE15
```

TIDY NUMBERS

```
52000 REM: TIDY NUMBERS
52010 REM: IN COLUMNS
52020 :
52030 C = LOG(10): R = 8
52040 FOR A = 1 TO 10: READ N
52050 PRINT SPC(R-INT(LOG(ABS(N))/C))N
52060 NEXT:END
52070 :
52080 DATA 120.87451,16.12,1.1478925,2.0,254781
52090 DATA 44.123456,57.289,100,0.12,8
```

MORE QUICKIES!!

With Paul Blair

INSENSITIVE ROUND

```
50000 REM: INSENSITIVE ROUND
50010 :
50020 REM: ROUND AN INPUT FIGURE
50030 REM: TO SPECIFIED # DEC PLACES
50040 REM: WITHOUT ADJUSTMENT
50050 REM: SET XX=1E* WHERE * IS
50060 REM: NUMBER OF DEC PLACES
50070 XX = 1E2 :REM 2 DEC PLACES
50080 INPUT"GIVE ME A NUMBER";A
50090 B = A*XX
50100 C = INT(B)
50110 D = B-C
50120 IF C>0.5 THEN B = B+1
50130 E = C/XX
50140 PRINT"ROUNDED NUMBER IS"E
```

SENSITIVE ROUND

```
50500 REM: SENSITIVE ROUND
50510 :
50520 REM: ROUND AN INPUT FIGURE
50530 REM: TO SPECIFIED # DEC PLACES
50540 REM: WITH ADJUSTMENT
50550 REM: SET XX TO # DEC PLACES
50560 XX = 2 :REM 2 DEC PLACES
50570 XY = 10↑XX
50580 XZ = 1/(2*XY)
50590 INPUT"GIVE ME A NUMBER";A
50600 B = INT((A+XZ)*XY)/XY
50610 PRINT"ROUNDED NUMBER IS"B
```

HELLO THERE!

```
53500 REM: HELLO THERE!
53510 REM: IS YOUR PRINTER ON?
53520 REM: ASSUMES DEVICE #4
53530 :
53540 OPEN4,4:PRINT#4
53550 PRINT#4:IF ST=-128THEN PRINT "TURN PRINTER ON":GOTO53550
53560 PRINT"PRINTER IS ON!"
53570 PRINT#4:CLOSE4
```

BINARY CLOCK

```
1 REM: BINARY CLOCK
2 REM: JUST FOR FUN
3 :
4 PRINT CHR$(147):E=1593 :POKE53281,1
5 PRINT"■■■BINARY CLOCK"
6 PRINT"──────────":PRINT"■■■■■■■■■■"TAB(7)"┌──────────────────────┐"
7 PRINT"■■■■■■■■■■■■■■■■■■■■"TAB(7)"└──────────────────────┘"
8 PRINT"■■■■■■■■■■■■■■■■■■■■ ■■■■■ |"
9 PRINT"■■■■■■■■■■■■■■■■■■■■■■■■■■CAN YOU WORK IT OUT?"
10 FORB=1TO6:A=8:D=VAL(MID$(TI$,B,1)):F=E+(B-1)*3
11 FORC=4TO1STEP-1:G=209:IFA<=DTHEND=D-A:G=215
12 A=A/2:POKEF,G:F=F-40:NEXT:NEXT:GOTO10
```

REVIEW OF THE COMMODORE MPS-802 PRINTER

by JAMES Y. COTTRILL

The Commodore MPS-802 printer is a new fiction/tractor feed model for the Commodore 64 and VIC-20 computers. It is a replacement for the Commodore 1526 printer which reputably had some bugs with its ROM.

I took delivery of my MPS-802 printer after a two month wait for a 1526 model. The 1526 never turned up and in its place I received a MPS-802. On unpacking the contents of the carton I found it contained the printer, serial cable, power card, printer ribbon cartridge, wire paper holder, and a users manual. The MPS-802 printer comes in the same colour as the Commodore 64 computer.

The first thing which must be done to prepare the machine for use is to remove the two shipping bolts at the bottom of the case. Also the red plastic tape and white cubic securing the print head must be removed. The printer can then be connected to the computer's serial port or port on the disk drive. After pluging in the power cable, inserting some paper, and a cartridge ribbon, I was eager to see if the printer was functional. With reference to the various manuals for my peripherals I found that the best order to turn on the equipment is; disk drive, monitor, computer and printer last.

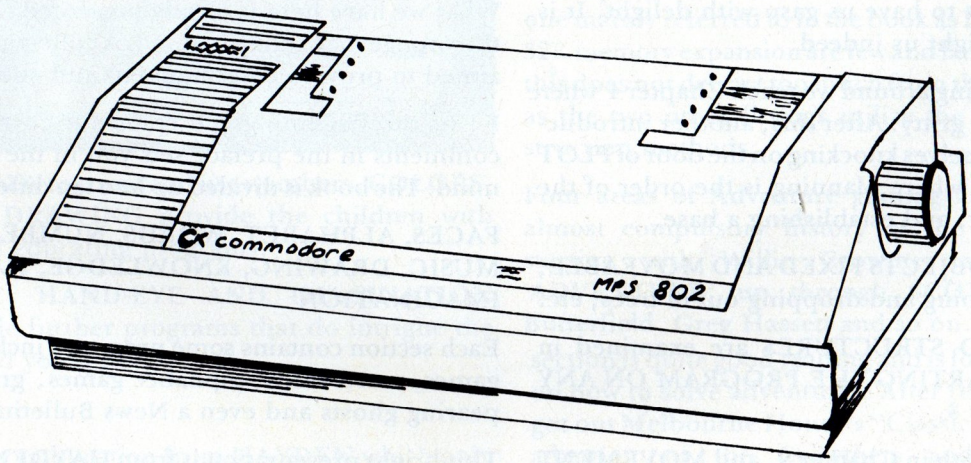
Finally I was ready to try some printing. I thought that I would first try to print some of my EASY SCRIPT files. On power up the printer resets itself and executes a diagnostic and initialization sequence. Once EASY SCRIPT was loaded I commenced printing. After about twelve minutes of non-continuous printing the printer died and its power light started flashing madly, indicating an error. What was wrong!After some experimentation I found that the printer had some sort of thermal problem. Any more than twelve minutes of printing disable it. The problem seemed to be that the drive motor and/or a chip was over-heating. Well, back to my friendly Commodore dealer for a replacement.

This time the printer worked perfectly! No thermal problems at all. So lets have a look in more detail at the printer itself. It can accept both tractor feed paper and single sheets. A small lever must be moved for the different modes. The printer can print up to 80 columns per line at 45 lpm and is bi-directional. Paper widths acceptable can vary from 4.5' to 10' and up to three copies including the original can be accommodated.

The carbon ribbon with a life of 1.2 million characters gives a very clean, clear print and the print quality is excellent. The characters are formed by an 8 x 8 dot matrix and in many of the characters the dots composing it, cannot be discerned. Lower case letters have descenders and the Commodore graphics come out lucidly. The print quality is even acceptable for business correspondence.

The printer having its own internal microprocessor has excellent formatting capabilities. Formatting features includes the ability to specify left or right justification of columns, or alignment of numeric data on its decimal position. Line spacing is programmable, and the printer can store user defined characters. Enhanced and reverse printing is available as is also bit mapped graphic output.

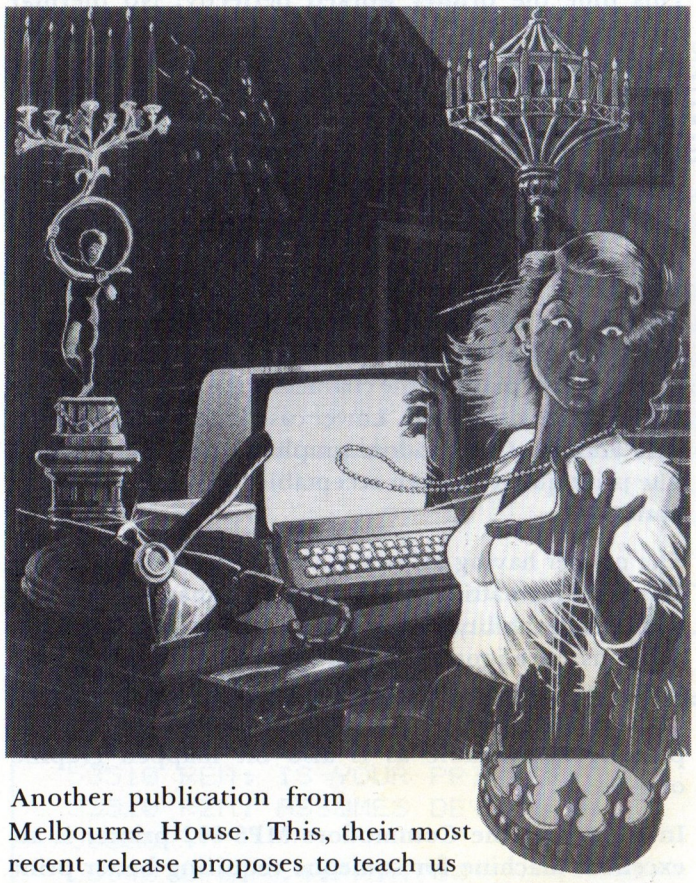
In summary, the Commodore MPS-802 printer is an excellent machine for someone requiring better print quality and speed than the MPS-801 model. The price of $499 would make the machine a very worthwhile contender for someone who requires high quality hardcopy from their Commodore 64 or VIC-20 computer.



BOOK REVIEWS

THE COMPUTER AND VIDEO GAMES 'BOOK OF ADVENTURE'

by Keith Campbell. reviewed by Wayne B. Hodges.



Another publication from Melbourne House. This, their most recent release proposes to teach us about writing adventure games on our little Micros'.

You will find inside this book a wonderful recipe for baking your own adventures' as it is so succinctly put in the foreword.

Spread throughout you find a myriad of helpful information which is meant to have us gasp with delight. It is quite a book to delight us indeed.

After the initial playing around we reach Chapter 4 where we get into the nitty gritty. After this, another introduction and we find ourselves knocking on the door of PLOT AND LOCATIONS where planning is the order of the day, devising a plot, and establishing a base.

Chapter 6 handles OBJECTS FIXED AND MOVEABLE, taking an axe, climbing and dropping out of trees, etc.

SPACE TIME AND STRUCTURES are examined in Chapter 7, and STARTING THE PROGRAM ON ANY MICRO in Chapter 8.

INPUTS are dealt with in Chapter 9, and MOVEMENT in Chapter 10. SCREEN PRESENTATION is investigated at some length in the following chapter.

The remaining chapters provide interesting and essential assistance for us in the writing and compiling of our adventure programs.

The most interesting part of this little publication is when we reach the end of the book and find the complete program listed for SPECTRUM, COMMODORE 64 and BBC Microcomputers, with other assorted information.

IN CLOSING

Melbourne House have indeed produced an interesting little guide to assist us in the writing and compiling of a text adventure game.

However at the rear of the book there are listed the completed programs.

Interesting part is I tested this 'versatile' program (using an expanded VIC-20) and it does not work. (ED; Wayne it did say Commodore 64!).

Apart from this, however, the book does represent some value for money for those interested in learning about the writing and plotting of 'ADVENTURE GAMES'.

Title:	THE COMPUTER & VIDEO GAMES BOOK OF ADVENTURE
Author:	Keith Campbell
Publisher:	Melbourne House
Price:	$12.95
Sample from:	Melbourne House Suite 4/75 Palmerston Cres. South Melbourne VIC (03) 690 5336

THE VIC PLAYGROUND

By Fred D'Iganzio reviewed by Wayne B. Hodges.

What we have here is a gaily presented little book with the younger age group in mind. A collection of programs aimed to provide entertainment and education.

From the beginning the colourful cover and helpful comments in the preface sets you in the right frame of mind. The book is divided up into ten different sections:–

FACES, ALPHABET, WORDS, NUMBERS, COLORS, MUSIC, DRAWING, KNOWLEDGE, HAND-EYE,and IMAGINATION

Each section contains some programs including learning games, word skills, alphabet games, graphics, disappearing ghosts and even a News Bulletin.

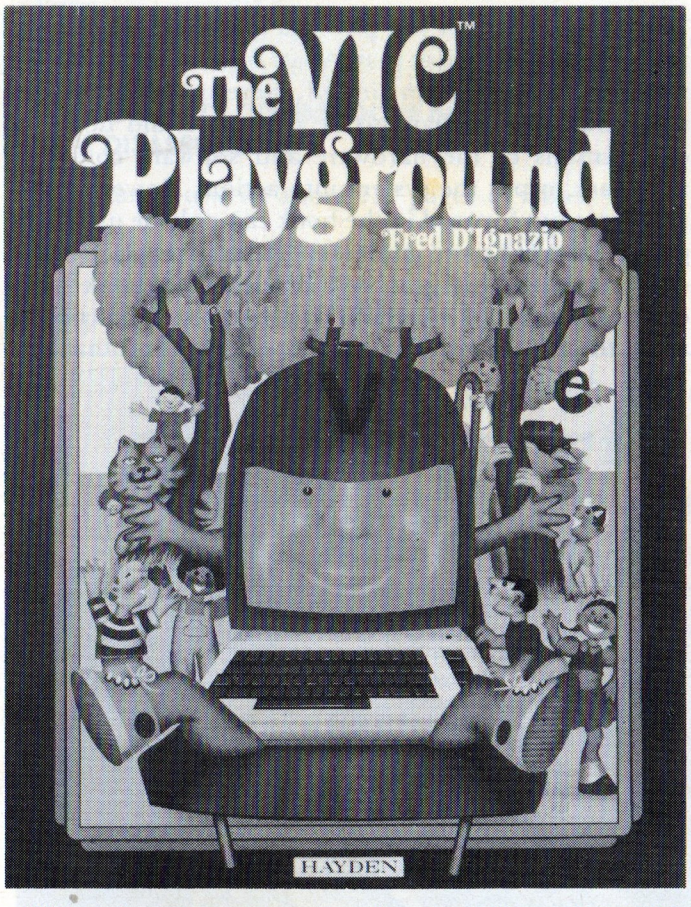
This bright presentation is from HAYDEN, and being in

the position to test this book on my two younger children, I set out and found that it passed the most stringent test, they were interested!!

The collection included HAPPY AND SAD FACE . . . a novel little program which can be included in other programs to use as a reward or as an indicator of an effort; Alphabet Al, the ABC Song, and others which test the young persons with letters of the alphabet.

SKYWRITER, Spelling Bee and Musical Words are intriguing tests and provide wonderful entertainment.

GOOSE EGGS, SCRAMBLED EGGS, AND THE DISPPEARING GHOSTS, (amongst many) provide many varied and encouraging games to help the younger



children learn how to count and use numbers. COLORS, MUSIC AND DRAWING provide the children with interesting and educating programs.

KNOWLEDGE, HAND-EYE AND IMAGINATION serve to provide further programs that do intrigue the curious minded youngster.

IN CLOSING

Another quality publication from HAYDEN which only strengthens their reputation here. This one provides many varied programs for the young children to play with for both entertainment and education.

Each section is clearly written and set out, with explanations, highlights and do-it-yourself hints to follow up.

After passing the ultimate test with my children, it held their interest, I can certainly recommend it.

Title:	THE VIC PLAYGROUND
Author:	Fred D'Ignazio
Publisher:	Haden
Price:	$15.95
Sample from:	Holt-Saunders Pty. Ltd.
	9 Waltham St. Artarmon NSW 2064
	(02) 439 3633

EXPLORING ADVENTURES ON THE VIC

Reviewed by Mervyn Beamish

The biggest problem I had with this book was putting it down to write the review. One of the best books I've read on adventures. But if you are a VIC owner be warned you will need 16k to 32K memory expansion for your machine.

When the author started reviewing, as sample scenarios, various SCOTT ADAMS adventures I got a little aggravated because these use big memory. To my surprise I found that they are nearly all available for the unexpanded VIC 20 on cartridge for around $30.00. Again the VIC shows itself as a marvellous little machine a real Home Computer.

Back to the book. I found it engrossing reading. Basically there are three good adventures to enter and play; CASTLEMAZE (16K) TUNNEL ADVENTURE (16K) and UNDERGROUND ADVENTURE (32K)

It is a pity that UNDERGROUND ADVENTURE is the one mainly referred to in the book as I believe VIC's with 32K memory expansion are few and far between. However this does not detract too much from the value of the book as the two other listings utilize the same BASIC construction methods.

Four areas of Adventure gaming are looked at. The almost compulsory history of the Adventure Game starting with Willie Crowther and Don Woods 'ADVENTURE' up through SCOTT ADAMS, Jim Butterfield, Greg Hassett and so on. This introductory section is quite good reading and is followed by a chapter on how to solve adventures. After reading this section I got out Melbourne House's ''Classic Adventure'' (a C64 adaption of the Crowthers and Woods original

ADVENTURE now on PAVLODA) and commenced to while away a couple of hours solving it – no I did not complete it.

We then go into a clear and concise description on creating and writing your own Adventures. Utilising UNDERGROUND ADVENTURE the author steps the reader through how things are done. Room movement, creatures how they live and die, picking things up, mapping and pre-planning.

The book is an asset to any writer of BASIC Adventures no matter what machine they own. But C64 owners hang on! There is a C64 version on the way complete with cassettes of the programs. We will review it ASAP. The English Publishers do have cassettes available for the listings in this book but as yet I do not believe that ANZ Books (Australian Distributors) have them available here.

A little disappointed that the book is not based around an unexpanded VIC (no arguments – it can be done. Look at some of the Computer Classics programs we've reviewed in previous issues.). But let me not detract too far it is an excellent book, 240 odd pages crambed with information and inspiration.

Title:	EXPLORING ADVENTURES ON THE VIC
Author:	Peter Gerrard
Publisher:	Duckworth
Price:	$19.95
Sample from:	Australia & New Zealand Book Co. Pty. Ltd. P.O. Box 459 Brookvale NSW 2100 (02) 452 4411

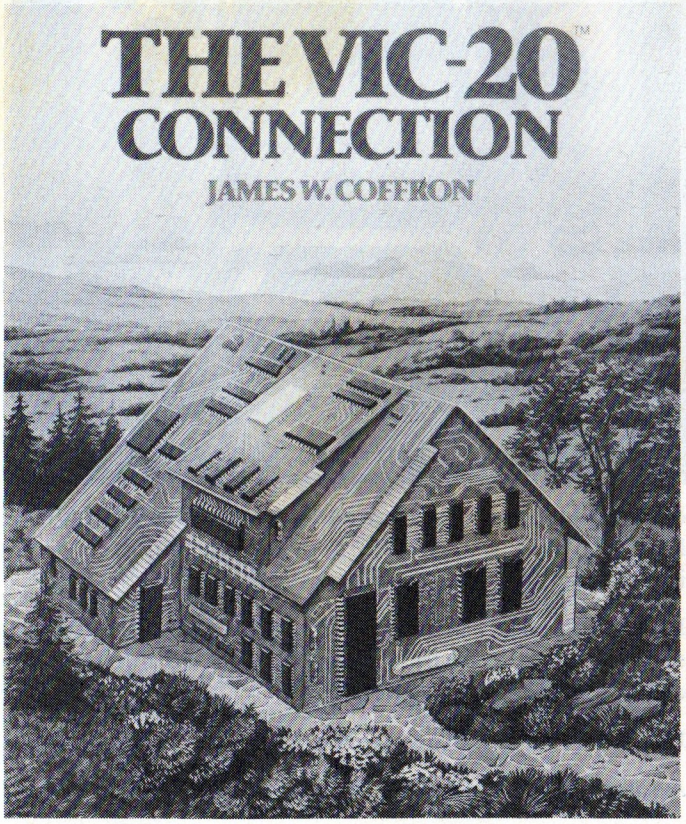
THE VIC 20 CONNECTION

This book is aimed at those people who have recently bought, or are thinking of buying, a VIC 20 and would like many multitudes of questions answering.

The author assumes that the user of the computer is familiar with BASIC in that they should be able to write simple software. Given this as so, the user should also be acquainted with basic computing terms like CPU, peripherals, transducer, and so the new vocabulary pages are a bit pointless.

What happens after this is a brief, but quite useful, outline of software for output. This covers the use of the CMS I/O board and the instruction POKE.

The author does not just give you a program to solve a problem and leave it at that. Apart from actually implementing the application himself, there are definitions of the problems that have to be overcome and detailed explanations of the hardware and software concepts necessary to put the system into action. However, the problems put forward in the book can only be used as a general idea of how to implement the system in your own environment. This is a well documented book with either photographs, diagrams or programs on practically all of the 268 pages. The reader will also find that the



book is very well equipped as far as appendices are concerned.

The Australian distributors inform us that a C64 version of the book will be out soon.

The only book on this subject that I can remember seeing and one I'm pleased to have in the library. No reams of machine language but a good introduction in a quite readable format. With ROBOTICS busting to get into the hands of the home computerists this book is worth reading.

Title:	THE VIC-20 CONNECTION
Author:	James W. Coffren
Publisher:	Sybex
Price:	$17.95
Sample from:	Australia & New Zealand Book Co. Pty. Ltd. P.O. Box 459 Brookvale NSW 2100

THE COMPLETE COMMODORE 64 ROM DISASSEMBLER

What can you write about 152 pages of tables

The Preface states. "This book is intended to be used by the serious Commodore 64 programmer, and gives a complete disassembly of all the 64 ROM routines. Also included for reference is the complete 6510 machine code instruction set, together with a listing for a full assembler/disassembler for the Commodore 64."

The production of the book leaves a little to be desired as type style and size varies from chapter to chapter and you would need to be an ant with a magnifying glass to comfortably read the last few pages.

One major good point is it's index. This topic/page index mades the book a very comprehensive and useable reference tool.

To all but the 'serious' computerist the book might seem gobble-de-gook but I know a number of users who will grab at the chance to get hold of this one. There is also a sister volume on the VIC 20.

Title:	THE COMPLETE COMMODORE 64 ROM DISASSEMBLY
Author:	Peter Gerrard & Kevin Bergin
Publisher:	Duckworth
Price:	$22.50
Sample from:	Australia & New Zealand Book Co. Pty. Ltd. P.O. Box 459 Brookvale NSW 2100 (02) 452 4411

Book reviews continued on page 48

GAME REVIEWS

reviewed by Mervyn Beamish

Gridrunner - Vic 20
(cassette, joystick, no extra memory)

Defending earth from the ravishing hordes from outer space ('well! poetic license'). It must be as busy out there as Pitt Street at peak hour. With Gridrunner the action takes place in the dim and distant future. Earth has erected grid in space to supply energy to the humanoids on the planet below.

Energy is lagging and an investigation finds that those horrid little alien hordes are mucking things up again. You, of course, are sent with your trusty pea shooter (an awesomely powerful plasma cannon – we're told!), to send them packing.

The aliens take many forms (don't they always).

Caterpillar – like life forms stalk about the grid getting ever nearer to the bottom and to you. It's a destroy or be destroyed situation.

If you succeed you move to the next of a total 31 levels.

Each segment of the caterpillar that you hit turns into a 'Pod', which goes through an evolutionary life style before unleashing a bolt of energy down the grid.

These bolts are lethal, as are those fired by the 'X-Y Zappers'. These patrol the edge of the grid and fire at you at will.

Of course the more success to you, the more skill you need to keep going.

A fast traditional arcade game which is also very popular in the USA. Another LLAMASOFT beauty. Great fun and a definite for a gamers library.

Title:	GRIDRUNNER
Author:	Jeff Minter
Publisher:	Llamasoft
Price:	VIC $19.95, C64 $21.95 (cassette)
Sample from:	Progressive Software Publishers
	P.O. Box 436, Pymble NSW 2073 (02) 44 6393

ABDUCTOR – VIC 20
(cassette, joystick – no extra memory)

Single handed defence of the galaxy against another attack from alien nasties: –

'After many years of intergalactic tension the attack has finally come. The Alien Nasties, however, are not attacking with huge starships as predicted by Humanoid experts. They have sent thousands of tiny spaceships to decimate the humanoid population.

You are a Humanoid in charge of a Mark One plasma cannon. You have six Humanoids under your protection and the attack is about to begin!. If you can just survive until the fourth wave you will be given a Mark 2 stage on the base of your Mark One Cannon, allowing you to fire more rapidly.

But now, beware, there are four abductor ships in the atmosphere flying in crazy loops that would put the Red Arrows to shame . . . and your Humanoids are looking worried.' . . . DON'T PANIC!

Shoot down all the aliens before they take your men. If you shoot an alien as he is lifting your man, he will float down to the surface and be safe. If the alien reaches the top with your man, a skull will be thrown down at you. The skull is lethal so mind out.

My ten year old son read all this trype I wrote and got totally immersed in the game. He reckons that it's the best ARCADE game he has played and it seems many agree with him.

Title:	ABDUCTOR
Publisher:	Llamasoft
Price:	$19.95 Cassette)
Sample from:	Progressive Software Publishers
	P.O. Box 439, Pymble NSW 2073 (02) 44 6393

HORACE SKIS ON PAVLODA
– C64 (cassette, joystick or keys)

No not that sweet crusty stuff made from egg whites and stuffed with cream, fruit salad and strawberries – PAVLODA!

PAVLODA is a routine developed by Andrew Pavlomanolakos ('Pav') that SAVEs out to dattacassette nearly any BASIC or ML program six times faster than conventional SAVE and can be LOADed useing standard LOAD commands and retains this speed factor and in short PAVLODA make cassette loading as fast as, if not faster than disk loading!

Melbourne House, who own the system, have released Horace Goes Skiing (2 min LOAD), Classic Adventure (3 min) and the Hobbit on PAVLODA. They intend releasing most future software packages and current packages on the new system.

What is more moves, are afoot to get the system working even faster. But don't throw away your disk drives yet! Melbourne House are holding PAVLODA very close to

their chest – they have no plans to release it in utility program format to the waiting and gropping hordes of C64 users.

About the only other think I can tell you is that it is software based and programs saved with PAVLODA use virtually no useable memory.

HORACE

I ran HORACE GOES SKIING. There seemed to be no great difference other than time, although it seems hard to believe this program would take 12 minutes to load useing conventional methods. There was a rather mezmerizing multi-colour pattern on the screen whilst the game was LOADing – that is an advantage.

The game itself starts off with Horace crossing the road to get to his skis – FROGGER revisited. Having gotten them and after crossing back over the road again to the ski slopes, Horace commences a down hill slalom course. Watch our for trees and hills, don't knock down those flags you'll loose points – oh bye the bye, how much money have you got left after all the ambulance fees.

The game is the usual good quality we've come to expect from Melbourne House but somehow lacks that touch of creativity one associates with Horace – as in HUNGRY HORACE. Good graphics, fun to play and I preferred using a joystick but key option is built into the game.

Name:	HORACE GOES SKIING
Producers:	Beam Software
Price:	??
Sample from:	Melbourne House Suite 4/75 Palmerston Cres. South Melbourne 3205 (03) 640 5336

HOVER BOVVER

– C64 Cassette, joystick)

LLAMASOFT tend to make a real production number out of their products and HOVER BOVVER is no exception. Right from the opening titles the graphics have polish and finesse.

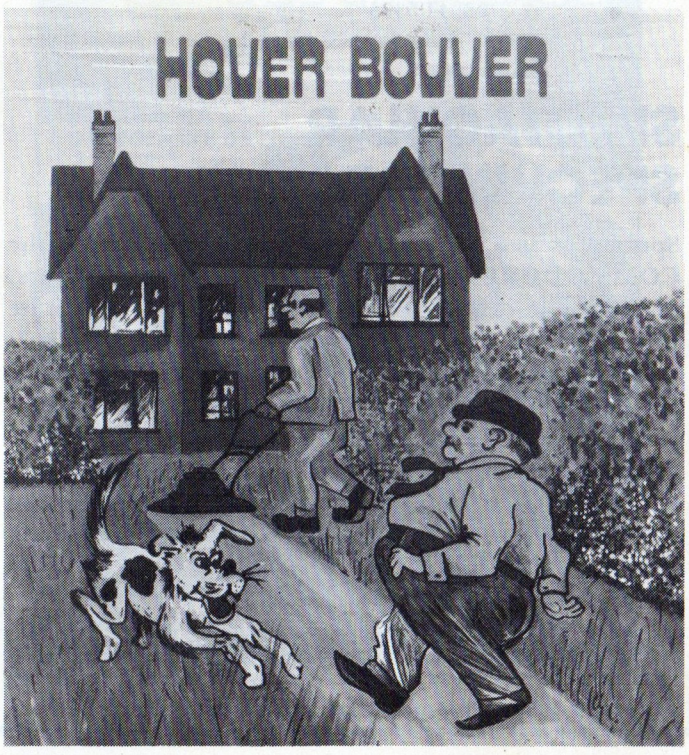
HOVER BOVVER is the most unlikely theme on which to create a computer game. It is based on that most annoying of suburban dwellers – the perpetual borrower. In this case the item borrowed is a Flymo lawn mower (this is the one that operates on the hovercraft principal – none of the good old 'Victa's' here. Llamasoft's description is as follows:–

Summertime in England . . . and all across the land lawns are growing and men's thoughts turn to mowing.

So it was with Gordon Bennet. But when he went to investigate, he found to his dismay that his cylinder mower had rusted into a heap of junk.

'No problem,' he thought, 'I'll pop round and borrow Jim's 'Air-Mo'. (For of course, borrowing the neighbour's mower is a traditional aspect of English suburban life).

So Gordon popped round to Jim's house, abstracted Jim's mower and began mowing his lawn. Unfortunately, Jim has decided he wants his Air-Mo back and no sooner has Gordon begun his task than Jim sets out in hot



pursuit, intent on retrieving his mower.

Your task is to guide Gordon Bennet on his mowing mission, trying your best not to annoy your dog Rover or the gardener, and avoiding your neighbour's unwelcome attentions.

Some gardens these 'poms' have, (no predjudice, I'm one myself) 17 in all and the mower owner gets very persistent. As for the dog, you end up wanting to shoot the mongrel.

The game is played by balancing the elements and is quite tricky in parts. Annoyed by you faithful dog Rover who you can scitch onto the neighbour or if you knock down some of his flowers, the gardener. Rover has a nasty habbit of attacking the mower and stopping it. You then have to wait for it to cool off before starting again. However you are chased by a neighbour and gardener who are determined to take the mower off you.

A game of strategy and wits. Great graphics and sound although you will need to like the tune 'IN AN ENGLISH COUNTRY GARDEN' (it can be muted). Creative and imaginative.

Name:	HOVER BOVVER
Author:	Jeff Mintor
Production:	Llamasoft Software
Price:	cass. $29.95 disk $34.95
Sample from:	Progressive Software Publishers P.O. Box 436, Pymble NSW 2073 (02) 44 6393

SPECTACULAR SPECULATOR

Speculator is a high finance adventure game for the COMMODORE 64'. It is designed for 1 to 3 players. Playing time can be from a half hour to an indefinite period. Ideally players should set their own time limit. It contains a certain amount of luck but concentration and skill ultimately decide the winners and losers. Six simulated markets fluctuate either up or down. These markets are real estate, land & house, automobiles, shares, gold and silver. Other facets affecting outcome are taxes and messages. Both of these are based on random selection although some of the randomly selected messages require decision making and action by the players.

This is a very professional Australian produced game that deserves a rave review if it wasn't for one small oversight (I'm informed that this is to be amended.)

SPECULATOR is a Monopoly type game complete with corporate logos as markers that move around a square games board generated on your moniter's screen. After lengthy LOADing of cassette, (I really think a disk version is essential,) you are immediately rewarded with a brilliant but simple bit of graphics in the form of an investment chart.

The next page of graphics is, unfortunately, overpoweringly red and hard to read. It simply asks the players names and whether there are 1, 2 or 3 players. Players are allocated with corporate logos and then up comes the games board. The board is well laid out and easy to read.

On the right is a market indicator showing current values of cars, houses, stocks, futures etc. On the left is the actual colour coded board around which the players move. At each of the four corners of this board are special areas. PAY – just like GO in monopoly. Pass this and receive $2,000. MAIL – similar to CHANCE cards in monopoly with +ve and –ve results. TAX – need I say more.

Each player has his or her own personal key f1 for player one, f3 for two and f5 for three. As each players turn comes around the key activates a dice routine and

determines how far around the board the player moves, and of course moves him/her.

This is where the problem lies. The player is given no chance to read the relevant section of the Market Indicator before they move into the menu of the market that the player can now trade in. This menu offers 1. to list current assets and return to menu. 2. to access buying mode. 3. to access selling mode or 4. to pass 'no deal'.

The problem is that without the pricing knowledge in the Market Indicator, which you cannot recall without losing a turn, it is virtually impossible to make a rational decision to buy/sell/pass. I would have thought it would have been quite easy to include an additional option in the menu or the relevant Market Value on the screen. I believe this is now being done with future issues.

If you make a purchase sale with too little a rather apt 'Financial Missmanagement' statement is displayed on the screen.

As play continues for whatever time period the players have decided on, a game counter (oblivious to the players) functions and after four turns each, market prices will change up or down. After twelve such changes to the market the game counter reverts back to zero and starts over again (players assets and market prices do not return to their starting values however).

An excellent game. I have a pre-issue version and found it quite stimulating. The graphics are very professional. A definite worthy addition to the library.

Title:	Speculator
Author:	Greg Long
Producer:	CW Electronics
Price:	$20.00
Sample from:	The Vic Centre
	P.O. Box 18, Stones Corner
	Brisbane Qld 4120 (07) 397 0888

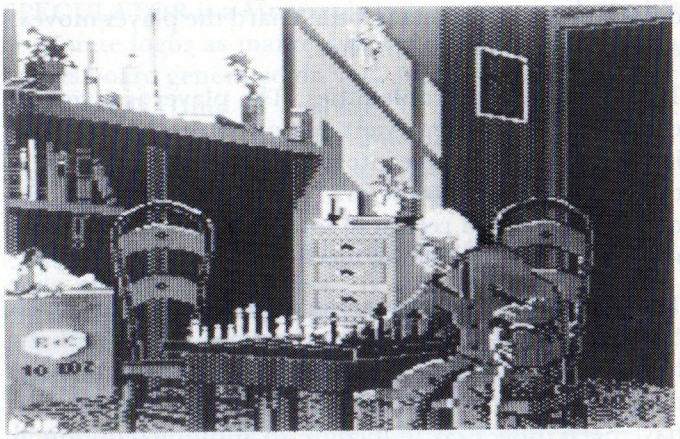
Paintpic/Koala Pad Comparison

PAINT PIC/KOALA PAD comparison
Auther unknown, believed to be from Kiwisoft themselves.

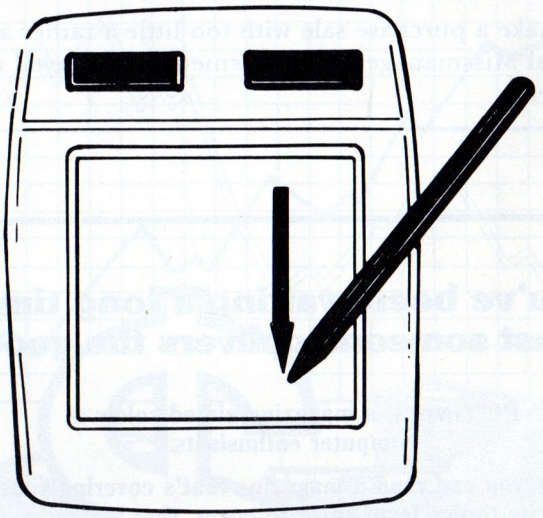
There is very little comparison between PAINTPIC and the KOALA PAD. Each offers different features. PAINTPIC is the most complete utility program but KOOLA PAD offers some dazzling-looking capabilities.

The KOALA PAD plusses are IKONS, speed of action, and simple finger touch drawing. The Koala ikons mean that the program can be used by non readers of English. Ikons are the current fad items for computer menus. The KOALA PAD is very fast in what it does. This is a genuinely impressive feature of the KOALA PAD. Everything happens at assembly code speed. Finally finger touch drawing is a lovely concept. In practice, I found the touch pad a problem because of lack of resolution (only a 4-inch square pad) and a tendency sometimes to not register my finger move.

PAINTPIC plusses are price, range of shapes including text characters and complex brushes, picture and block storage, and oil-painting quality. PAINTPIC is only one-quarter the price of KOALA PAD. It allows many more shapes including tilted shapes. PAINTPIC allows you to use any Commodore 64 character in your picture, and permits use of very complex multicolor brushes using your own patters. PAINTPIC does a very compact storage of pictures or user defined blocks. Note that block storage and retrieval is not allowed with KOALA PAD. Finally color granularity for multicolor is best handled by PAINTPIC and consequently PAINTPIC can be used to produce true artist quality paintings.



A Paintpic picture called "Room".



The koala touch tablet

STOP PRESS

Just received a sample copy of PAINTPIC II.
Has faster, new "Fill" commands & brushes - Touch Pad i.e. Koala Pad compatible!
REVIEW NEXT ISSUE
If you can't wait, phone Bill Brown at The Vic Centre (07) 397 0888

ERRATUM
We apologize for leaving out the following information in the last issue.

Title:	PAINTPIC
Price:	$49.95
Sample:	The VIC Centre P.O. Box 18 Stones Corner Qld 4120 (07) 397 0888
Title:	KOALA PAD
Price:	with cart – $169.95, disk – $149.95
Sample from:	Ozisoft 3rd floor 8-24 Kippax Street, Surry Hills NSW (02) 2111 266

Hardware Review

Cicada 300C Modem

reviewed by Greg Perry

What's a modem you may well ask? The word modem is an abbreviation for MOdulator DEModulator. It is a device to allow two-way asynchronous communication between computers via the normal telephone lines. If you wish to connect your C64, VIC, or PET to other computers, across town or across the world, all you need is a modem, a connection between your computer and the modem, a terminal program, and bags of money to pay for the telephone costs! But, more on this later.

Modems come in two basic types; acoustic coupled, where the telephone headset fits into a pair of rubber cups; and direct connect, where the modem is directly connected to the telephone line in place of the telephone. The direct connect variety, like the Cicada 300 series, are becoming more popular because of their ease of use and better reliability.

The modem is usually connected to the computer via a serial RS-232 line, and herein lies the first problem for Commodore users.

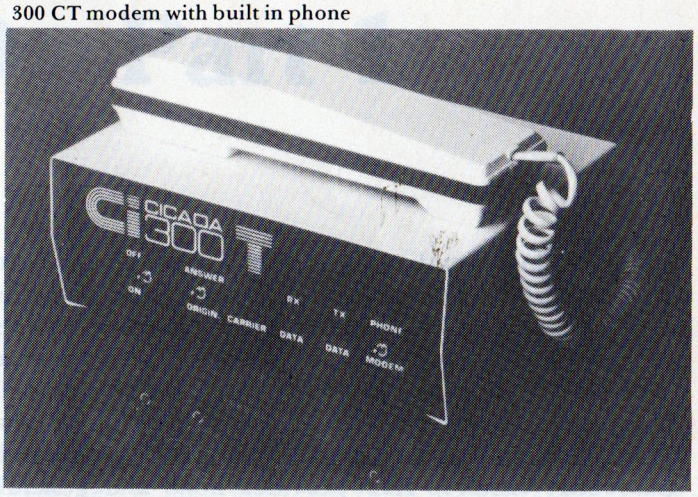
If you own one of the earlier 4000/8000series Commodores, you are on your own to a large extent since there is no RS-232 port. You must build or purchase a special interface for either the User Port or the IEEE Port. (IEEE interfaces are available commercially at around the $200 mark.)

C64 and VIC users are more fortunate in this regard, with a built-in RS-432 available from the User Port. The RS-432 standard is almost identical to the RS-232 (originally developed for use with teletypes), except that it operates at different voltage levels. The RS-232 uses +12 Volts and −12 Volts to represent binary offs and ons, whereas the RS-432 uses the now conventional voltages for microcomputers of +5 Volts and 0 Volts. (This 0-5 Volt range is known as TTL levels.) To overcome this voltage problem, the C64 or VIC user would normally purchase a Commodore RS-232 interface which plugs into the user port and performs the required voltage conversions. These interfaces retail for approximately $20-$50, depending on the retailer.

The original Cicada 300 or 300T modems came with the standard RS-232 connection, but the manufacturer and distributor have done their homework and have now produced the new 300C modem which will plug directly into the User Port of the C64 or VIC.

The 300C can be supplied with a piggy-back telephone plug to allow simple connection to an existing telephone installation. On the earlier models, it was often necessary to

300 CT modem with built in phone



ask Telecom to install it for you, or, to dismantle the wall plugs and connect the modem in parallel with the existing phone, and then live in terror of the accidental visit by Telecom!

The 300C provides the following features:

- Direct connection to the C64 or VIC via the User Port.
- Direct connection to an existing telephone installation via a piggy-back plug.
- Transmission of data at 300 baud or approximately 30 characters per second.
- Two channels (Answer/Originate) for asynchronous two-way communications.
- Switches for Phone/Modem and Answer/Originate channel selection.
- Separate red lights to monitor
  - power
  - carrier tone present
  - data being transmitted (TX)
- data being received (RX)

Once you have successfully connected the 300C to the computer and telephone line, all that remains is to load a terminal program into your computer and the world is available to you. Your local user group should be able to provide several Public Domain terminal programs, and special programs to access The Australian Beginning (the TAB Frontend) can be obtained from your user group, TAB, or Computer Classics dealers.

To use the 300C, you simply dial another user, select which channel to use, either Answer or Originate (the other modem must be set to the opposite mode), switch from phone to modem and start typing.

Once you are 'on-line' with the 300C, you may send programs or documents to friends or access one of the growing number of public data base or bulletin board

systems. The Australian Beginning is probably the best known public data base. This is situated in Melbourne and accessed via 813 3522 locally, or, if you are outside Melbourne relatively cheaply ($4.00 after hours) via Telecom's AUSTPAC on 01921 followed by typing H <return>, then ?238220000. (You may access TAB if you are not a member by using the username: visitor and password: visitor.) TAB provides news and general information bulletins, and free programs which you can supposedly download to your own computer, although it is taking them a long time to get their C64/VIC act together. Their are several other PBBS (Public Bulletin Board systems) in Australia and overseas which can also be accessed if you know the phone number.

Summary

A number of members of our user group, including myself, have been using the earlier Cicada 300 modems for several months and all have performed admirably well. It appears to be very reliable unit, the only problem seems to be the mysterious increase in your telephone bill!.

However, I do have a couple of minor criticisms.

First, the price of the 300C seems a bit high, especially since the earlier modems required more circuitry. On the other hand, this is offset to some extent by the direct connection feature for the C64 and VICs. One can expect that modems will be the next boom in the micro market, especially when Telecom's data base and mail service – VIATEL- comes on line towards the end of 1984. Given this, together with the estimated 60000+ C64 users in Australia, one would expect that a suitably priced modem, around the $150 mark, would be a viable proposition.

Second, the main chip used in the Cicada modems is actually 300/600 baud switchable, but the 300 series are designed only for 300 baud operation. It is not possible to use the 600 baud mode without getting out your trusty soldering iron. It should be a simple matter (?) to bring this out to a switch on the front panel. Since the normal telephone lines can cope with up to 1400 baud, this faster transfer rate would be useful to many users. I sometimes send programs or letters to friends interstate via STD and at 600 baud it would only cost half as much!

Manufacturer:	Centre Industries Allambie Heights NSW
Supplier:	Centre Industries (Available from most Commodore dealers)
Price: R.R.	$295

Using the SID Part 1

by GREG PERRY

If you have been trying to use the sound capabilities on the C64, but having little success, your troubles are over. In the next few issues of the Commodore Magazine, we will present a series of articles on how to use the C64's Sound Interface Device or SID chip to its best advantage.

We will start from the assumption that you have only a rudimentary knowledge of the SID as gained from the examples provided in the C64 User Manual.

INTRODUCTION TO THE SID

To help us gain an overview of the SID's operation, it is initially best to forget the fact that it's a chip. Think of it as a traditional music synthesiser consisting three voices and a number of separate, but interconnected modules. Each module then controls a specific function, but may contains a number of 'switches' to allow us to vary the activity of that particular function. Consider the following simplified diagram.

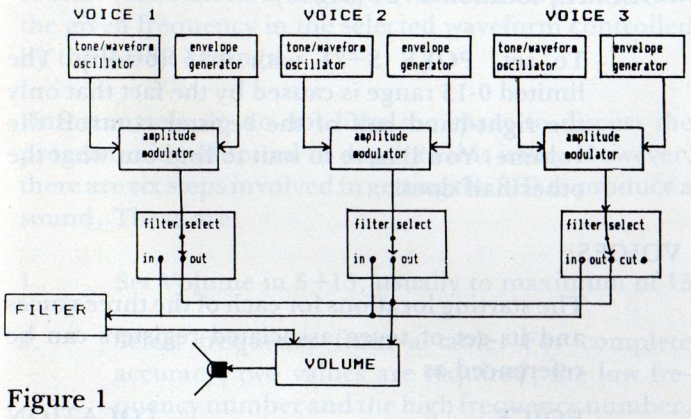


Figure 1

In reality, there a many more interconnections than shown in the above diagram. But, we should only look at these once we understand the basic modes of operation.

From the programming point of view, each of these modules occupies one or more memory locations (known as REGISTERS) in the SID chip. There are only (!) 25 registers in all. However, in order to compress the capabilities of the SID into this limited range, many of these registers control more than one operation. In such cases it is necessary to understand something about BINARY arithmetic so that we may set the desired operation without disturbing the others. We will leave most of this until a later issue.

Before looking at the specific registers, it is helpful to understand something about the physics of sound. Music and sounds are defined by three main characteristics; the pitch or frequency; the loudness or volume; and the 'quality', more normally referred to as tone or timbre.

Let's spend a short while looking at these concepts. The volume and frequency are self-explanatory. However, the quality of sound is a highly complex subject, which academics and musicians spend years studying, Hi Fi buffs spend years (and vast sums of money, time, and energy) try to reproduce, and its subjectivity will always produce argument between music-orientated people.

For our purposes, we can loosely define the quality of sound as that characteristic which makes the same note played at the same volume on different instruments sound different.

In the SID, this quality is controlled by the waveform, the sound envelope or ADSR settings, and the filters. We will devote a special article to filters at a later date, so lets look at the other two parameters.

1. WAVEFORM: Most sounds we encounter consist of one fundamental frequency plus a cloud of harmonics which are generated above it. (Harmonics or overtones are multiples of the fundamental frequency.) That remarkable organ, the ear, hears the fundamental note and identifies this as the frequency of the sound, but it's the number and relative strength of the harmonics that give the note its distinctive timbre. This is what enriches the quality of sounds from different musical instruments.

   In the SID, the basic tone or harmonic content of each voice is controlled by selecting one of four electrical waveforms to generate the note. Each of these waveforms produces a different series of harmonics. These waveforms are

   Triangular:
   composed of the fundamental frequency with weak odd order harmonics giving a mellow flute-like tone.

   Sawtooth :
   consisting of both odd and even order harmonics producing a bright brassy tone.

   Pulse :
   a variable waveform, the harmonic content of which can be changed by adjusting the width of the pulse.

   Noise :
   a random combination of frequencies, not just harmonics or multiples of the fundamental.

Used for wind, surf, drums, cymbals, gunshots, lasers, etc.

IMPORTANT NOTE: Producing an output from the SID's waveform generator is actually done by two separate and distinct operations which are usually combined into one, thereby creating some confusion. The first process involves selecting one of the four waveforms. The second process is to turn the waveform generator ON or OFF. This second process acts like a tap, opening or closing the 'GATE'. It is vital for the correct programming of sound to understand this concept.

2. ADSR SOUND ENVELOPE: With most normal sounds, the volume of the sound changes in a complex way with time, further enriching the quality. In the SID, this characteristic is imitated by four separate controls for ATTACK, DECAY, SUSTAIN, and RELEASE, as shown in the following diagram.

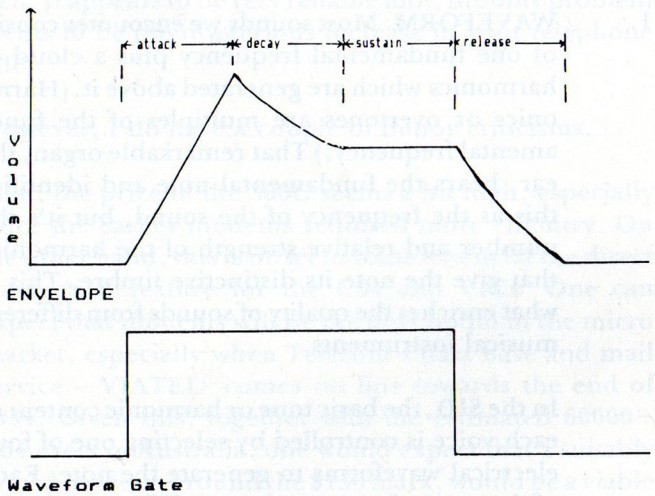


Figure 2

With this simple example, when the note is struck, the sound volume increases rapidly to a peak then drops to some intermediate level. The times taken for these two events are called the ATTACK and the DECAY respectively. The intermediate volume level is the SUSTAIN and the note remains at this volume until the 'gate' is closed. The sound will then die away over a time called the RELEASE.

Each of the ADSR controls for each voice can be independantly set within a range of 16 steps (0-15).

SID REGISTERS

The SID registers start at memory location 54272. When programming sound, it has become traditional to initially set a variable 'S' to this location (S=54272) and then reference all the registers to this variable. For example, the fifth register would now be referred to as S+5, and so on. It also means that you only have to remember this one specific location!

Each of the three voices has seven specific registers to control the main functions of frequency, waveform, and sound shape or ADSR envelope. Of the remaining four registers, three and a half are used to control the filters, and half a register is used to set the volume. It is important to note that there is only one overall volume control, not specific volume controls for each voice. In fact, as we will see later, it is possible to roughly adjust the levels of each voice with the SUSTAIN control.

VOLUME: location S+24 (54296)

To set, POKE S+24 with 0-15 (0=off). The limited 0-15 range is caused by the fact that only the right-hand half of the register controls the volume. You'll have to wait to find out what the other half does!

VOICES:

The starting locations for each of the three voices and its set of seven associated registers can be referenced as

VOICE		LOCATION
1	S	54272
2	S+7	54279
3	S+14	54286

The specific voice control registers are then

REGISTER	SETTING (R)
0	Frequency number Low (FL)
1	Frequency number High (FH)
2	Pulse width Low * (PL)
3	Pulse width High * (PH)
4	ON Waveform OFF (W)
	17 Triangular 16
	33 Sawtooth 32
	65 Pulse 64
	129 Noise 128

(Note: the OFF value is the ON value –1)

5	Attack * 16 + Decay
6	Sustain * 16 + Release

* These registers are only used if Pulse waveform is selected

Any of the registers may be set with the POKE instruction. For example, to set register R, POKE S+R with the required setting. Since registers are actually memory locations in the peripheral SID chip, and not in normal RAM or ROM, they are 'write only' locations. This simply means that it is possible to POKE to them but not possible to PEEK the location to read its value. A PEEK of a SID register always returns the value 0, irrespective of the setting.

Registers may be set in any order EXCEPT for the waveform register S+4. This must be set LAST since this controls the waveform GATE which actually activates the sound. When the note is 'gated', the sound is produced at the given frequency in the selected waveform controlled by the ADSR settings.

Unfortunately,we do not have the space to discuss the programming of sound in depth in this issue. However, there are six steps involved in getting the SID to produce a sound. These are

1. Set Volume in S+15, usually to maximum of 15

2. Select frequency from a table. For complete accuracy, two values are required; the low frequency number and the high frequency number. These are POKEd into S and S+1 respectively. However, for many sounds it is viable to use only the high frequency number. By the way, the tables of notes provided in the C64 User Manual, p. 152-3, and the C64 Programmers Reference Guide, p. 384-5, are inaccurate for Australian and European C64s. We will remedy this situation next month. But, for now, continue to use these values; they are sufficient to experiment with.

3. Chose attack, decay, sustain, and release settings from range of 0-15 and POKE them to the appropriate registers. It is a good idea initially to use the maximum sustain level of 15, thereby assuring maximum sound output.

4. Select a waveform (leave pulse waveform alone for a while) and POKE the ON value to the waveform register S+4.

5. Allow the note to play for some period by using a FOR/NEXT delay loop.

6. Turn waveform gate off by POKEing the waveform register with the OFF value. The sound will now die away as controlled by the release setting.

A simple program to perform this would be

```
100 REM SINGLE NOTE IN ONE VOICE
110 S=54272
120 POKE S+24,15: REM VOLUME TO MAXIMUM
130 POKE S,214: POKE S+1,28: REM FREQ OF NOTE A-4
    FROM TABLE
140 AT=2:DE=5: REM ATTACK AND DECAY
150 POKE S+5,AT * 16+DE
160 SU=15:RE=10: REM SUSTAIN AND RELEASE
170 POKE S+,SU * 16+RE
180 POKE S+4,17: REM 'GATE' TRIANGULAR WAVE ON
190 FOR T=1 TO 2000: NEXT :REM WAIT 2 SECS
200 POKE S+4,16: REM WAVEFORM 'GATE' OFF
```

In the next issue we will continue our discussion of sound programming in more depth. However, if you enter the following keyboard program, you will be able to experiment with the waveform and ADSR settings to try the different effects.

(☆☆Refer to NICE LISTER elsewhere in this issue for instructions on how to enter the following program.☆☆)

```
10 REM (C) GREG PERRY, BRISBANE 1984
100 REM SIMPLE SOUND KEYBOARD
110 DIM N(13),K(13,2):P$="(SPACE16)"
120 S=54272:A(2)=9:A(4)=17:OC=3:PW=4000:Q=0:
    PF=1:PF$="POLY"
130 FOR I=1 TO 13: READ N(I): NEXT : FOR I=1 TO 13:
    READ K(I,0): NEXT
140 FOR I=0 TO 28: POKE S+I,0: NEXT
150 POKE 54296,15:GOSUB 450:GOSUB 630
170 GOSUB 600: POKE 53281,2: PRINT
    "CHANGE(SPACE)ADRS(SPACE)AND( SPACE)WAVE"
180 POKE 198,0:SL=7: FOR I=0 TO 4: IF I=4 THEN SL=14
190 GOSUB 610: INPUT A(I)
195 IF I=4 THEN IF (A(4)=17 OR A(4)=33 OR A(4)=65 OR
    A(4)=129) T HEN 220
200 IF I<4 AND A(I) >-41 AND A(I) <16 THEN 220
210 GOSUB 700:SL=SL-1: GOTO 190
220 NEXT
230 P=PW: IF A(4)<>65 THEN P=0
240 FOR Q=0 TO 2: POKE S+3+Q*7,P/256:
    POKE S+2+Q*7,P AND 255
```

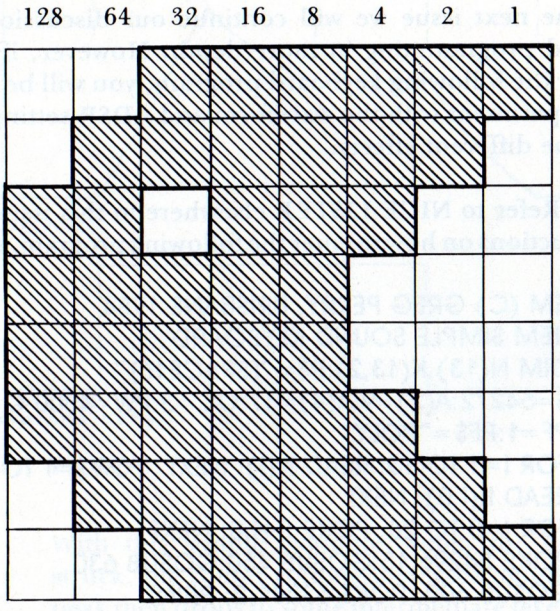
THE VIC MAGICIANS APPRENTICE

by Micheal Spiteri

Have you ever sat in front of your Vic trying to draw a picture on the screen but can never find the right shape or character on the keyboard that will make your picture complete?

Well now is your chance to design your own characters and create nearly any picture you wish onto the screen of your TV. The Vic-20 has 256 characters, 64 of which can be redesigned to suit your own needs and you dont have to be a computer genius to learn how to do this! To get you started I will slowly write a program that will draw a PACMAN shape. The first thing you have to do is to design a PACMAN. To do this you first have to draw up onto a squared sheet of paper an 8 by 8 squared grid. At the top of the grid you have to write 8 numbers starting from the left hand side with 128 then halve it and write the next number which should be 64, then 32, 16, 8, 4, 2, and finally 1. Then you have to fill in the squares until a PACMAN kind of shape can be noticed.

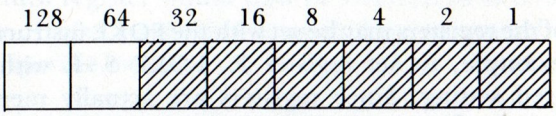
For example:



Although it doesn't look as convincing as the arcade favourite, maybe later you could design a better looking PACMAN. Well at least now we know what we want to print onto the screen. Now comes the good part, getting the computer to kindly create and store the character into its memory!

First we have to somehow turn our little character into 8 numbers so that the computer can understand us. We do this by taking each row of the grid seperately and converting it first into a BINARY number and then into a DECIMAL number. Don't panic! it isn't as hard as it sounds!

Lets begin by putting the first row by itself –



Next we replace the un-filled squares with 'O' and the filled squares with a '1' and we should be left with:

0 0 1 1 1 1 1 1

This is what we call a BINARY number, which then we have to convert it to a DECIMAL number and this is where those funny little numbers at the top of our grid come in.

Look at the first number (128).

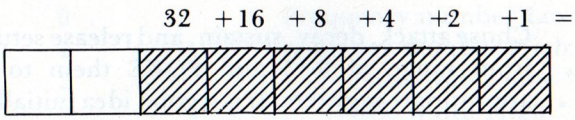
Is there a 'O' or '1' beneath it?

Well, if we are using the first row, then there is obviously a '0' beneath the 128. We then look at the next number which is 64 and you ask the same question. Well there is a '0' below the 64. So, we forget all about those two numbers because there is a '0' beneath them.

Next we go to the next number which is 32, is there a '1' beneath it? Yes, there is, so what you do is write it down somewhere. You then do the same thing to next number which is 8, and you will notice that there is a '1' beneath it as well, so you write it down next to the other number you wrote down somewhere! You keep doing this to all the other numbers with a '1' beneath it and ignore the numbers with a '0' beneath them.

"WHAT DO I DO NEXT!!?", you ask eagerly.

Well, you collect up all of those numbers you wrote down for that row and you add them up together and PRESTO! you should have a decimal number. In this case it should be 63. You then write this number next to the correct row like so:

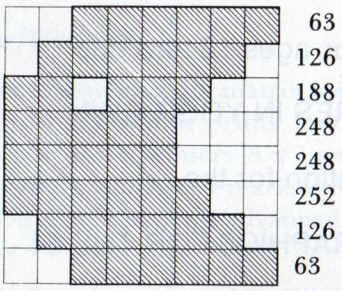


If the decimal number adds up to 0 then the row you are adding up has no squares filled in at all.

But if it adds up to more than 255 then you are in trouble so add them up again.

Designing Your Own Characters

Once you have done the first row you then do the next row and then the next and the next until you have done the whole grid and you should be left with 8 DECIMAL numbers like this:



So at last we have got our 8 numbers that we will feed to the computer via a computer program . . . . read on First we type out these two lines –

```
10 POKE 36869, 255
20 POKE 52, 28: POKE 56, 28: CLR
```

All these two lines do is get us into an empty area and give us more memory to place our characters in. Line 10 pokes us into the best place for storing our designed characters. Location 36869, 265 gives us 64 characters to redesign. Line 20 opens up the Vics memory giving us some to use. Our next line is –

```
30 FOR I=7168 TO 7679: POKE I, PEEK (I+25600):NEXT
```

This line moves all of the 64 characters that can be redesigned open to you, this makes redesigning the characters much easier and more accessible.

Next you have to choose what character you want your PACMAN to replace. The starting location for the 64 characters is 7168. Here are the starting and the finishing locations for the first ten characters of the 64. Don't worry if you don't understand just yet what I mean, I will show you how they are used later.

CHARACTER	STARTING LOCATION	FINISHING LOCATION	DISPLAY CODE
@	7168	7175	0
A	7176	7183	1
B	7184	7191	2
C	7192	7199	3
D	7200	7207	4
E	7208	7215	5
F	7216	7223	6
G	7224	7231	7
H	7232	7239	8
I	7240	7247	9

You will notice that the difference between the starting and finishing location of each character is 8 – 1 for each row of the character grid of that character.

Let's redesign the letter A with our PACMAN.

Type out these two last lines–

```
40 FOR C = 7176 TO 7183: READ A: POKE C, A: NEXT
50 DATA 63,126,188,248,248,252,126,63
```

What these two lines do is counts through every row of the letter 'A' and replace the DECIMAL NUMBERS (not these again!!) with our 8 DECIMAL numbers (which are stored in the DATA line, line 50).

NOW, when you run our program, all the letter A's on the TV screen will turn into our little PACMEN.

HOORAY – If you got this far, that means you can go on and design your own characters. HOW do I design more than one character at once?

Well, say we want to redesign A B C and D we change line 40 to read –

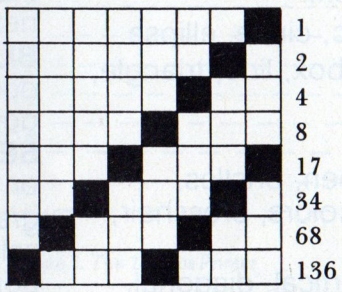
```
40 FOR C=7176 TO 7207: READ A: POKE C, A:NEXT
```

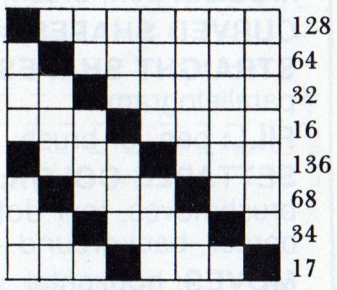
The first number is the starting location of A and the last number is the ending location of D.

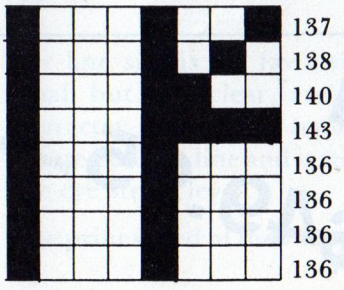
And since you are changing four characters, not one, then you should have 32 decimal numbers, not 8.

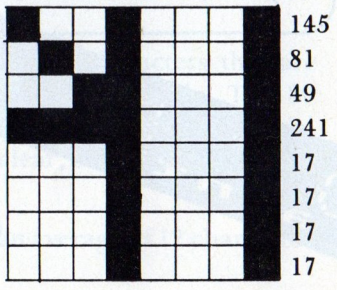
HUH???

Let me show you



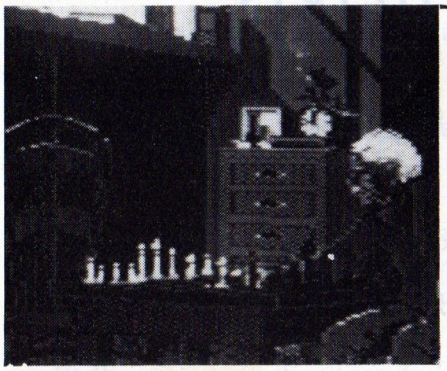






PAINTPIC™

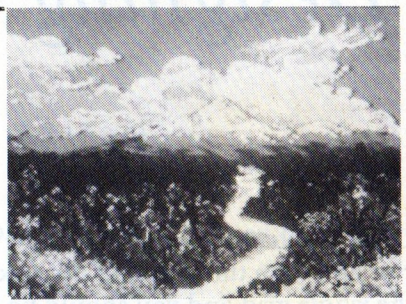
SUPER ART FOR THE COMMODORE 64



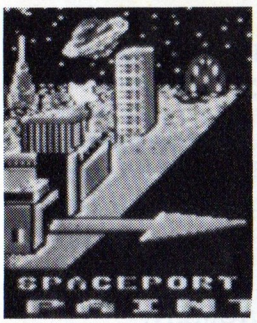
by

KIWISOFT™

PROGRAMS



"There's nothing like it!"



EDUCATIONAL ART: Art the modern way. For ages 12 and up.
FUN: You design it, PAINTPIC does the work.
PROFITABLE TOOL: PUT PAINTPIC PICTURES IN YOUR OWN PROGRAMS & GAMES.
SOPHISTICATED: Fourth generation application for the Commodore 64.
REVOLUTIONARY: THE END OF CRUDE GRAPHICS FOR THE 64

Step by step instructions, a good first program

PAINTPIC is a complete color drawing and painting application for the Commodore 64, using multi-color bitmap. It is designed to be easily used by young first-time computer enthusiasts. It also provides so much that professional artists will be able to produce publishable work.
PAINTPIC requires no joystick, printer, or anything special beyond basic computer, tape-drive and color TV. Joystick can be used. Can run from disk.
The Manual is easy-to-read and has complete step-by-step instructions designed to quickly teach the new user how to draw pictures. It has been tested with both teenagers and professional artists. The manual also contains picture load and display program.
PAINTPIC incorporates a start-up attractor picture of the Rose, which automatically cycles through the sixteen Commodore colors.

MODES: pen, brush, text.
CURVED SHAPES: arc, circle, ellipse.
STRAIGHT SHAPES: box, line, triangle, parallelogram.
FILL: pen, or brush
SETTABLE COLOR: pen, bristles, brushmoves, four dot-colors, crosshair, border, background.
MOVES: horizontal, vertical, diagonal, by dot, brush width, character.
POINT MOVES: to start, end, midpoint, next home, perspective.
BLOCK MOVES: copy, rotate 90°, halve or double across or down, mirror across and down
SELECT FEATURES: file save/get picture or block to tape/disk; mix shapes, text, all graphics characters; eight storable brushes; select brush width; tilted shapes; perspective point and line; mark start, end, perspective point; Help Menus.

PaintPic

$49.95 plus P & P

The VIC Centre
416 Logan Road, Stones Corner,
Brisbane, Australia.
P.O. Box 274 Sunnybank Qld 4109
Tele: (07) 397 0888
STD FREE: (008) 777 130
(A division of CW Electronics)

THE VIC 1520 PRINTER/PLOTTER

By Jim Gracely

Article from Commodore: The Microcomputer, Volume 5, Number 1

Commodore has a new printer/plotter for use with the VIC 20 and the 64. Although the word "printer" appears first in the name, I only thought of it as a plotter. In fact, it wasn't until after I read the manual that I even realized that it could print! In this article, we'll examine some of the features of the 1520 and present some of its better points.

What Is a Printer/Plotter?

The main difference between a dot matrix printer and a printer/ plotter is in the way it prints. A dot matrix printer has a block of tiny hammers (5 x 7 on the 1525) that hit the printer ribbon and make marks on the paper. At the end of each line, the paper is advanced and a new line is started.

The 1520 printer/plotter, on the other hand, has four small pens held in position off of the paper. When something is to be printed, one of the pens is brought in contact with the paper. Because only one pen is used at a time, the paper must be moved up and down to make lines. If you watch a printer/plotter while it prints a word, you will notice that it actually draws each line of each letter.

The VIC 1520

The 1520 printer/plotter comes all ready to start printing and plotting. Many people think that the 1520 is larger than it really is. It is about 26cm wide, 150cm deep (230cm including the paper roll) and 6cm high. My trusty assistant has demonstrated to me that the 1520 takes up the same table space as two diskettes laid side-by-side.

In addition to the printer/plotter itself, you get everything else you need to start. You get a serial cable that plugs into the serial port on either the 64 or the 1541 disk drive. You also get one roll of paper 11.5cm wide and four pens (one each, blue, black, green and red). The pens are easy to install and the paper is on a roll, mounted to the rear of the printer. In just a few minutes the printer/plotter is ready to go.

There is one major difference between the hardware configuration of the 1520 and all of Commodore's other printers-it is device number six (not four). This is a little confusing at first, but it doesn't take long to get used to.

The 1520 as a Printer

The 1520 is a very good quality printer, because the letters are actually drawn and not impacted onto the paper. In addition to this, you can specify any of four printing sizes. The four printing sixes are: 10, 20, 40 or 80 characters per line (see Figure 1). The ten character-per-line size is my favourite, with characters that are small but very clear, and fill the line nicely. The 80 character-per-line size is nice if you want a lot of material printed on one line and is still clear, but it is approaching the eye strain level.

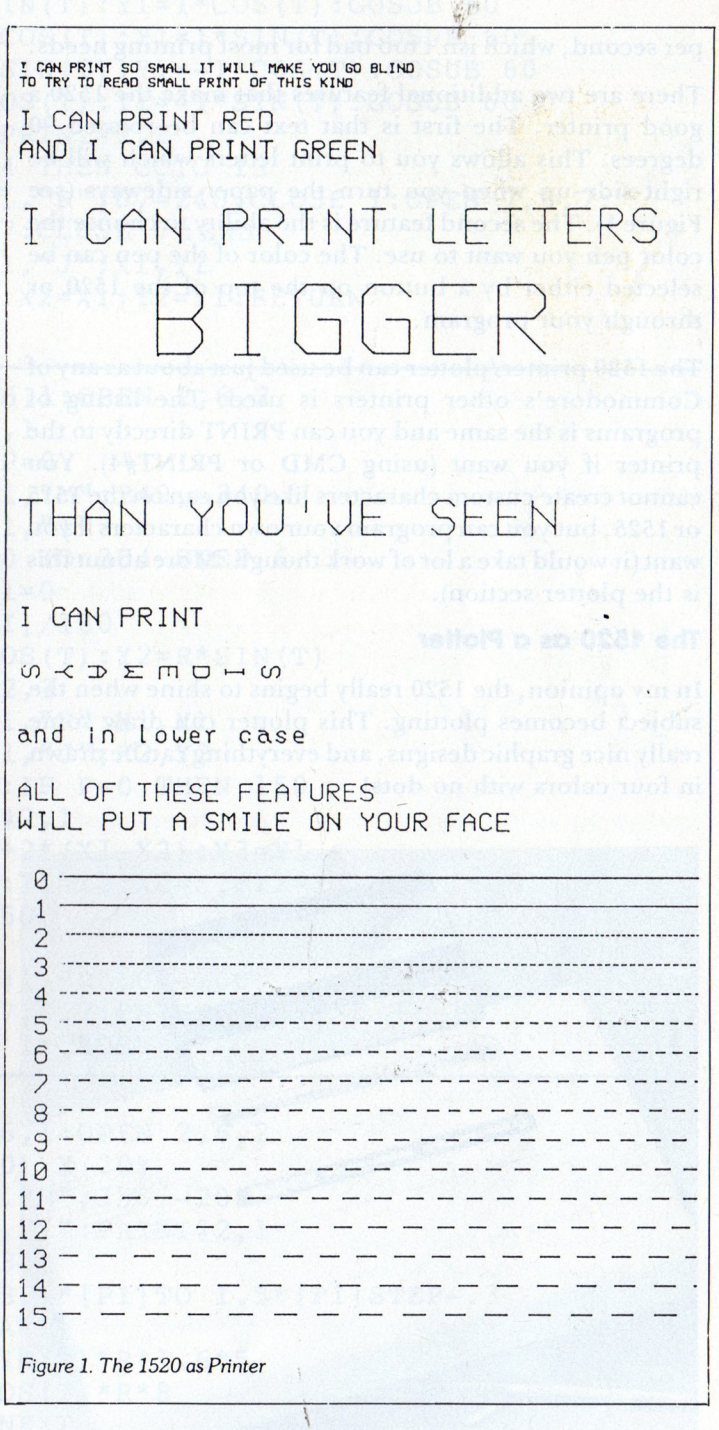


Figure 1. The 1520 as Printer

The print speed of the 1520 is an average of 12 characters

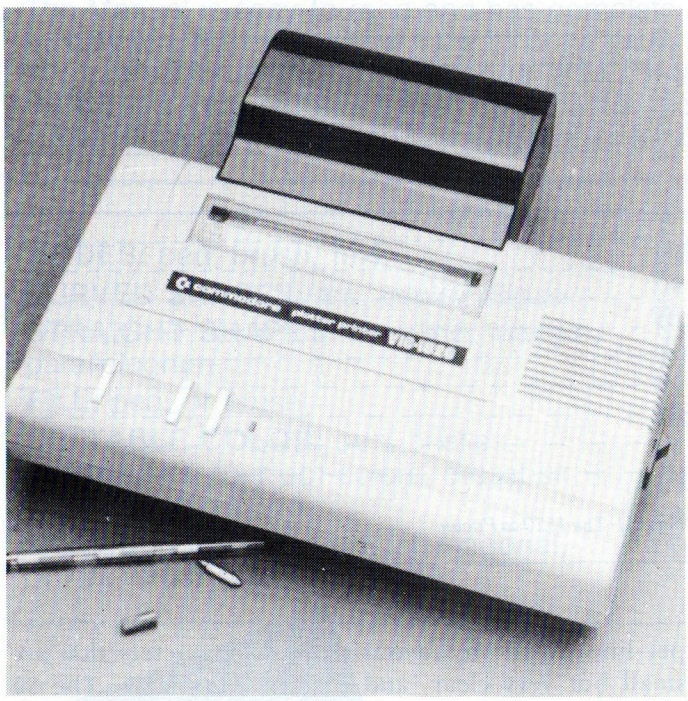
per second, which isn't too bad for most printing needs.

There are two additional features that make the 1520 a good printer. The first is that text can be rotated 90 degrees. This allows you to print letters which will be right-side-up when you turn the paper sideways (see Figure 1). The second feature is the ability to choose the color pen you want to use. The color of the pen can be selected either by a button on the top of the 1520 or through your program.

The 1520 printer/plotter can be used just about as any of Commodore's other printers is used. The listing of programs is the same and you can PRINT directly to the printer if you want (using CMD or PRINT#4). You cannot create custom characters like you can on the 1515 or 1525, but you can program your own characters if you want (it would take a lot of work though. More about this is the plotter section).

The 1520 as a Plotter

In my opinion, the 1520 really begins to shine when the subject becomes plotting. This plotter can draw some really nice graphic designs, and everything can be drawn in four colors with no dots!



The plotter paper is set up like a big grid and you can move or draw from anywhere to anywhere on that grid. The grid has 480 blocks across the paper and a +/− 999-block range of the paper vertically. This is a large working surface. It represents almost 960,000 individual points that each pen can be moved to (from now on I'll refer to them as plotter pixels). The high resolution screen of the 64 is only (only?) 64,000 pixels, so we have 16 times as many pixels to work with.

One of the nicest plotting features is the ability to use both absolute and relative positioning. The position of the pen when the plotting file is opened is the absolute 'home' (X=0:Y=0) position. Any absolute moves or draws are relative to this position. You can also set any other point as a relative home position, and any relative moves will be relative to this point. This allows you to move the relative home position from the left side of the paper to the middle of the paper. The hours of grief that this will avoid can only be appreciated by those of us who have graphics on the VIC or 64.

Plotting graphs or graphics on the 1520 is nothing more than drawing lines between points. Anything that you can draw on a piece of graph paper you can plot on the 1520. Of course coming up with things to plot is not the easiest task to accomplish. For those of you who already have the 1520, I have included three of my favourite plot programs to get you started.

In conclusion, I must say that I found the 1520 much more fun to work with than I had first expected. The paper is just the right width for printing out directory listings, and even some machine language code. The plotting capabilities had me pouring over designs I had previously created, translating them to the 1520 (and they were much shorter in every case!). All in all I think that it is a great little printer.

Cubic Spiral See top right

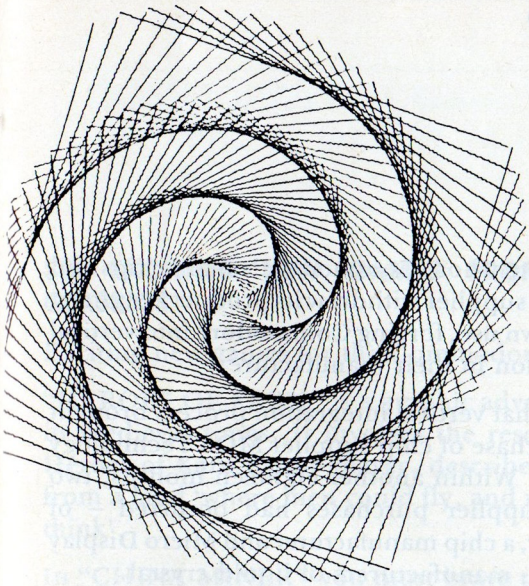
Graphix See middle right

Geosnail See bottom right

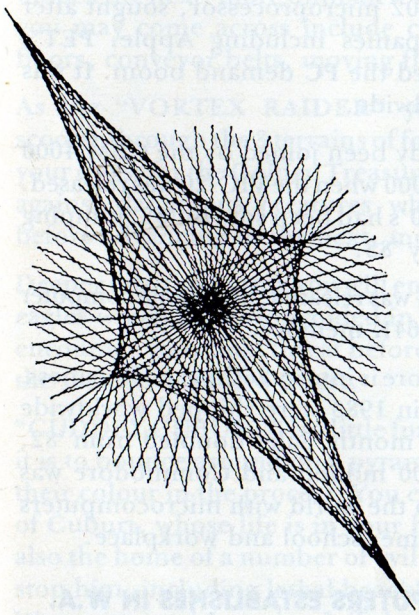
STOP PRESS

TURBOCHARGER has been released. This is a 3 minute disk copier program for a single 1541 drive.

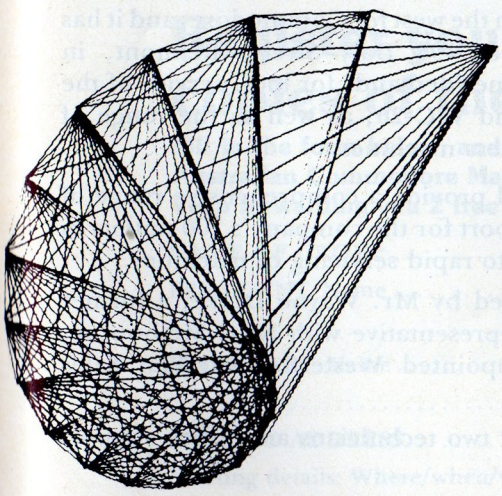
Further details next issue or if you can't wait ring Ralph Down (075) 32 4028 (8am-10am)



```
5 OPEN 1,6,1:OPEN 2,6,2
6 PRINT#1,"M";240,-240
7 PRINT#1,"I"
10 I=240:A=-5:S=1000:M=S+1:Z=1
12 PRINT#1,"R";0,I
13 A=A+5:T=A*[PI]/180
15 X1=I*SIN(T):Y1=I*COS(T):GOSUB 60
20 X1=-I*COS(T):Y1=I*SIN(T):GOSUB 60
25 X1=-I*SIN(T):Y1=-I*COS(T):GOSUB 60
30 X1=I*COS(T):Y1=-I*SIN(T):GOSUB 60
35 Z=4-Z:PRINT#2,Z
40 IF I>=4 THEN GOTO 13
50 PRINT#1,"R";0,-240:CLOSE 1:OPEN 7,6,7:
   PRINT#7:CLOSE 7 :END
60 PRINT#1,"J";X1,Y1
100 I=I-1:X2=X1:Y2=Y1:RETURN
```



```
5 OPEN 1,6,1:OPEN 2,6,2
7 PRINT#2,1
10 R=120:P=0
12 PRINT#1,"M";240,-240
13 PRINT#1,"I"
15 FOR I=0 TO 354 STEP 6
20 X1=0:Y1=0
25 T=I*[PI]/180
30 X2=R*COS(T):Y2=R*SIN(T)
40 PRINT#2,3
50 PRINT#1,"R";X1,Y1
60 PRINT#1,"J";X2,Y2
110 P=1-P:IF P=0 THEN 150
115 PRINT#2,1
120 X3=X1+2*(X1-X2):Y3=Y1
130 X1=X2:Y1=Y2:X2=X3:Y2=Y3
140 GOTO 50
150 NEXT
155 PRINT#1,"R";0,-200
160 OPEN 7,6,7:PRINT#7:CLOSE 7
170 CLOSE 1:CLOSE 2
```



```
1 OPEN 1,6,1:OPEN 2,6,2
2 DIM X(20),Y(20)
3 PRINT#1,"M";350,-200
4 PRINT#1,"I":PRINT#2,1
5 Z=0:A=.34
10 FOR T=3.5*[PI]TO 1.5*[PI]STEP-.3
20 R=EXP(A*T)
30 X(Z)=SIN(T)*R*1.6*5
40 Y(Z)=COS(T)*R*8
50 Z=Z+1:NEXT
100 FOR I=0 TO 19:FOR J=I+1 TO 20
110 PRINT#1,"R";X(I),Y(I):PRINT#1,"J";X(J),Y(J)
115 PRINT#2,I AND 3
120 NEXT:NEXT
130 PRINT#1,"R";0,-300
140 OPEN 7,6,7:PRINT#7:CLOSE 7
150 CLOSE 1:CLOSE 2
```

News Releases CONTINUED

Continued from page 4

Subscript and superscript options are also available on the printer, simply by using the print half line function.

The number of characters per inch can be changed by using either a switch or software, with character spacings of 10, 12 or 15 CPI or proportional spacing.

While the printer is bi-directional, a uni-directional print phase can be selected.

The DPS1101 uses IBM cartridge ribbons.

Retailing for a recommended price of around $799, the DPS1101 is one of the most economical daisy wheel printers on the market.

25TH ANNIVERSARY HIGHLIGHTS

1983 marked Commodore's anniversary.

It also marked the significant position of Commodore products in the international market place and highlighted some important facts about the company.

Commodore was first into microcomputers and first to put one on the office desk.

Commodore was also the first to make a real computer for the home. And they now make them on three continents.

Commodore users enjoy an unrivalled range and variety of software and today over 4 million of their microcomputers, in over 140 countries, set the standards by which others are judged.

Commodore teaches more children in more of the world's schools than anyone else.

Commodore is also unique in being solely responsible for their product quality: Commodore designs and builds every component of their microcomputers.

Commodore has come a long way since starting in 1958 as a typewriter mending business in Toronto, Canada.

This chronological wrap-up spells Commodore's progress since then:

1962 Commodore bought a West German typewriter-manufacturing factory in Berlin and also started importing mechanical adding machines from Japan.They commissioned the manufacture of high quality electronic calculators.

1969 Commodore manufactured the first 'hand-held' calculator. The range developed.

1975 What could have been a fatal blow turned in fact into a unique quality: Commodore manufactures from go to whoa. Commodore's main chips and displays supplier withdrew its product keeping it for its own use, forcing Commodore into vertical integration in their manufacture.

1976 Part of that vertical integration process brought the purchase of chip supplier MOS Technology in 1976. Within another eighteen months, two more supplier purchases had occurred – of Frontier, a chip manufacturer and Micro Display Systems, manufacturers of liquid crystal.

1977 The PET computer was released. PET used MOS Technology 6502 microprocessor, sought after by other companies including Apple. PET's release triggered the PC demand boom. It was marketed wordwide.

1980 PET had already been joined by the CBM 4000 and the CBM 8000 when the VIC-20 was released. 800,000 VIC-20's had been sold by '82, jumping to 1,500,000 by '83.

1982 Commodore 64 was released, first home computer with the huge 64K memory.

1984 Now Commodore is into its 26th year of business. Commodores in 1983 were shipped worldwide at 250,000 per month. Sales doubled from '82, topping $US100 million and Commodore was number one in the world with microcomputers installed in home, school and workplace.

COMMODORE COMPUTERS ESTABLISHES IN W.A.

Commodore Computers has opened a new office in Perth to handle the rapid growth in computing in Western Australia.

It's the first office in the west for Commodore, and it has been established at 198 Daly Street, Belmont, in response to consumer demands for local service of the Commodore 64 and VIC-20, as well as the range of Commodore business machines.

The new office will provide a comprehensive range of services, from support for the company's 200 outlets in Western Australia to rapid servicing of machines.

The office is headed by Mr. Wayne Drake, a former Dealer Product Representative with NEC Melbourne, who has been appointed Western Australian Sales Manager.

He's supported by two technicians and office support staff.

Commodore in Western Australia may be contacted on (09) 478.1744.

SIX EXCITING NEW GAMES FROM COMPUTER CLASSICS

Exciting new games for the Commodore '64'.

"HEROES OF KARN" is a graphic adventure game set in medieval times. It involves the rescue of the four Heroes of Karn by the player, described as a Stranger from a land 'where men could fly, and machines could think'.

In "CHINA MINER" you must brave the perils of the Jade Mines in search of treasure and the keys which unlock the next, more difficult level. Some of the threats you may come across include chasms and collapsing floors, conveyor belts, moving floors and laser beams.

As the "VORTEX RAIDER" you must fly your jet scooter through the 3 terrains of forest, temple and sea in your quest for the Golden Treasure Chest. You are pitted against dangerous creatures which you must defeat before advancing to the next, more dangerous stage.

Deeper into the Vortex you will encounter giant mutated eagles which must be avoided in order to survive, then encounter your final threat before claiming your prize – the Golden Treasure Chest.

"CUDDLY CUBURT" is a little furry creature whose task it is to bounce around on a pyramid of cubes, changing their colour in the process. You control the movements of Cuburt, whose life is in your hands. The pyramid is also the home of a number of evil characters who aim to stop him, including lethal beachbals, Coily the Cobra, Wrongway and Jumping Jeff the Gippy Jester.

If Cuddly Cuburt falls off, you must start again. When all the pyramid has been changed to a new colour, Cuddly Cuburt moves on to the next level.

"SIREN CITY" has been described as 'the roughest game in the whole USA'. The city is a maze of skyscrapers and seemingly peaceful suburban roads, but on its streets lurk some of the toughest criminals not behind bars. As a rookie patrolman, it is your job to keep law and order.

Some of the criminals you may encounter include Slit-Throat Steve; Public Enemy No. 1, Dune-Buggy Jon; Public Enemy No. 7 and the evil Dr. J. Davis Ph.D, V.E.A.S.

Details of each assignment will come over the teleprinter if requested, and your performance will be assessed by your superiors and a place may be given to you on the City Roll of Honours.

These great new games from Interceptor Micros are available on both tape and disk from computer specialists, electrical retailers and department stores and sell for around $25 (tape based) and $30 (disk based).

Computer Classics has also released "ZONE SIX", an action game for the Commodore '64'. This exciting and demanding game is ideal for every computer game enthusiast and is sure to provide plenty of non-stop entertainment and challenge.

For further information, please contact Gerry Gerlach, Computer Classics, 286 Pacific Highway, NORTH SYDNEY N.S.W. 2066 Telephone; (02) 438-4866. ■

FREE OFFER!

Register your User Group and receive FREE copies of the Commodore Magazine

Fill in the form below, and we will send your Group 2 free copies of the biggest and brightest Australian Commodore Magazine. Keep us informed of your activities each month and we will keep forwarding you 2 free issues as they are published.

NAME OF GROUP .....

PRESIDENT Name ..... Address .....

.....

SECRETARY Name ..... Address .....

.....

MAILING ADDRESS .....

Meeting details: Where/when/why .....

..... Number of members .....

Signed: ..... President

Offer may be changed or cancelled without notice.

We will print details and give free publicity to every Group that responds. If you keep us up to date, we will publish that also. Send to: Kim Books (address on page 3)

MOONLANDER

by Paul Elvey

Use F1 to increase thrust
Use F3 to decrease thrust

```
50 x=rnd(-ti):Poke36879,93
100 t=0:f=9999:v=rnd(1)*500-1850:a=0:d=150000*rnd(1)+250000
200 Print"■■■thrust":Print"■fuel"tab(18)"l":Print"■accel."tab(18)"9"
210 Print"■velocity"tab(18)"km/h":Print"hei9ht"tab(18)"km"
500 ifPeek(197)=39andt<100thent=t+1
510 ifPeek(197)=47andt>0thent=t-1
520 Poke36878,0:forx=1to10:next:Poke36878,15
600 ift>fthent=f:9oto620
610 f=f-t
620 d=d+v*.5+1.25*a
630 v=v+a*5
640 a=lo9(1+t*.3)-1/(1+d*.00001)
700 Print"■■■"tab(13);ri9ht$(" "+str$(t),3)"■■"
710 Printtab(13);ri9ht$("  "+str$(f),4)
720 Print"■"tab(12);left$(str$(a),5)
730 Print"■"tab(12);left$(str$(v*3.6),5)
735 ifd<999then760
740 Printtab(11);left$(str$(d*.001),6):9oto780
760 Printtab(11);left$(str$(d),6)" m "
770 ifd<1then1000
780 ifd>500000thenPrint"■lost in sPace":9oto900
790 ifabs(v)>1850thenPrint"■craft has broken uP":9oto900
800 Print"■■":iff<999andf>0thenPrint"■arnin9! fuel low":9oto820
810 Print"                "
820 Print:ifabs(v)>1700thenPrint"■arnin9! reduce sPeed":Poke36875,abs(v)-1600:9
oto500
830 Print"                          ":Poke36875,0
840 9oto500
900 9eta$:ifa$="■"then100
910 9oto900
1000 Print:ifv<-99thenPrint"■lander destroyed":9oto900
1010 ifv<-9thenPrint"■eavy landin9":9oto900
1020 Print"■ con9ratulations on a safe landin9":9oto900
```

MASTERMIND

Use numbers 1 to 8 to enter colours (e.g. 1=BLK, 2=WHT, etc). You have to 10 guesses. A white peg means you got the right colour but in the wrong place.
A black peg means you got the right colour in the right place.

```
100 x=rnd(-ti):Poke36879,155:Poke36878,7
110 fori=0to4:c(i)=int(rnd(0)*8):next
120 Print"■■■■■■■■mastermind■"
130 for9=1to10
140 t=0:fori=0to4:x(i)=0:y(i)=0:next:Print9;tab(4);
145 forP=0to4
150 9eta$:ifa$=""then150
160 ifa$<"1"ora$>"8"then150
170 b(P)=asc(a$)-49:Print" "mid$("■■■■■■■",b(P)+1,1)"0";
175 Poke36875,199+2*b(P) :forz=1to70:next:Poke36875,0:next
180 Print"  ";:fori=0to4
190 ifc(i)=b(i)thenPrint"■";:t=t+1:x(i)=1:y(i)=1
200 next
210 fori=0to4
220 ifx(i)=1then260
230 j=0
240 ify(j)=0andb(i)=c(j)thenPrint"■";:y(j)=1:9oto260
250 j=j+1:ifj<5then240
260 next:Print"■■":ift=5then290
270 next:Print" it was";:fori=0to4
280 Print" "mid$("■■■■■■■",c(i)+1,1)"0";:next:9oto300
290 Print" con9ratulations"
300 9eta$:ifa$<>"■"then300
310 9oto110
```

BOOK REVIEW
Continued from page 27

BUSINESS APPLICATIONS FOR THE COMMODORE 64 - Techniques and subroutines for business users.

Reviewed by: Greg Perry

This book is designed "to enable those thinking of using the C64 for business to design and write their own programs ..... to show the user how to produce working programs in such a way that the lack of programming experience is not a serious disadvantage." The jacket blurb reinforces this theme-"cuts through the software jungle... programs are designed specifically for the C64, making full use of the peripherals available. If you are considering applying the power of the C64 to your business, this book is the most cost-effective start you can make". Admirable aims, you must agree, but a tall order in practice, especially in a 200 page book. Does it succeed? Like many claims for books these days, I'm afraid the answer is no. However, do not be put off by my cynical view. The book does indeed provide many useful routines as well as a good overall discussion on writing programs.

The author approaches this daunting task in an easily readable style, with considerable attention to the finer details. The book leads the reader through a number clearly laid out discussions on the general concept of writing business style programs, data file structures for records and fields and standard input/output operations, and then provides several example applications using these concepts.

The early sections of the book provide a number of useful subroutines to perform many of the common program tasks. These include

- Numeric and alphanumeric input routines using the GET command which allow entry of only the desired number and type of characters and with full editing of the entry field.
- Creating a menu
- Cassette and disk handling of data files.
- Editing of files from tape and disk.
- Output to printers, including a section on using non-commodore printers and how to tell whether the printer is actually switched on using the STatus variable.

Most of these subroutines interact with each other and are designed with a modular programming style in mind. This is good for the reader, since, with the simple utility routines provided, such as program merge from tape and simple renumber and delete line routines, the reader is able to save these routines separately then merge them together to create a useful application program at a later date. Most of these subroutines seem well thought out and are presented in annotated sections which clearly explain their operation.

Unfortunately, the book is largely orientated towards the tape user and the disk handling routines are limited to sequential files only, relative files are not mentioned. I also wonder whether the extensive use of the GET statement in the input subroutines will lead to the horrific garbage collection problem of BASIC 2.0 to rear its head. (Garbage collection occurrs when using extensive string manipulation in the C64. It eventually runs out of free space to store new strings and just sits there for endless periods doing nothing but cleaning up its RAM memory to find some new space.)

The later sections use these subroutines as well as extra code to provide several useful application programs including

- Day to day accounting
- Stock control
- Transaction analysis- monthly statements, balance sheets etc.
- Simple word processing including form letters
- Society mailing list

Overall, the book will be of great use to those who know something about the C64 and BASIC and wish to expand their horizons to actually write useful programs. Beginners should learn quite a lot from studying the details of the programs and especially from the general approach to creating and writing application programs. Most of the code is error free although some errors have crept in as usual.

Title:	BUSINESS APPLICATIONS FOR THE COMMODORE 64
Author:	James Hall
Price:	$19.95
Sample from:	Computer Reporting Services Level 12, Town Hall House 456 Kent St. Sydney (02) 267 1066

```
250 POKE S+5+Q*7,A(0)*16+A(1): POKE S+6+Q*7,
    A(2)*16+A(3): NEXT
260 Q=0: GOSUB 450
270 GOSUB 600: POKE 53281,6:
    PRINT"PLAY(SPACE)NOTES"
280 K=PEEK (197): IF K=64 THEN 280
290 IF K=60 THEN 750
300 IF K=4 THEN GOSUB 630: GOTO 270
310 IF K=5 THEN GOSUB 640: GOTO 270
320 IF K=6 THEN 170
330 IF K=3 THEN POKE 54296,0: POKE 198,0: END
340 N=0: FOR I=1 TO 13: IF K=K(I,0) THEN N=I:I=13
350 NEXT
360 IF N=0 THEN 280
370 IF PF THEN Q=Q+1: IF Q>2 THEN Q=0
380 IF K(N,1)>255 THEN 280
390 POKE S+1+Q*7,K(N,1): POKE S+Q*7,K(N,2)
400 POKE S+4+Q*7,A(4)
410 FOR T1=1 TO 50*A(0): NEXT
420 IF PEEK (197)=K THEN 420
430 POKE S+4+Q*7,A(4)-1
440 GOTO 280
450 PRINT "(CLR)OCTAVE(SPACE)"OC: TAB(15)
    "KEYBOARD(SPACE2)OR(SPACE)F1,3,5,7"
460 PRINT TAB(10)"(<N>,RVS,SPACE,RIGHT,SPACE,
RIGHT,SPACE,B,SPACE )";
465 PRINT TAB(10)"(RIGHT,SPACE,RIGHT,SPACE,RIGHT,
    SPACE,B,OFF,<J> )"
470 PRINT TAB(10)"(<N>,RVS,SPACE,OFF)2(RVS,
    SPACE,OFF)3(RVS,SPACE,B,SPACE,OFF)";
475 PRINT TAB(10)"5(RVS,SPACE,OFF)6(RVS,SPACE,
    OFF)7(RVS,SPACE,B,OFF,<J>)"
480 PRINT "MODE" TAB(10)"(<N>,RVS,SPACE,B,
    SPACE,B,SPACE,B,SPACE, B,SPACE,B,SPACE,B,
    SPACE,B,SPACE,<L>)"
490 PRINT PF$: TAB(10)"(<N>,RVS)Q(B)W(B)E(B)R";
495 PRINT TAB(10)"(B)T(B)Y(B)U(B)I(<L>)"
500 PRINT "(DOWN)NOTE" TAB(10)"(SPACE)C(B)D(B)E
    (B)F(B)G(B)A(B)B(B)C"
510 PRINT "(DOWN)ADSR(SPACE)VALUES(SPACE2)0
    (SPACE)-(SPACE)15"
520 PRINT "ATTACK(SPACE6)"A(0)
530 PRINT "DECAY(SPACE7)"A(1)
540 PRINT "SUSTAIN(SPACE5)"A(2)
550 PRINT "RELEASE(SPACE5)"A(3)
560 PRINT "(DOWN)WAVEFORMS(SPACE2)TRI(SPACE2)
    SAW(SPACE2)PUL(SPAC E2)NOI"
570 PRINT "NUMBER(SPACE6)17(SPACE3)33(SPACE3)
    65(SPACE2)129"
580 PRINT "WAVEFORM(SPACE3)"A(4)
590 RETURN
600 SL=19
610 SL=SL+1: POKE 214,SL: PRINT : PRINT TAB(15)SP$:
    POKE 214,SL: PRINT : PRINT TAB(15);
620 RETURN
630 OC=OC+1: GOTO 650
640 OC=OC-1
650 OC=OC+(OC>7)-(OC<0)
660 GOSUB 600: POKE 53281,2: PRINT "OCTAVE(SPACE)
    CHANGE"
670 FOR I=1 TO 13:F=N(I)*2(OC-4)
680 K(I,1)=INT (F/256):K(I,2)=F-K(I,1)*256: NEXT
690 PRINT "(HOME)OCTAVE(SPACE)"OC: GOSUB 600:
    RETURN
700 POKE S,6: POKE S+6,0: POKE S+5,8: POKE S+4,17
710 FOR J=400 TO 20 STEP -.5: POKE S+1,J: NEXT :
    POKE S+,16: RETURN
715 REM AUSTRALIAN NOTES FOR OCTAVE 4. C4 - C5
720 DATA 4455,4720,5001,5298,5631,5947,6300
730 DATA 6675,7072,7492,7938,8410,9440
740 DATA 62,59,9,8,14,17,16,22,19,25,24,30,33
750 POKE 214,3: PRINT
760 PF=1-PF:PF$="SOLO": IF PF THEN PF$="POLY"
770 PRINT PF$: FOR T=1 TO 100: NEXT
780 GOTO 280
```

Instructions:

The program allows you to play notes from a one octave keyboard. The frequency values used are exactly in key.

The 'F1' and 'F3' keys raise or lower the keyboard by an octave.

The 'F5' key displays the current ADSR and waveform settings and allows these to be changed.

The 'F7' key quits the program.

The SPACE BAR alternates between three voice polyphonic mode (where each successive note is played by a different voice) and single voice solo mode.

Notes will hold as long as a key is pressed and only when the key is released will the note die away under control of the release setting.

Experiment with the different settings, being sure to keep a record of the settings that produce what you consider is an interesting sound or effect. You will need these for later sound programming. The following settings are useful starting points for your experimentation.

INSTRUMENT (?)	Attack	Decay	Sustain	Release	Waveform
Violin	10	8	10	9	17
Drum	0	9	0	9	129
Piano	0	9	0	0	17
Piano	0	9	2	11	17
Harpsicord	0	9	0	0	33
Organ	0	0	15	0	33
Accordian	12	0	15	0	17

You may not agree with my suggestions, but that's what makes sound such a fascination subject. ■

I have just designed 4 characters, I have also worked out their decimal numbers (8 numbers for each character). All of these numbers are the ones that will eventually end up in line 50. The four letters I want to redesign are A B C and D. Now I will rewrite that program so that the computer will display my four characters –

```
10 POKE 36869, 255
20 POKE 52,28: POKE 56, 28: CLR
30 FOR I=7168 to 7679: POKE I, PEEK (I+25600): NEXT
40 FOR C=7176 TO 7207: READ A: POKE C, A: NEXT
50 DATA1,2,4,8,17,34,68,136,128,64,32,16,136,68,34,17,
60 DATA 137,138,140,143,136,136,136,136,145,81,49,
   241,17,17,17,17,
```

Notice I had to fit all of the numbers into two lines as they would not all fit in one.

I will just add a finishing touch –

```
70 PRINT "AB": PRINT "CD"
```

Now type RUN.

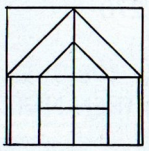
And a little pattern should appear on the screen. This pattern is made up from 4 characters – A B C D. Every time you hit one of those letters, part of the pattern should appear.

The letter A = 

The letter B = 

The letter C = 

The letter D = 

AB
CD = 

First experiment with your own designs, and then move onto something big.

You can improve your own game by adding little pictures into it, or if you ever improve enough to write your own space game, you can invent your own space invaders and give your game that arcade look. Remember, you can redesign up to 64 different characters!

NOTE: when you turn your Vic off you will lose all of the characters you designed until you write the program again and type it in.

So, good luck with creating graphic characters! ■

Continued from page 7

Commodore Disk Doctor

BASIC for temporary storage of variable information. This is especially important when many new strings are being used as in this case. After a while, the sprite pattern is simply overwritten by the storage of the new string. The problem can be overcome by either putting the sprite image at locations 828-892 (change lines 100 .....:POKE 2040,13 and line 110 FOR T =828 TO 892.....) or by lowering the top of BASIC memory to below location 12288 by 90 POKE 56,64: POKE 55,0:CLR.

Q. I have a small data base program which contains several FOR/NEXT and GOSUB statements. If I use the program for a short period, it works correctly. But, when I attempt to enter a long application, the program crashs with an OUT OF MEMORY error. However, if I check the free memory with ?FRE(0), it shows that I still have 15643 bytes free. What is happenning?

A. The problem is caused by one of two features. The program either uses too many GOSUB statements without the correct RETURN statements, or, more likely, falls into a classic trap of using an IF.. or GOTO within a FOR/NEXT loop. For example, the follwing type of program structure is inherently dangerous.

```
100 FOR Q=1 TO 1000
110 IF..something..THEN 500
120 NEXT
130...
```

What happens is that each time a FOR statement is encountered, the BASIC interpreter places a number of 'cards' on the microprocessor STACK. These cards are used to allow the processor to keep track of what loops are in operation, which line numbers they come from, the variable name, and other 'overheads'. If the FOR/NEXT loop reaches its correct conclusion, that is, when the loop variable (Q above) becomes greater than the end value (1000 in Line 100 above), then all these cards are removed from the stack. If not, these remain as rubbish to simply clutter the stack area. The stack is only 256 bytes long, and is vital for the normal operation of the processor. If it becomes too full of rubbish there will come a time when there is insufficient space for its normal operation. Hence, an OUT OF MEMORY error.

This problem can be avoided by the following structure in FOR/NEXT loops.

```
100 F=0: FOR Q=1 TO 1000
110 IF..... THEN F=Q4:Q=1000
120 NEXT
130 IF F<>0 THEN 500
```

NEVER get into the bad habit of having a GOTO inside a FOR/NEXT loop. GOSUBs are ok.

Q. I use a small program to calculate interest rates and bank balances. How do I ensure that the values contain only two decimal places.

A. This is an easy one. In general, to round any floating point number N to a set number of places use the following formula:

For two decimals : N=INT(N*100+.5)/100

For three decimals : N=INT(N*1000+.5)/1000

and so on.

Q. I use the EASY SCRIPT wordprocessor and a Commodore printer. I have no majour problems with normal text but it will not correctly print square brackets, the up arrow symbol and many Commodore graphics. Is there some way these characters can be printed correctly?

A. The correct method is to define a special character as discussed in the manual. However, the square brackets and up arrow problem can be solved another way. If you look at what characters EASY SCRIPT actually prints, you will see that for the '[', ']' and 'UP ARROW" characters it instead prints a shifted '+', shifted '–' and shifted 'UP ARROW". And, lo and behold, if you tell it to print a shifted '+', what appears is the '[' character. The solution then is, before the final print is done, to use the search and replace function to change the original characters to their shifted replacemants. By the way, try using the joystick in the back port with EASY SCRIPT. On some versions you can use it instead of the cursors – quite useful when viewing the format of a doccument.

Comment

I would also like to introduce two continuing sections to this column. Both allow you to WIN something for just a simple bit of programming – see below.

COMPETITIONS

COMPETITION 1. : The most interesting ONE LINE program. This may be a sound, graphics or other useful (?) routine. A one line game perhaph? ★★

There are only two conditions.

0) The routine must provide a continually changing output.
b) It must be able to be typed in directly from the keyboard. But, you may use as many abbreviations of the BASIC keywords as you can fit in 80 characters – two 40 column screen lines or four on the VIC.

Send your entries to "COMPETITION 1" at the address below.

COMPETITION 2 : The best computer solution to a set problem, or a good problem (which can be solved more easily by computer than by hand), with which we can tempt our readers.

I'll start this one off with a problem that fascinated me a number of years ago. It is extremely difficult to solve by hand. In fact, it's extremely difficult to solve period!

The Problem: Two computer experts, who live on country properties, are having a quiet drink in a country pub. Expert 'A' owns a property which is totally enclosed within a 23 by 23 kilometre square. Expert 'B' knows the area of the property and that the sides are whole numbers (integers), but does not know the dimensions. He ('B') asks if the breadth of the property is greater than half the length. Expert 'A' answers. (We are not privledge to rural conversation, but we know the answer was either yes or no.) On hearing the answer, expert 'B' can now calculate the dimensions of the property. A farmer has been quietly listening to the conversation, and, although he did not previously know the area of the property, on hearing both the question and answer, thinks for a while, and then, to their astonishment, tells the computer people what the area and dimensions of the property are. (What happens to him after that we won't discuss.)

★ ★ ★ ★

That's the problem. Can you do it? What is the area and dimensions of the property? (Hint; work out all areas possible in a 23 by 23 kilometre square, then find which one is uniquely related to the length verses breadth question L>B).

We'll give you two months on this one. The correct solutions will receive NSW Instant Lottery Tickets, one for each star against the competition, or, if no correct solutions are received, then the closest or best effort will receive the prize. Good luck!

GREG PERRY

Send to: COMPETITIONS
KIM BOOKS
82 Alexander St
Crows Nest 2065. ■

DEFINITIONS COMPETITION

In the last issue we started to run a competition that we hoped would encourage more people to write to us and also to add some light, good spirited humour to our magazine. The nature of the competition is as per some of the examples shown below, and also we have received our first entrant who will obviously get the first lottery tickets.* Some of his entries are also below.

We must give credit to 'The War Machine' newsletter for the idea and also for the use of these examples. They should get you enthusiastic. An extract from their competition: "....There appears to be a great deal of hostility out there to all aspects of the home micro industry; the impression is of useless software and defective hardware supplied by a bunch of crooks.....".

*We are offering Instant Lottery tickets at random to the entries. Please submit your entries to the editor, (see page 1 for address).

Program Listing Included — There's a bug in this one and we can't find it. When our readers tell us what it is we'll pass it off as a typo error.

R. J. Hoffman

Illegal Quantity — Number of errors in 1540 disk drive manual.

Bad Subscript — Story line from a B-Grade film about a U-Boat

POKE 36878,0 — What you get when you ask your Commodore dealer for advice.

Aweful — Standard of spelling found in Commodore Magazine (See June issue, page 10)

Ed: Come on! Keep the entries coming in. But try not to knock the mag!!!

USER GROUP

Geelong Commodore Computer Club
C/O 15 Jacaranda Place, Belmont, 3216
Geelong, Victoria, Australia.
Phone (052) 442863

The Editor
Commodore Magazine,
284 Victoria Av,
Chatswood 2067 N.S.W.

We wish to advise you that we have formed a Commodore users group which goes under the title of the Geelong Commodore Computer Club.

If at all you publish articles on user groups or list user groups worldwide could you please include our group in your article.

Yours sincerely
D. Gerrard(Hon Secretary)

HIGH-SCORES

Next issue we will attempt to give more space and time to the High Scores section. We also intend to start the score table from scratch as some games have become obsolete and other new ones are coming in of greater interest. So if you think you have a great score - send it in!

VIC AVENGER
13,000 ..... Andrew Patford, Corio, VIC

RADAR RAT RACE
122,720 ..... Phillipe Koschitzke, Warracknabeal, VIC.

MOLE ATTACK
343 ..... Phillip Salive, Massachusetts, U.S.A.

OMEGA
3 Ships: 326,300 ..... Barry Atchinson, Commodore, Toronto
5 Ships: 260,050... Ben Piper, Chico, CA

GORF
99,999..... Maree Mullin, Aust.

GALAXIAN
26,000..... H. De Bruin, Aust.

ALIEN BLITZ
24,360..... David Hunt, Ingle Farm, SA

MONEY WARS (rnd 12)
104,240..... D. Fry, A.C.T.

SLITHER
304..... David Ratcliffe, NSW

BLUE MEANIES
1,260 ..... Alan Newman, Fairfield, CT

VIC FROGGER
217,010..... D. G. Fry, Duffy, ACT

6 LANE DODGEMS
404 ..... Brian Sutton, Stanhope, VIC

GROUND ATTACK
2,760 ... Jason Mathewson, Colinsville, QLD

SQUASH
7,352..... Bruce Sutton, Stanhope, VIC

LAZARIAN
26,680 .... Damien Nelson, East Malvern

COSMIC CRUNCHER
1,085,610 ..... Paul Zsiby, Bibela, QLD

MONEY WARS
70,090..... David Hunt, Ingle Farm, SA

GALACTIC CROSSFIRE
15,920... Mark Freemantle, Narellan, NSW

UMI
142,757... Mark Freemantle, Narellan, NSW

STORM
3,620..... Darren Mathewson, Colinsville, QLD

RAID ON FORT KNOX
10,612..... Stewart Edrich, Gold Coast, Qld.

CLOWNS
327,550..... David Hunt, Ingle Farm, SA

MENAGERIE
2,200 ..... David Hunt, Ingle Farm, SA

STAR BATTLE
28,400 ..... Colin Mullin, Aust.

CASINO BLACKJACK
10,681..... Darrel Wadsworth, Elizabeth Vale, SA

TRASHMAN
188,880..... Carol Watts, Perth, WA

JUPITER LANDER
56,200 ..... Steven Spence, Northcote VIC

Who's keeping up with Commodore?

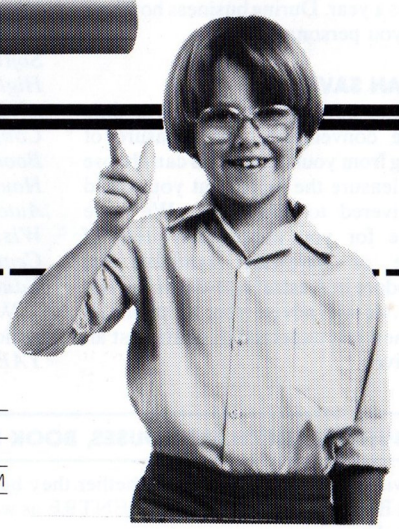
The Commodore 64 is designed and priced so that you can pile on the peripherals. Like a disc drive, printer and even a printer plotter. You can own the Commodore 64 AND disc drive and printer for little more than you'd pay for many other computers alone.

With 64K memory, outstanding colour graphics, a music synthesiser to rival the professionals, a fantastic range of games cartridges and full upper and lower case keyboard.

It's outstanding!

commodore COMPUTER

Keeping up with you.



Commodore Business Machines Pty. Ltd.
5 Orion Road, Lane Cove NSW. 2066. (02) 427 4888.
Please send me more information on the Commodore 64™

Name _____

Address _____

_____

Postcode _____ Phone _____ CM

BMS CC157

YES YOU CAN PHONE THE VIC CENTRE MAIL ORDER DEPARTMENT

ON (008) 777 130 STD FREE

The **VIC CENTRE** mail order department is open now 24 hours a day 365 days a year, here you can phone FREE on **(008) 777 130** at any time whatsoever from any where in Australia.

YOUR PHONE CALL REFUNDED

Try it NOW. Phone **(008) 777 130** to put your name on the mailing list and you will be credited your 20¢ for the local call charge against any future order that you place.

YOUR FREE "MENU"

You will also receive **FREE**, if you have not already done so, a copy of the **VIC CENTRE "MENU"** (cost $3.50). This is a 152 page book cataloging the majority of C64 and VIC-20 hardware, software and publications available in Australia to-day together with pages of hints and tips on the C64 and VIC. There is even an amatuer radio section.

FREE USER NEWSLETTER

Also once on the mailing list you will receive your regular **FREE** user newsletter which will hold technical tips, useful hint, specials and other benefits.

FREE STD PHONE CALL

We have now installed for you the latest Telecom (008) phone service on which you can phone the **VIC CENTRE** order department from anywhere in Australia for the price of a local call. We will deduct from your order the 20¢ local call charge, making your call to us truly **FREE.**

FREE 24 HOUR SERVICE

As well as the **(008) 777 130** number we have installed for you the very latest computerised telephone answering and ordering machine available from U.S.A. This will allow you to order 24 hours a day 365 days a year. During business hours we talk to you personally.

YOU CAN SAVE

You can now save money; save time with the convenience and pleasure of shopping from your home, you can choose at your leasure the items that you would like delivered to your door. We have available for you almost any item of software or hardware available for Commodore in Australia to-day and if not in stock we will advise you, by phone or post, when it is expected in or suggest an alternative.

SPECIALS

We will have specials from time to time for you that will be announced in your **FREE** users newsletter or you can phone our enquiry number (07) 397 0888 for further details.

STOCK

You will find that we endeavour to keep in stock most items from Australia's and the world's most reputable companies including those listed below.

LARGE RANGE

Our ever increasing range includes both software and hardware from:-

Commodore, Imagineering, Ozi soft, Kiwisoft, Progressive Software Company, Abacus, Romik, Totl, South Pacific Software, Quicksilva, Micro Applications, High Technology, Ashton Scholastics, ANZ Book Co., Computer Classics, Computer Market, Dataform, Kim Books, Pittwater Computers, Melbourne House, Lamasoft, Umi, Hes, Creative, Auto Simulations, Pixel, Phototronics, Wizware, Microgenis, Currah, The Vic Centre, Computer Craft, Contronics, Vic Education and others.

We also stock a large range of amatuer radio equipment including *ICOM, YAESU, DIAWA and ATN* etc.

OUR GUARANTEE TO YOU

Beside the manufacturers warranty you will have our personal guarantee to replace or repair any faulty item (in original condition and packaging) returned to us within 90 days of the date of your **VIC CENTRE** invoice date.

CREDIT CARDS

We accept your Bankcard, Master card, Visa card and American Express for all phone and mail orders.

SAVE money, **SAVE** time and phone **FREE** right **NOW** from the comfort of your home.

What could be easier for you than placing an order with the **VIC CENTRE.** Phone the order department now on **(008) 777 130.**

For enquiries and local Brisbane orders phone (07) 397 0888 for prompt service.

Mail orders are also welcome at the **VIC CENTRE.** Write to:

THE VIC CENTRE
416 LOGAN ROAD,
STONES CORNER,
QLD. 4120
TELEX. 40811

STD orders only **(008) 777 130.**

Local and enquiries (07) 397 0888.

DISTRIBUTORS, SOFTWARE HOUSES, BOOK PUBLISHERS & MANUFACTURERS.

If you wish your products to sell whether they be Commodore, IBM, APPLE etc. Contact Brian Beamish of the VIC CENTRE as we are looking to increase our range extensively.