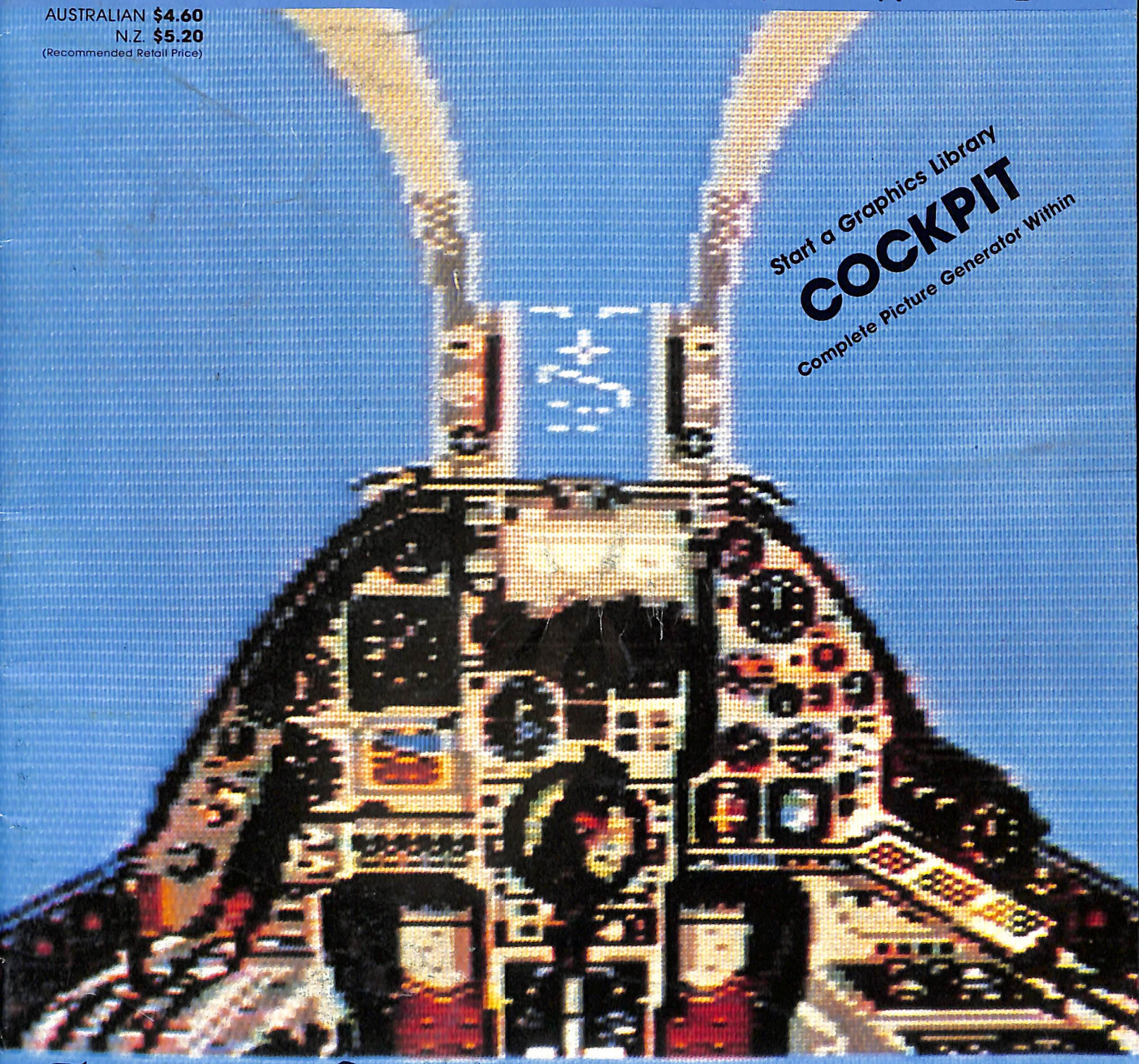
Issue 31

COMMODORE MAGAZINE

VOL 5 NO 3

AUSTRALIAN **$4.60**
N.Z. **$5.20**
(Recommended Retail Price)



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COMMODORE MAGAZINE

COMMODORE USERS MAGAZINE VOLUME 5 NUMBER 3 ISSUE 31

Commodore Magazine is published 6 issue per volume currently 10/12 issues a year (this may alter without notice.) Produced by Mervyn Beamish Graphics Pty Ltd through its division Kim Books. The cost of a one volume subscription (6 issues including p&p) is $A30 within Australia, $NZ36 within New Zealand and $A38 elsewhere. Overseas airmail (including New Zealand) $A8 extra. Subscriptions are available from the Publisher and individual copies from News Agents, dealers and other retail outlets.

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(02) 439 1827

PRINTER
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52 Gibbes St., Chatswood 2067
(02) 406 6266

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EDITORIAL

MERVYN BEAMISH

Mervyn Beamish

COVER

Cover is No. 2 in our series of Graphic Library Pictures. This COCKPIT Illustration demonstrates the magnificent graphic flexibility of the Commodore 64.

NEXT ISSUE

- ★ **Sound Effect Generators**
- ★ **Telecommunication**
  The series continues
- ★ **Commodore PC**
  How does it like sidekick
- ★ **The Chess Player**
  Another picture in our graphics library
- ★ **Beginner's Corner**
  BASIC error messages
- ★ **Listings-Games-Reviews**

A CONVENTION!!

I'm surrounded by BLAKE 7, STARWARS, RINGWORLD and other science fiction characters. Rubbing shoulders with LARRY NIVEN, FRANK HERBERT, ANNE McCAFFREY and other world famous authors.

What has this to do with the Commodore magazine?

Very little, only to point out that in this issue Denise Elkins has ably stepped in as editor and held up the magazine while I organised our representation and attended the AUSSIECON II (43rd World Science Fiction convention) in Melbourne.

Having attended this convention I wonder if it is not the way Home Computerists should be moving. The Computer market has its traditional computer conferences and exhibitions, but these are marketing exercises not "get togethers" of enthusiasts.

Imagine a convention featuring panel discussions, demonstrations, workshops etc. all aimed specifically at the Home Computerist. Visiting experts, maybe oscar type awards for software, club newsletters, books etc.

A huckster room which enables even the small producer to display, demonstrate and sell his/her wares without being swamped by big commercial groups. Computer memorabilia, banquets and parties all under the one roof!

Just think about it!! Let me have your thoughts and ideas. It would need to be run on a non-profit basis and possibly by a large user group.

Mervyn Beamish
Editor

READ THIS PAGE
Before entering listings printed in this magazine.

If you want to enter any of our programs without HELPOUT, omit the checksum at each line.

HELPOUT

HELPOUT is a program checker that makes it easier to correctly enter C64 programs from the Commodore Magazine. Once HELPOUT is loaded enable it with SYS49152, type TEST <CR>.

A typical line would be:

6045 NEXT:GOSUB 6300'CFSI

You type ALL of it, remembering to use a single quote ('), not "talking marks". You may use shorthand typing (GO then SHIFT and S for GOSUB, for example), and put in or omit spaces as you like (except, of course, inside quotes).

If you do it wrong, one of six error messages will appear, and a fog-horn will blow.

NO CHECKSUM: You probably forgot the apostrophe, or some or all of the four character checksum. Cursor to the end of the line, enter the checksum as shown, and press Return.

QUOTE: HELPOUT checks to ensure that quotes come in pairs. Either you left one out, or got a bit carried away and added one of your own.

PARENTHESIS: This is like QUOTE, except that HELPOUT looks for pairs of (and).

KEYWORD: You may have misspelled a Basic keyword (GOSLOB instead of GOSUB) or simply left one out. Recheck the line.

#OF CHARACTERS: Ignoring spaces outside quotes, you have typed too many or too few characters. This could even be a typo in a keyword, so check the line carefully.

UNIDENTIFIED: The cowards way out. The line is not right, but the error could be any of a number of things- wrong line number, wrong checksum, or you just mussed it up. Read the line carefully to find the error.

If you do get an error, the line WILL NOT be entered into your program. You will have to take some action to correct it before that can happen. To clear the error message, press any key (the line underneath the error message will not be affected if you use, say, the space bar), then get to work to fix the problem.

Then the line is OK, HELPOUT strips off the checksum, then enters the line into your program. There is no program space overhead from using HELPOUT.

We like HELPOUT. It comes from Mark Robin, and is the program that Commodore uses in its homegrown magazines. With a pedigree like that, and with the very considerable help it gives, we know it will make your programming more enjoyable.

If you want to add checksums to a program of your own, say for this magazine or a User Group publication, load HELPOUT and get it all going. But this time, enter ADD <CR> instead of TEST.

If your program is already written, load it and LIST it to the screen. Using the cursor keys, put the cursor on each line in turn and press Return. You will get a chirp of sound at each line, but nothing will appear on the screen until you type LIST again.

ADD will include checksums if you are writing new lines. Nothing could be more simple!!

Lastly, you may turn HELPOUT off to suit yourself. Type KILL <CR>, and HELPOUT is disconnected. If you want it again, type SYS49152 <CR> and away you go.

```
1000 REM: HELPOUT '64
1010 REM:
1020 REM: COMMODORE MAGAZINE
1030 REM:
1040 SA=49152:FA=50052
1050 FORI=SATOFA:READA:S=S+A:POKEI,A:NEXT
1060 IFS<>103233THENPRINT"->ERROR.. CHECK AGAIN!!":END
1070 PRINT"OK":NEW
1080 DATA  76, 35,192,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0,  0, 13
1090 DATA   0, 88,193, 94,193,102,193,118,193,131,193,143,193,234,234,234
1100 DATA  76,131,192,162,  5,189, 29,192,149,115,202, 16,248, 96,160,  2
1110 DATA 185,  0,  2,217, 60,193,208, 11,136, 16,245,169,  1,141, 16,192
1120 DATA  76, 31,193, 96,160,  3,185,  0,  2,217, 56,193,208,224,136, 16
1130 DATA 245,169,  0,141, 16,192, 76, 31,193, 96,160,  3,185,  0,  2,217
1140 DATA  52,193,208,224,136, 16,245,160,  5,185,162,227,153,115,  0,136
1150 DATA  16,247,169,  0,141, 24,212, 76, 31,193,230,122,208,  2,230,123
1160 DATA  76,121,  0,165,157,240,243,165,122,201,255,208,237,165,123,201
1170 DATA   1,208,231, 32, 90,192,173,  0,  2, 32,163,192,144,220,160,  0
1180 DATA  76,234,193,201, 48, 48,  6,201, 58, 16,  2, 56, 96, 24, 96,200
1190 DATA 177,122,201, 32,208,  3,200,208,247,177,122, 96, 24,200,177,122
1200 DATA 240, 53,201, 34,240,245,109,  5,192,141,  5,192,173,  6,192,105
1210 DATA   0,141,  6,192, 76,189,192, 24,109,  7,192,141,  7,192,144,  3
1220 DATA 238,  8,192,238, 11,192, 96, 24,109, 10,192,141, 10,192,144,  3
1230 DATA 238,  9,192,238, 12,192, 96, 10,168,185, 17,192,133,251,185, 18
1240 DATA 192,133,252,160,  0,169, 18, 32,210,255,177,251,240,  6, 32,210
1250 DATA 255,200,208,246, 32, 84,195, 32,126,195, 32,228,255,240,251,160
1260 DATA  27,185, 63,193, 32,210,255,136, 16,247,104,104,169,  0,141,  0
1270 DATA   2, 76,116,164, 75, 73, 76, 76, 84, 69, 83, 84, 65, 68, 68,145
1280 DATA 145, 13, 32, 32, 32, 32, 32, 32, 32, 32, 32, 32, 32, 32, 32, 32
1290 DATA  32, 32, 32, 32, 32, 32,145, 13, 81, 85, 79, 84, 69,  0, 75, 69
1300 DATA  89, 87, 79, 82, 68,  0, 35, 32, 79, 70, 32, 67, 72, 65, 82, 65
1310 DATA  67, 84, 69, 82, 83,  0, 85, 78, 73, 68, 69, 78, 84, 73, 70, 73
1320 DATA  69, 68,  0, 78, 79, 32, 67, 72, 69, 67, 75, 83, 85, 77,  0, 80
1330 DATA  65, 82, 69, 78, 84, 72, 69, 83, 73, 83,  0,200,177,122,208,251
1340 DATA 132,253,192,  9, 16,  3, 76,199,193,136,136,136,136,136,177,122
1350 DATA 201, 39,208, 19,169,  0,145,122,200,162,  0,177,122,157, 60,  3
1360 DATA 200,232,224,  4,208,245, 96, 76,242,194,160,  0,185,  0,  2,153
1370 DATA  64,  3,240,242,200,208,245,160,  0,185, 64,  3,240,232,153,  0
1380 DATA   2,200,208,245, 32,215,193, 76, 86,194,160, 11,169,  0,153,  3
1390 DATA 192,141, 60,  3,136, 16,247,169,128,133,  2, 32, 27,195,160,  0
1400 DATA  32,155,193, 32,202,193, 32, 49,194,230,122,230,123, 32,124,165
1410 DATA 160,  0, 32,175,192,240,205, 36,  2,240,  6, 32,215,192, 76, 18
1420 DATA 194,201, 34,208,  6, 32,188,192, 76, 18,194, 32,231,192, 76, 18
1430 DATA 194,160,  0,185,  0,  2, 32,163,192,200,144, 10, 24,109,  9,192
1440 DATA 141,  9,192, 76, 51,194,136,162,  0,185,  0,  2,157,  0,  2,240
1450 DATA   4,232,200,208,244, 96, 24,173, 11,192,105, 65,141, 11,192, 56
1460 DATA 173, 12,192,233, 25,144,  6,141, 12,192, 76, 96,194,173, 12,192
1470 DATA 105, 65,141, 12,192,173,  5,192,109,  7,192, 72,173,  6,192,109
1480 DATA   8,192,141, 14,192,104,109, 10,192,141, 13,192,173, 14,192,109
1490 DATA   9,192,141, 14,192, 56,233, 25,144,  6,141, 14,192, 76,150,194
1500 DATA 173, 14,192,105, 65,141, 14,192,173, 13,192,233, 25,144,  6,141
1510 DATA  13,192, 76,171,194,173, 13,192,105, 65,141, 13,192,160,  1,173
1520 DATA  11,192,205, 60,  3,208, 32,200,173, 12,192,205, 61,  3,208, 23
1530 DATA 200,173, 13,192,205, 62,  3,208, 14,173, 14,192,205, 63,  3,208
1540 DATA   6, 32,100,195, 76,122,192,173, 16,192,208, 17,152, 72,104, 76
1550 DATA 247,192,173, 16,192,240,  1, 96,169,  4, 76,247,192,164,253,169
1560 DATA  39,145,122,162,  0,200,189, 11,192,145,122,200,232,224,  4,208
1570 DATA 245,169,  0,145,122, 32,100,195, 76,122,192,160,  0,185,  0,  2
1580 DATA 240, 17,201, 40,208,  3,238,  3,192,201, 41,208,  3,238,  4,192
1590 DATA 200,208,234,173,  3,192,205,  4,192,208,  1, 96,169,  5, 76,247
1600 DATA 192,169, 32,141,  0,212,141,  1,212,169,  9,141,  5,212,169, 15
1610 DATA 141, 24,212, 96, 32, 65,195,169,129, 32,119,195,169,128, 32,119
1620 DATA 195, 76,113,195, 32, 65,195,169, 17, 32,119,195,169, 16, 32,119
1630 DATA 195,169,  0,141,  4,212, 96,141,  4,212,162,112,160,  0,136,208
1640 DATA 253,202,208,250, 96
```

NICE LISTER 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, [DOWN 15].

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. Multiple 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.

News Releases

PROFESSIONAL FLIGHT MANAGER.

Flight planning is an essential part of the daily routine aircraft pilots often find very time consuming. Now thanks to Pittwater Distributors, a Sydney computer software company, the task has been made far easier. By employing the many advantages of a small portable computer, they have developed what could become standard equipment for many pilots.

A Commodore SX-64 and their software – Professional Flight Manager, provides a transportable, easy to use method of Flight Planning and Trip Costing. The system was developed over a period of two years by a commercial pilot with extensive experience in the field.

The program provides the operator instant access to computerised Flight Planning, Navigation, Flight Costing, Fuel Analysis and Route Study information.

Professional Flight Manager maintains a database of airports, and related information for Australia, although additional airports can easily be added. Regularly flown routes are stored as disk files, as are performance details of aircraft types operated. These route and aircraft files are created by the operator according to his needs and provide data for immediate recall when planning or costing future flights.

Flights for four sectors and their alternates, where appropriate, can be entered in each session. The entry of cruise altitude and en-route forecast winds provides accurate details of fuel burn and en-route time, for which the pilot selects reserves and the desired fuel uplift. Results of the navigation calculations, including top of climb, ground speeds, heading, time intervals, fuel calculations, point of no return, and equi-time point may be printed for cockpit use as an accurate en-route navigation reference.

Flight Costing allows cost and time comparison of different aircraft types over a selected or computed route. It could be used by Charter Operators to provide immediate comparative quotes on flights to remote locations, or a student pilot wishing to assess the cost of a contemplated hire.

Professional Flight Manager requires only a basic knowledge of operating the Commodore 64, and it comes complete with extensive training material allowing even novice users to become quickly acquainted with the program.

Student pilots can use computed data to check their calculations during training and study through to ATPL standard. Private and commercial pilots can have an accurate plan before leaving home using forecast winds obtained by phone. For further information please contact Bob Drew (02) 939 2858.

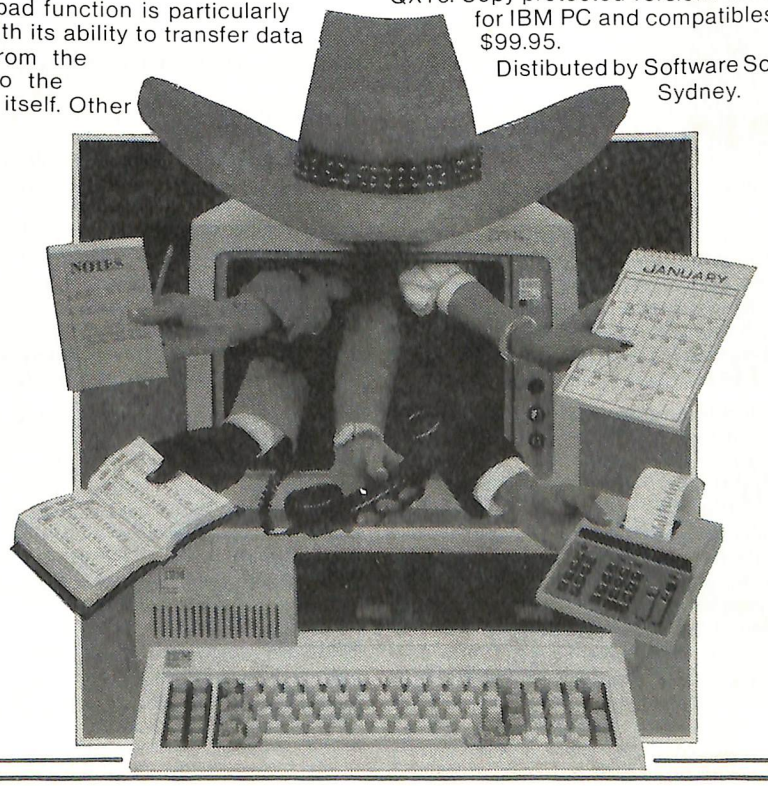
SIDEKICK

Sidekick, recently voted 'Software Product of the Year' by Info World, adds new functionality to IBM PC's and compatibles (Commodore PC?). This inexpensive programme adds instant access to an electronic notepad, calendar, phone directory and character chart from within virtually any application running on your computer.

The notepad function is particularly useful with its ability to transfer data directly from the screen to the notepad itself. Other features include the ability to sort data in the pad, and to automatically time and datestamp notes. Powerful search and replace commands and 'Wordstar-like' editing facilities make Sidekick an essential part of any office environment.

Other versions are available for Epson QX16. Copy protected versions are available for IBM PC and compatibles for just $99.95.

Distibuted by Software Source, Sydney.



NEW NAME FOR THE BEGINNING

The Australian Beginning computer communications network has a new name, Teledata. The services have also been greatly enhanced.

Available on the Teledata Network are:

- Nationwide electronic mail system
- 24 hour fully automatic worldwide telex service
- Nationwide multi-chat system
- Public and private bulletin boards
- File transfer facilities
- Free programs
- Electronic shopping ordering system

Electronic mail provides broadcast mailouts, electronic filing, new mail notification, and password security.

A cost saving benefit of the telex service is that transmission times can be specified in order to take advantage of 'off peak' rates. The system also incorporates a 'try again' facility if the destination party can not be reached on the first call. An optional beeper service is offered which will advise members when a telex arrives.

Telechat is useful for tele conferences when written records of instructions or decisions are needed without delay.

Among the public access bulletin boards available to every members are; trading post, public announcements and special interest items such as games and philospher's note book.

The electronic shopping system allows members to view information on and instantly purchase a range of products.

There are two types of memberships, commercial and home/student. Commercial membership gives entry to all commercial services and other facilities without access surcharge. Home/student membership is only available to credit card holders or by special advance payment, and all commercial services carry an access surcharge. Other differences also exist which are elaborated in the Teledata information brochure. There is a once only joining fee of $50 for manuals and other items.

A special offer currently available is a three months trial membership of the Scholastic Text and Retrieval System (STARS) which incorporates the entire Macquarie Dictionary, as well as other reference works.

Teledata modem formats include 300 baud or 1200/75 baud, and if a person wants a brief foray into Teledata, a Visitor Mode is available and the password is "Visitor".

Teledata's telephone number is (03) 813 1133.

ED – Next issue we hope to run a review of this product using the Commodore PC. It should be a good test of compatible compatibility.

LETTERS

Address letters to: The Editor, Commodore Magazine, Kim Books, 82 Alexander St., Crows Nest 2065

DEFENCE FORCES CLUB

Dear Mervyn,

Just a follow up to my telephone call on the 23rd of July.

Thank you very much for your information in regard to the Bulletin Board problem. I rang Greg and he gave me some more information on the subject and also provided me with another contact in Sydney. He also said that there was nothing in his mail box.

You asked for some information about my Club. The Club has been providing a service for over 3 years. We offer this service to members and dependants of members of the Defence Force, we are not specific to any one type of computer and as such we have organised several special groups to deal with each type. We meet on the first working Monday of each month, provide a newsletter to all members and have extra meetings to cater for the special groups. Any contact can be made to "B. Cartmill" at: DEFCOMP SEQLD, DSU Enoggera, Mil P.O. ENOGGERA, BRISBANE, QLD, 4052, or by phoning on (07) 354 7438.

Thanking you again for your kind assistance,

G. Hillier
Committee Member
Commodore Representative

USEFUL TIP-BITS

Dear Mr Beamish,

May I please suggest some minor amendments to the Mapgen Program on page 19 of Vol. 5, No. 1.

(a) In line 20, precede GOSUB 400 by READX(I), instead of after.

(b) Likewise in line 70.

(c) Abbreviate (in line 80) "POSITION" to "POSN" (to fit all on one line).

(d) In line 190, RED should be READ!

The map of the world is very colourful! Regards,

Mike Finch

Dear Sir,

Like many others I congratulate you on a fine and informative magazine.

I have discovered, what I feel, is an unusual incompatibility between the Koala Pad and EPYX Fastload Utility, which I would like to point out to other users.

Fastload will load the Koala pad with no obvious problems, but when it comes to saving pictures on disk I have found it impossible whilst Fastload is activated; it gives a reading "74 Disk not ready". However, once Fastload is disabled, then there is no problems saving pictures on disk.

I hope this may help others and would be interested to hear any comments you may have.

Yours Faithfully,
Carol Vanderwerf

SOUND

Dear Sir,

I own a Commodore 64 and recently I purchased a Sanyo green screen monitor to connect to it. I didn't realise that the monitor didn't have a speaker so I am missing out on sound.

Is there anyway in which I can connect some device to my C64 so that I can once again have sound?

Yours Faithfully,
Wayne Murray

Ed – Go to Dick Smith and buy one of his 1 or 2 transistor amplifier kits, they are quite cheap.

You may need to make up a new lead with a Banana jack on it. This is how we did it with the old 2000 series and I can't see why it won't work with the C64.

SSORT/1541 VERSIONS

Dear Sir, I've just spent the weekend typing in Basad.A for the C64 – your article in Commodore mag. Vol. 4, No. 4. Made the expected errors, of course, discovering in the process an error and an omission on your part!

In line 1022 the checksum appears to be 50954 not 50999. You also omitted to state that the Loader should be run prior to entering SYS 49152 [RETURN] (after checking by RUN 1007 and saving) – discovered in pull-out next issue.

Has anyone noticed this before me? If not, I am probably the first to type it in!

May I take this opportunity to say how enjoyable your articles are (and Greg Perry's, not forgetting others).

I hope to solve most problems at monthly meetings of an informed User's Group in Maroochydore (John Mahone's shop) and am also a country member of CCUG (QLD). I've seen Greg a couple of times with problems.

Another query I have is: how to use SSORT? On page 56 (of Vol. 4, No. 5) you give the loader (I've typed and saved) but, despite the imputation of instructions for its use, I can't find where you have explained its use (?). Can you help, please, because I've nearly finished an adaptation of Greg's "Easy Card File" for nearly 1200 correspondence chess player's. The ML routine is imperative!!

Another problem is the use of "Fast-Disk" – line 1013 refers to "V3 or V5" 1541 Disk Drive. My program displays "V1.1 ON" on the screen and doesn't work – the screen goes blank and the D/D just goes on and on.... When I power D/D down, "program not found" appears on the screen. But it's certainly on the disk! Can you elucidate, please, because this could be a very useful program.

Hopefully,
Michael J. Finch

ED – Michael, I can see that your a person who acts first and reads the manual second.

PAUL – SSORT was a commercial program for PET computers, in which I had a part. No version was ever released for the C64, so I did one myself. Despite my own efforts, I am not sure about copyright on even my own C64 rewrite, so I have not gone into print about it. This is a pity, because it is the most powerful and certainly the fastest sort routine over the widest range of applications I have ever used.

V3 and V5 refers to ROM revisions for the 1541, and has nothing to do with FD V1.1 in that sense. The reason for specifying V3/5 was that some of the older 1541's, particularly some converted 1540 specimens, seem to have some internal glitches that play odd tricks with some software. One local dealer here so despaired of ever finding out why that he junked his old long board 1540/1 to save himself the time and money it was costing him!

LABELS WANTED

Dear Sir,

I enclose three programs that may be of use to readers.

.....I use this program (address book) to address the newsletter that we send out. I am trying to find address labels that will fit my 1520 printer plotter. I was told when I bought the 1520 that there were labels to fit this machine. I hope someone can help me find some that will fit.

Yours,
Anthony D.T. Wiggins

ED – Anthony I hope to use your interesting programs in a future issue. Can anyone assist with the labels?

MUSICAL APPLICATIONS

Dear Editor,

As a new Commodore user with a particular interest in musical applications and MIDI interfacing, I would be pleased to hear from anyone else who is into using a Commodore computer in musical applications.

Although I'm relatively new at home computing, I have 13 years experience with synthesizers and also have a reasonable working knowledge of recording techniques, in which I am also very interested.

I would even be interested in the possibility of starting a MIDI users group if enough people were interested, to give members a chance to pool ideas, resources and programming skills on projects of common interest, and to give us a chance to assess the relative merits of various brands of hardware and software for music applications.

Yours sincerely,
Max Fyfe

ED- Can anyone assist. Greg is doing something within this area I believe.

User Group Column

Laurence Hulse

The Shepparton, Victoria Commodore Computer Club is participating in the Shepptember Festival by joining forces with the Shepparton Library to have a VIATEL demonstration on Sept 15. The club also announces it now owns a VIC20 and the Secretary is busy typing in programs.

A hearty welcome to the members of the recently formed: Peninsula Commodore Users' Group in Victoria. Their address is:

c/o Red Hill Consolidated School,
Flinders Rd,
Red Hill, Vic. 3937.

The Yarra Valley Commodore Computer Group drew more than 50 people to their first meeting. Great Going!

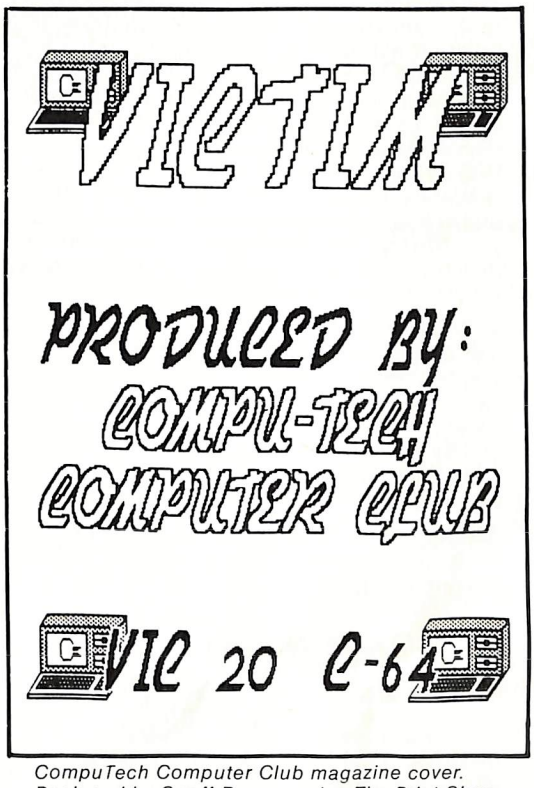
The Commodore 64 Users' Group of Abbotsford, Victoria have a new address. It is:

PO Box 64,
Abbotsford,
Vic. 3067.

The group's newsletter editor, Frank Martin, has an interesting idea. From his June edition, "From the many enquiries that I receive from people not able to attend a meeting each month, it was decided to form a Central Commodore Group. This entitles them to keep in touch via the newsletter, have access to the library, enjoy discounts when available and generally have all the benefits that attending members enjoy. The fees have been fixed at $20. per year. ..."

VICTIM, produced by the Compu-Tech Computer Club at the Newcastle Technical College, reports that their annual open meeting is being planned where everyone can bring along their computer and show off their latest hardware or software. In addition, the club is doing a survey on word processors. In addition, congratulations go to Steve Beveridge on his recent appointment as a Club Director.

The July edition of the A.C.T. Commodore User Group Newsletter carries an sad story about the damage un-keyed plugs can create. A printer was injured when its cable was plugged upside down into the user port of a C64. This happened even with the precautions of the supplier provided tag identifying the top and a bigger label stating, "STOP: IF YOU CAN SEE THIS LABEL, DO NOT PLUG IN". Remember, double check the double checked!



CompuTech Computer Club magazine cover. Designed by Geoff Rayner using The Print Shop.

The A.C.T. Vic-20 User's Association published an interesting Letter to the Editor from Merv Quinn who wondered if, "As many radio amateurs have VIC-20;s, if a list of amateurs could be listed and maybe ideas on communication soft and hardware exchanges." Merv is VK3ADX.

ED – refer below. Bye the Bye I'm VK2 PEH.

Some changes are being suggested for a Queensland group. The Cairns User Group intends either affiliating with the Brisbane User Group or becoming a sub-group. The main advantage is that members would be able to receive the Brisbane's 'Cursor' newsletter.

ED – refer below also

The Townsville Commodore User Group reports that they have an enlarged library of public domain software.

The Christchurch Commodore Users' Group newsletter carried this closing paragraph in The President's Report, "Finally I would like to thank all those people who in the last two-and-a-half years have given me their support and ideas. Many people do a lot, and are not acknowledged. To them, many thanks. The CCUG will progress only if we get your thoughts on what your require. --- John Sparrow." Some pretty good thoughts there!

Letters

VK Group

Dear Sirs,

I note with interest your invitation to register our group with "Commodore" magazine and receive a copy of the mag. The VK Commodore Users Group was formed in August 1984 to enable radio amateurs who own Commodore computers to make better use of our machines in the persuance of our hobby.

Our meetings take place on amateur frequencies as members are radio enthusiasts.

I invite any interested amateurs who may read this to apply for membership to me at the address listed, forwarding $2.00 to cover costs and join the net on 3.570MHZ plus or minus QRM at 0900 UTC Sunday nights.

P.O. Box 168
Launceston
Tasmania 7250

Details for Club Listing
Name of Group: VK Commodore Users Group
Net Controller: Bob Richards VK7NAI
Mailing Address: P.O. Box 168,
Launceston, Tasmania 7250
Meetings: Amateur frequency 3.570MHZ. Sundays 0900 UTC (7pm local).
No. of members: 22 as at 30/4/85

ED – Sorry this took so long to get into print Bob.

Yarra Valley Grp

Dear Sir,

Recently, we have formed a user group in the Yarra Valley area of Melbourne. The group meets on the first Tuesday of each month at the Melba Hall, cnr Market & Castella Streets, Lilydale at 8pm. The group is affiliated with the Melbourne Central Commodore Users Group. Enquiries can be directed to:-

Secretary: Barry Vickers 735-0638
Librarian: Jon Hall 725-0176

Brisbane Grp

Dear Mr Beamish,

Thank you for referring to our newsletter, "CURSOR", in the most recent copy of your magazine. Our editor does a splendid job, we feel.

Would you please check our current listing for our Group and amend it, if necessary, to read as follows;

BRISBANE
Commodore Computer Users Group (Qld) Inc.
P.O. Box 274, Springwood Q 4127
BBS: (07) 808 2125

Our President, Dr Greg Perry is, well known to you. He is a very capable and helpful leader of our Group which currently numbers 459 members. Our Group has been providing support and guidance to Commodore Users since July 1981.

May your magazine continue to prosper.

Yours Sincerely,
N.R. Chambers.
Secretary.

ED – The presidents name seems to have a familiar ring!?

THREE FROM CYMBAL

Mervyn Beamish

SPREADSHEET PLUS

Spreadsheet with integrated graphics (2 complete programs). Features include: large electronic worksheet with 65 columns and 250 rows, explanatory commands, help screens, barcharts, pie charts and line graphs.

A spreadsheet is the equivalent of a 65 column page you can scan on the screen of your computer into which alpha-numeric information can be entered. The user then has the ability to move things around and experiment with "what if..." questions. Uses are quite numerous and the most obvious uses relate to forecastings, income statements, balance sheets, cash flow analysis, sources and application of funds.

However don't be limited to business oriented uses. It is quite feasable to run computer strategic games through a spreadsheet and Play By Mail games are quite often based around the use of spreadsheet and database usage.

The Spreadsheet Plus is claimed to be a user friendly electronic spreadsheet which is quite sophisticated and very powerful for its size. The matrix is a large 65 columns by 255 rows which can be further enlarged by linking one spreadsheet with another stored on disk.

Features include:large matrix, 255 rows x 65 columns, predefined assumptions, user formulae, many display formats by colomn, easy text entry, variable column width by column, duplicate and replicate functions, linked spreadsheets, row ID's as well as numbers, predefined loan amortization assumption, predefined trend analysis, predefined present and future value, audit trails, report formatting, spreadsheet directory, copy, move functions, full cursor control, automatic screen scrolling, consolidation of spreadsheets, printing options, user defined functions, window feature, upper and lower case.

Spreadsheet Plus supports 1541 Disk Drive

The manual supplied with the program is explicit, easy to read and the only flaw is the lack of information on printer compatibility. The samples we received had a blank page (?? misprint) where the printer information should have been. However, printer selection is Commodore 1525 (or equivalent), or Epson MX80, Star Gemini 10 or compatibles.

DATABASE PLUS

Database and statistical analysis containing a Report Generator.

A database is designed to help control data i.e. book lists, recipes, reference material, addresses, client and membership information etc. With a database at a touch of a key or keys you can send information into virtually any order required i.e. alphabetical, numerical, subscription or membership expiry dates. Information can be erased, changed, updated,or restored.

Database Plus differs or improves upon other similar systems. Firstly, Database Plus is written with PETSPEED, a compiled computer language, which greatly decreases the amount of time it takes to sort, find and change information. (Database Plus is about 30 times faster than programs written in BASIC language.) Secondly, Database Plus has an updating function which allows additional categories (or fields) to be added to an already structured file. In some other data base programs, once a file structure has been set up, any alterations to that structure require a total restructuring of the file. Thirdly, Database Plus has a MATH option which performs calculations on numerical data stored in categories. The mathematical computations include the number of numerical values, their sum, range, mean and standard deviation. In addition, a graphic printout can be obtained if you have a printer available. Fourthly, Database Plus has a HOUSEKEEPING option so that you can perform numerous disk utility functions. From the HOUSEKEEPING menu you can format a new diskette, validate a diskette, initialize the disk drive, and even scratch unwanted files. In addition, you can opt for Database Plus Report to design personal reports and have your records printed to suit your needs.

With Database Plus you can create up to 20 categories per record. For instance FILE entitled "membership" may have up to 250 RECORDS (i.e. member details). Each record can be up to 250 characters in length and be divided into CATEGORIES i.e. name, address, phone numbers etc. A disk can hold up to 650 records.

Although file linking is not a built in option, it is quite obvious that by pre-planning, seperate files can be linked i.e. membership A - C, membership D-F etc.

One facility that DataPlus has is a built in report generator which produces customized printouts of data i.e. a list of all members of a user group who own 4000 series CBM etc. The report option can sort records into whatever order you require; it can search for words and phrases and subsequently print hardcopy of your data to your customized design.

Database Plus has been designed for the Commodore 64 with a 1541 disk drive and the VIC 1525/1526 printer (or equivalent).

The program is very user friendly as indicated by its opening menu.

Add	**M**ath
Browse	**P**rint
Create	**R**ead
Delete	**S**ort
Edit	**U**pdate
Find	**V**iew
Houskeeping	**W**rite

THE ORGANIZER

Decision Maker and Computerized Diary. (2 complete programs)

FINANCE 64: Helps you make the right business decision regarding buying or leasing, management, buying power, profit margin and loan analysis.

SCHEDULE 64: Organise your daily, weekly, monthly or yearly schedules at a glance, highlight appointments, provides instant daily or weekly scan, printing schedules - project management tool.

The Schedule 64 program turns your Commodore Computer into a full automatic diary. With this program you can enter your appointments, assign them priorities, scan and display days at a glance, print your schedules and avoid double-bookings and missed appointments.

It is very easy to use. There is no detailed syntax to learn or reference, no special keyboards to memorize and no abbreviations to confuse you.

The programs are menu-driven. This means that at all times a menu of options will display and you choose what you want to do.

With the very simple technique of selecting the number on the menu that corresponds to your choice and pressing this number on the keyboard, you may select any item from the menu.

In addition, the cursor, the little blinking box that appears on the screen, will always guide you through any and all Schedule 64 functions.

Unfortunately the program shows its American origins early in the piece by asking for the date in month/day/year order.

Business is a serious game. Winning requires hard work and the information to make the right decisions. The more precise tools you have to make these decisions, the greater your chances of success.

By supplying correct information, Finance 64 allows you to be able to make the right decisions, thus increasing your bottom line profits.

The program features the necessary functions for the proper evaluation of corporate financial questions such as:

- Should we buy or lease a particular piece of equipment?
- How long will it take to recover the original investment?
- Can we afford to increase our debt portfolio? At what interest rate?

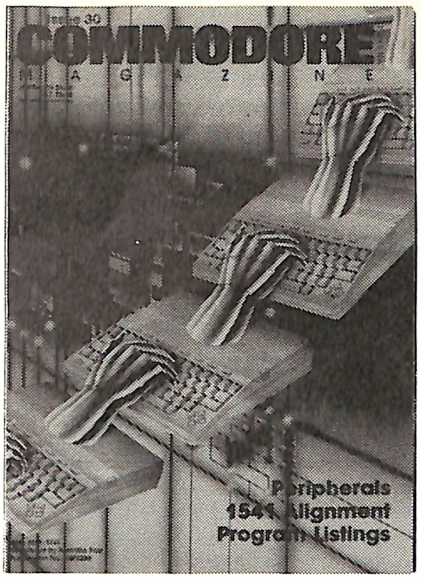
Also, it has useful functions for small businesses, and private individuals.

The Finance 64 package can accomodate questions such as:

- What will be the interest and principal for a thirty year mortgage?
- Considering my tax situation, would it be best to buy or lease a car? Boat? Large appliance?
- What is the future value (buying power) of my future earnings?
- At what price must I sell an article, if it cost me $120 and I want to make a profit of twenty percent?
- Considering today's rampant inflation, what is the value of money I will receive in five years?

This program is capable of generating these reports:
Buy vs Lease
Loan Analysis
Payback Analysis
Profit Margin

Again very American in its origins but the manual keys out quite clearly how calculations are made and the formulas are seen quite usable under Australian conditions.



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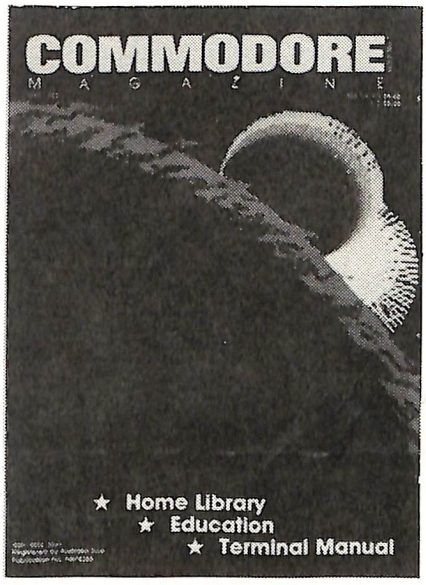

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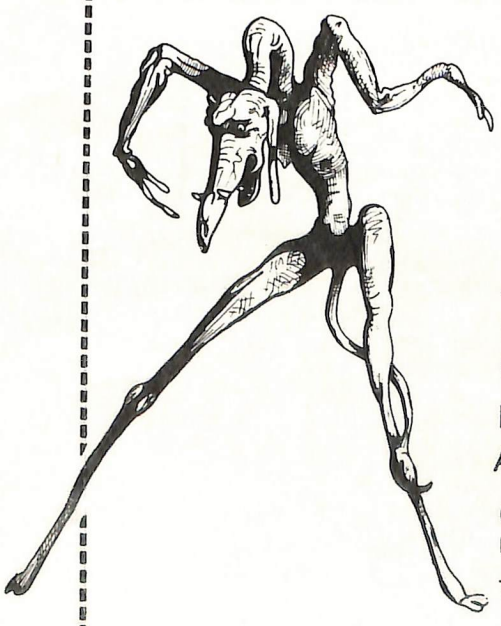

WANTED

Help seek out our non-converted brethren!

If, in your technical travels, you come across a retail outlet that should be selling COMMODORE but has not seen the light, please let us know by completing this card. Thankyou.

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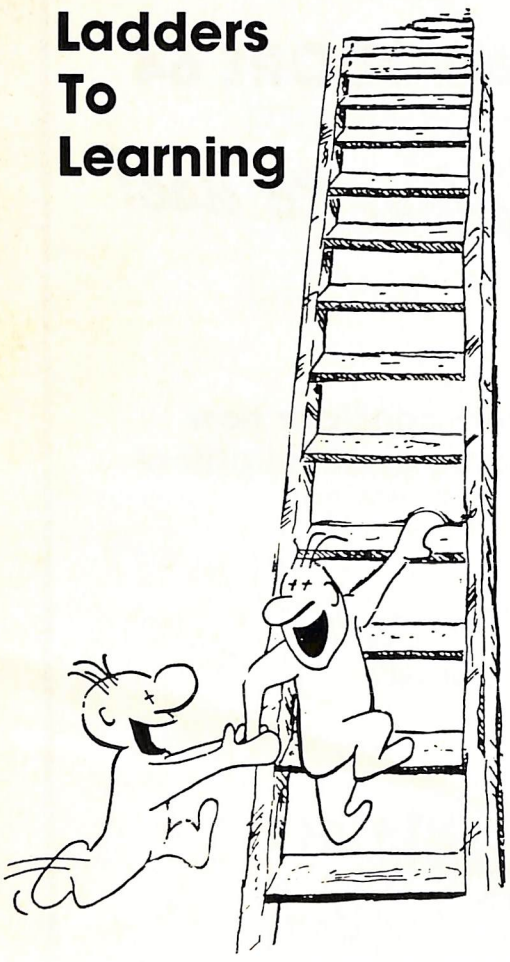
SPECIAL REVIEW

Ladders To Learning



In volume 5 number 1 we introduced an educational software series call LADDERS TO LEARNING. We offered a number of these packages to various educationalist for review. Here are the first batch of replies – unabridged

SCHOOL'S IN!

If you need to familiarize yourself with decimal fractions and you don't mind being instructed by a small, chubby, green man, then you will probably be interested in this educational program from the 'Ladders to Learning' series titled **Decimal Fractions**. Henry Hilo, your little green tutor, takes you through various sections of the program with the aim of leading you to a stage where you are capable of adding and subtracting decimal numbers.

The program starts by asking you if you want to work with decimals or preview one of the other 40 programs available in the series. Having decided that you wish to work with decimals, a menu provides you with one of the following three options:-

1. WHAT IS A DECIMAL? This is where you start if you know nothing about decimal fractions. Assuming you are familiar with ordinary fractions (eg. 1/2, 2/5, etc.), simple but effective block graphics are used to provide a link between decimals and fractions. Instruction is offered in decimal quantities of tenths and hundredths, with a short test after each section.

2. THINGS TO DO WITH DECIMALS. Having mastered the concept of decimals, Henry now proceeds to instruct you in the technique of adding and subtracting decimal numbers less than one hundred. Unless your mathematical intuition is high, you will certainly need some external assistance with the concepts of 'borrowing' and 'carrying'.

3. SKILL TEST. With your confidence running high from the success experienced in the previous two sections, you are now ready for the final testing. The tasks on offer here allow you to solve a series of ten mixed problems, or for the more adventurous you can try your skills against a friend or against the clock.

The tutorial sections of the program are well structured with the level of difficulty increased slowly and pictorial aids gradually removed as you successfully complete the required tasks. Should you answer a question incorrectly, assistance is given in the form of a simple prompt. The sight of Henry jogging off and on the screen (with eyes rolling around) will certainly appeal to younger children who use the program.

Two minor problems became apparent whilst using the program. Firstly, one needs to avoid pressing two keys in quick succession as the second key will most likely be missed. Secondly, not all sections of the program allow you to edit your answer before you press the return key. This is a bit of a nuisance particularly if you are a beginner and wish to change your mind whilst answering the problem.

CONCLUSION

Ideally, this program is suited for young children who are having their first encounter with decimal fractions or who have worked with them before but need a little more practice. It could also be used for remedial work however, because of the simplistic nature of the assisting prompts, a trained instructor would need to be on hand to provide further clarification. It is certainly not as sophisticated as some of the tutorial programs available but considering its low price, it is good value for money and is well suited for use in the home environment.

Name: DECIMAL FRACTIONS
Producer: McGRAW-HILL
Author: SUCCESSABILITY SOFTWARE
Price: $14.95 ($11.95 for cassette)
Computer: COMMODORE 64 disk or cassette
Reviewed by: Ian G. Zampech
– Toogoolawah, Qld

DISSAPOINTED

Dear Sir,

I have previewed the computer programs, **Word Power** (Nouns), **Phone Book Skills**, **North South East West**, and **Geography** in the new McGraw Hill series – (Ladders to Learning) and was generally disappointed with the presentation of all four programs and these comments refer to those modules.

The programs required that students must do them completely in a single sitting. There appears to be no provision for a student to continue on the next day where they left off on the previous day.

The text is presented slowly on the screen letter by letter. I feel this would have been much better word by word since students read words not letters. The rate of production of text is too slow for the more able students who then became bored.

The vocabulary used in the lower school module is not suitable for that age group. This is particularly evident in Phone Book Skills. Where the vocabulary is suitable, the text presentation is too slow.

There was little provision of help on many of the questions other than to 'high-light' the incorrect answer and repeat the question. The use of even limited reward, (eg. a frowning face with some music) is not educationally sound for an incorrect answer. It is much better to keep rewards for correct answers.

There seems to be little use of the computer's capability. On the whole, the programs are little better than students reading the relevant material from a text-book with a series of multiple choice questions or ones requiring a simple answer. Some answers were poorly programmed, eg. when 'man' was needed as the answer, 'the man' was not accepted.

The good part of these modules is the price. Teachers should – preferably – preview the modules before purchasing. If students will become bored with it, the educational objective will not be realized.

Yours Faithfully,
J. Goodsell
Queensland Department of Education
Central Region
Mobile Educational Consultancy

VALUABLE INFORMATION

McGraw Hill – Ladders to Learning #2 – **Water Cycle Game**. Learning Science. Successability Software, 1984. $14.95, 51/4" diskette.

In this production, children and adults are invited to learn the inside story of the water cycle by playing this 'exciting, scientific game with superb graphics' for 1-4 players. You are invited to battle against the elements and other hazards to complete the water cycle: here based partly on chance and partly on skill in answering questions about the water cycle. Is this all true?

On closer examination, the person buying this disk hoping for a 'high' in playing a computer game may be disappointed. But on the other hand it may give valuable information on almost anything you wanted to know about the water cycle.

After loading the program you are given a choice of either proceeding with the game or reading more about the water cycle. If you picked the latter you will be given about 13 screens of information about a world without water, its properties, the water cycle, animals and water, transpiration, storage, wells, rivers and lakes, supplies, man's use and its consequences. With patience and diligence you will easily master this information. You are then given a choice to re-read them all at the end or to proceed with the game.

Up to four people may play. To begin a picture of a spin counter, much like the old

faced clocks with hands (not digits!) is shown. On pressing any key this wheel spins to a 'rachet' sound where North, South, East, West positions are occupied by numbers 1, 2, 3 and 4 and the Northeast, Southeast and Southwest positions by a '?' and the Northwest by 'E' respectively. The numbers tell you how many spaces to advance and the '?' gives you a question about the water cycle. An unlucky 'E' means you 'evaporate' and return to a starting position.

The object of the game is to move through twelve points on a map starting in the sky as a cloud, falling as rain on top of a hill, through drainage channels and flowing towards the sea. The game is over once any player reaches the sea, that is, the water cycle is complete. A wild card selection is sometimes introduced to give an element of chance, eg. consumed by a bird, transported etc. in which case that player misses a turn.

My impression is that while the game is not very exciting, it certainly is very 'scientific' with the object of teaching oneself something. I suspect that this will be an invaluable help to teachers of geography, environmental science, and social science. Working alone or in a class this may occupy 1-4 students at any one time. Considering the cost it will be a useful addition to anyone's disk library for that 'rainy weekend'. The graphics could be better designed while your 'battle' is all a matter of skill and some chance.

McGraw Hill – Ladders to Learning #14 – **Explorers VI**. Learning to Read. Success-ability Software, 1984. $14.95, 51/4" diskette.

The disk you buy is sealed in a plastic 'blister' pack together with a leaflet giving just one load instruction [LOAD"*",8,1,#]. The hash mark (#) is curious and interesting because the program may load without it. After a two minute load a menu of four choices is shown plus an additional choice to preview another program. The menu included:

Part 1. Exploring the Northwest coast
Part 2. Gippsland -- a dual discovery
Part 3. Overlander or Explorer?
Part 4. The Squatters surge inland

There is good use of colour on the screen and after your choice the disk re-loads. In my first run I chose A which immediately produced a map of Australia. It has very good details of place names etc. and even includes Norfolk Island.

The program takes the following sequence:

1 Text -- six screens of information (40 cols x 12 lines each)
2 Spell with me
3 Meaning of key words
4 The main idea
5 Speed reading

The text gives you some background to explorers, key words, spelling and vocabulary. The text is displayed slowly and deliberately using an old English 'type face'. The characters are not true 'descenders' and this makes it hard to read quickly. In the spelling section you are 'flashed' a word and then asked to type it out on the keyboard. If you spelt it correctly a 'happy face' is displayed accompanied by a tune and message. The message is one of the following: 'excellent', 'marvellous', 'brilliant', 'astounding' and 'remarkable'.

This pattern of reward and a re-try is repeated for the rest of the program. There is thus 'reinforcement' of words for spelling, ideas and speed reading. After completing all five items you get a choice of doing it again, only the speed reading segment or finish.

The programme is well conceived and user friendly. However, the user has no control to change the program sequence; one needs to get through all five items in the order presented. The alternative of course is to switch the machine off and start again! It takes approximately 30-40 minutes to do one program sequence and will be ideal for private study or individual work in the class room if a local area network is available. The possibilities of self-paced instruction exists with this programme. It may be a good teachers aide. This programme is good for 10-13 year olds but not for older children since it lacks the excitement of an 'arcade' type computer game.

Reviewed by:Dr. George Cho
School of Applied Science
Canberra College of Advanced Education

SUPERIOR TO MAJORITY

I received (from Commodore Magazine) three titles in the Ladders To Learning series published by McGraw-Hill for the Commodore 64. They are #26,**Division II**, #34, **Multiplication II** and #38, **Skill Tester**. The suggested age range is for 8 to 10 year olds. All are on disk and retail at $14.95 each. The full range in the series is

Continued overleaf

Continued from previous page

available in many stores from a special display stand making selection easy.

My first action was to break the seal on the clear plastic protective packet that each one is supplied in. The seal bears the words 'Opening the sealed packet signifies your acceptance of the terms of the enclosed agreement.' This is not a new idea but I do like to see what I am agreeing to before accepting compliance with it.

On the inside of the display cover is the Licensing Agreement. In essence you have bought the right to use the program, and you agree that, other than making back-up copies for personal use, the disc will not be copied. The program itself remains the property of McGraw-Hill. Still, I suppose the company has to protect itself somehow from the pirates. The standard games-type loading instruction, LOAD"*",8,1# , put the programs in memory from a cold start with no problems. However, to load another program involves switching off then on again.

On the initial screen menu are two options – proceed to the program itself or preview another program in the series. The green on white menu choices were not very clear on my TV set. A 'darker colour would have been better. Your selection is loaded and we are ready to start.

The preview idea (shades of hiring videos) is excellent – other software producers please note! Each preview is quite extensive too so you are given a very good idea of what to expect from the complete program. As a result of one of the previews I will be buying 'Counting' (no. 40) for my grandaughter. Unfortunately the end of the preview does not give one the option of returning to the initial menu to load the program you paid for. Again switch off...

An omission from the initial instuctions are directions on using the RETURN key to enter responses and that a typing error can be corrected using the DEL key. Not all parents, teachers and students are familiar with this.

We are taken through what, for the most part, are very clear instructions which are printed slowy on the screen. It is good to see this – some programs present a screenful at once and this is too much for the average 8 year old. We are introduced to Mr. Hilo, our friendly tutor, who does seem to enjoy himself hopping across the screen waving and jumping up and down in response to correct answers.

I was delighted to see that all the mathematics was developed vertically. Many teachers develop work horizontally which is a bad habit to form in young children. They have great difficulty adjusting in later years.

I noticed a small number of minor formatting errors but they in no way detracted from the purpose. Screen layout and the use of colour to highlight a particular number or to bring attention to where an input is required was good. Now and again that green on white appeared.

To a greater or lesser extent, all the programs ran slowly. I assume this was deliberate. However, a bright child or one who is familiar with the program can anticipate the questions and type in the answers faster than the computer can accept them. I gave some incorrect answers because of this.

The explanatory sections of both Multiplication II and Division II are a genuine attempt to give a student a real understanding of the two processes. They both use standard classroom techniques with the addition of bleeps and dings and I see them as aids to help the student after the teacher has given an explanation. Of course the afterwards could be at home or at school.

For home use, parents please note that while some of the explanatory material may be different from that you had at school, the result is the same. A parent and child could work together through each session (as each program section is called).

Following each explanatory session is a series of questions to give practice. These appear to be randomly generated and it is possible to get a bad run as I did. I was asked the same question twice and later I was given the same (trivial?) divisor of 1 four times in succession.

Input error trapping is quite good; all keys not needed are disabled. It is not perfect though, Y,Yes and You are all interpreted as Yes in Division II. Similarly the student's name is requested early in the programs and rude remarks can be made which appear periodically on the screen. I have heard of one program which has a trap for 'swear' words and which refuses to continue until 'sorry' is typed in in response to the computer's demand for an appology !

It would be nice to be able to exit all the programs at any time or return to the initial menu screen, particularly at the end of the program. This, in school, would set everything up for the next student without the need for teacher intervention.

In Multiplication II, the reward messages for correct answers are varied but in Division II they are not. One section asks for three different versions of the same thing and a trap prevents the use of the same answer over again.

No attempt is made to analye an incorrect answer. The user is simply told, politely, of the error and to try again. The correct answer is supplied on a subsequent error. Having attempted to write a program to analyse incorrect responses, I know it is very difficult to anticpate every incorrect response and even when you think you have some *!/? student will come along and prove you wrong.

Skill Tester has a good selection of choices including difficulty level and the option of working against the clock. It assumes that all 8 year olds know the meanings of the words process, input, output and operator. If they do they have forgotten by the time they reach secondary school! Unlike the others one can return to the initial menu at various stages.

In Multiplication II, I suspect that the use of the distributive law of multiplication over addition eg.

```
  30 x 40
= (10 + 20)x(10 + 30)
= (10x10)+(10x30)+
  (20x10)+(20x30)
= 100 +300 +200 +600
= 1200
```

may be a bit heavy for some students. (Note that the program does not use technical mathematical terms, nor should it.) The short method is shown as

```
  30 x 40
= (10x3)x(10X4)
= (10x10)x(3x4)
= 100x12
= 1200
```

Certainly, both are correct but showing both close together can cause confusion. The first method uses each number twice and students then combine the two to produce

```
  30 x 40
= (10x3)x(10x4)
= (10x10)x(10x4)x(3x10)x(3x4)
= 100x40x30x12
= 1440000
```

which certainly seems correct based on the distributive law but this law does not apply to multiplication only.

In another section the distributive law is again used. Given 18x6, the response expected is (10+8)x6 but (8+10)x6 is not accepted. The average student should, initially stick to a system (which the program expects). (8+10)x6 is just as good as (10+8)x6 and brighter students will wonder what is happening if one is not accepted. Then again, brighter students will not need to use it.

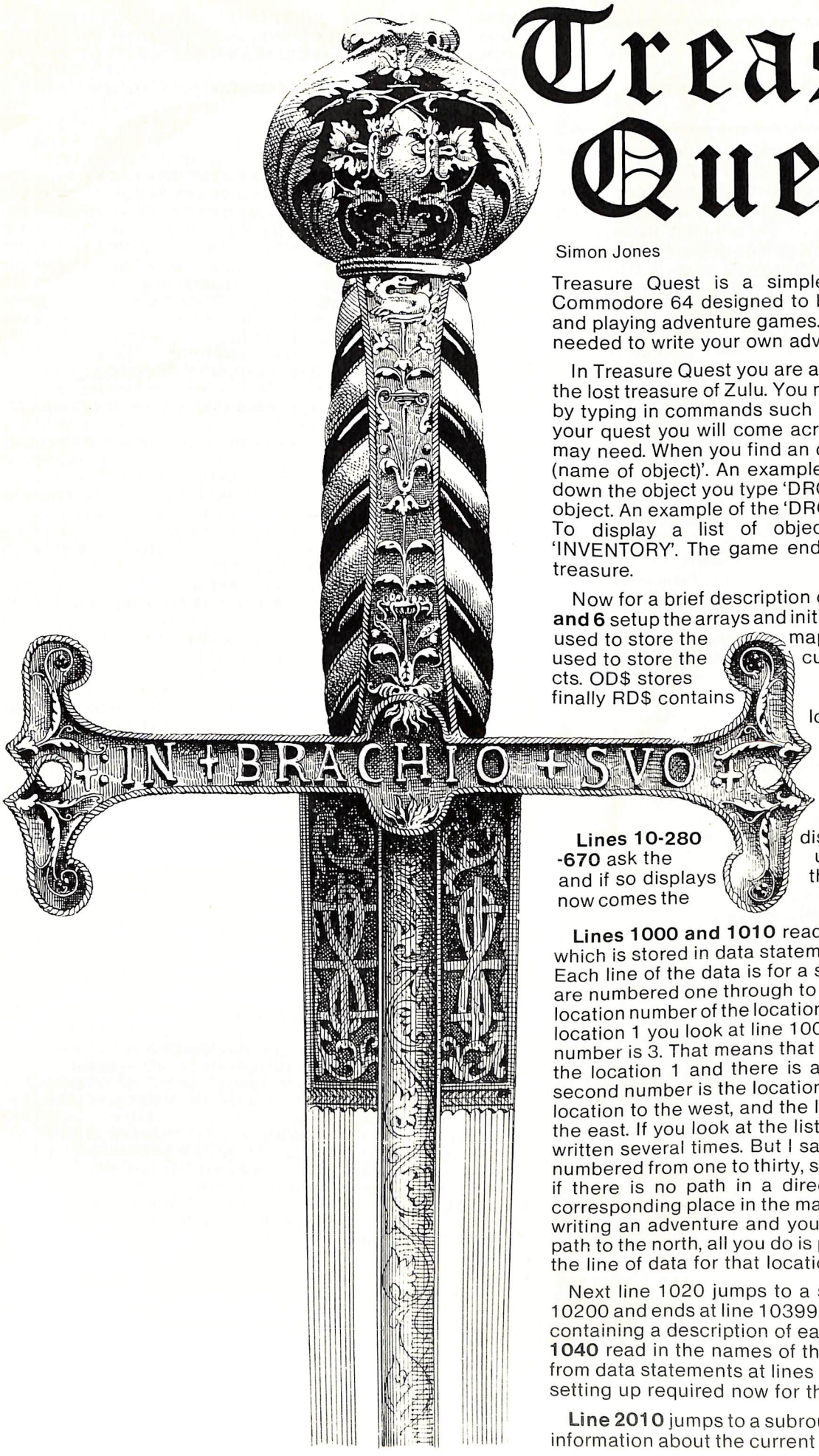
Conclusion.

As an aid to understanding and to give routine practice, these programs are fine. They are not a substitute for a teacher nor do I think they are meant to be. They are far superior to the vast majority of programs available in many magazines to type in yourself which usually give practice only.

Pricewise, for the cost of an average game you can buy three titles from the series and get some good educational value. My criticisms really are relatively minor – I would have liked to have seen Multiplication I and Division I as the approach in these may invalidate some of my comments – still each one should stand on its own.

Reviewed by: Peter Davies
Mill Park, Vic.

Treasure Quest



Simon Jones

Treasure Quest is a simple adventure game for the Commodore 64 designed to be an introduction to writing and playing adventure games. It shows the basic concepts needed to write your own adventure game.

In Treasure Quest you are a brave explorer searching for the lost treasure of Zulu. You move around the country side by typing in commands such as 'GO WEST' or just 'W'. On your quest you will come across various objects that you may need. When you find an object to pick it up type 'GET (name of object)'. An example of this is 'GET HAT'. To put down the object you type 'DROP' and then the name of the object. An example of the 'DROP' command is 'DROP HAT'. To display a list of objects you are carrying type 'INVENTORY'. The game ends when you have found the treasure.

Now for a brief description of the program itself. **Lines 5 and 6** setup the arrays and initialises a few variables. MP% is used to store the map (more on that later). OP% is used to store the current position of all the objects. OD$ stores the name of the objects and finally RD$ contains the description of all the locations, The variables in line 6 are the number of objects, the number of locations, and the position of the character in the adventure.

Lines 10-280 -670 ask the user if they want instructions, and if so displays them. These are the easy bits, now comes the guts of the program.

Lines 1000 and 1010 read in the map of the adventure which is stored in data statements at lines 10005 – 10150. Each line of the data is for a single location. The locations are numbered one through to thirty. The first number is the location number of the location to the north. So in the case of location 1 you look at line 10005 and you see that the first number is 3. That means that location 3 is directly north of the location 1 and there is a path connecting them. The second number is the location to the south, the third is the location to the west, and the last number is the location to the east. If you look at the list of numbers you will see 0 is written several times. But I said that all the locations were numbered from one to thirty, so what does 0 mean? Simple, if there is no path in a direction you put a zero in the corresponding place in the map. So for example if you were writing an adventure and you have a location that has no path to the north, all you do is put a zero at the beginning of the line of data for that location.

Next line 1020 jumps to a subroutine that starts at line 10200 and ends at line 10399. The routine sets up the array containing a description of each location. **Lines 1030 and 1040** read in the names of the objects and their positions from data statements at lines 10400 – 10460. That's all the setting up required now for the adventure itself.

Line 2010 jumps to a subroutine at 5000 which prints out information about the current location. The routine starts at

continued overleaf

Treasure Quest

Continued from previous page

5000 and ends at line 5110. The first thing it does is print the location description. It then prints 'I CAN SEE...' and searches through the array containing the positions of the objects. If any objects position is the same as the location that the character is currently at, the program displays the name of the corresponding object. If no object positions are equal it simply prints 'NOTHING'. Next it prints 'EXITS:' and checks to see if there is a zero in each possible direction of movement. If there is no zero for a given direction it prints the direction and checks for a zero for the next direction. It does this until all four directions have been checked for the location.

Line 2015 checks to see if location 15 has been reached if it has then the adventure has ended and the program jumps to 7100 to print out a message saying so. **Line 2020** inputs the users command. **Line 2030** jumps to a subroutine that separates the commands and put each word in a seperate variable. This is W1$ and W2$ where W1$ is the first word and W2$ the second. **Lines 2040 – 2090** check for any movement commands. If there is any movement commands the program jumps to line 8000. At line 8000 it checks if the movement command is possible in the direction chosen by the user. If movement is not possible the program prints a message saying this and returns the user to the command input section of the program at line 2020. **Line 8010** gets the location number of the location in the direction given by the user from the map stored in MP%. It puts this value in the character position variable CP and jumps to line 2010.

Lines 2100 – 2180 check if any of the valid commands were entered by the user and if so jumps to the appropriate routines as follows:

'LOOK' line 2010
'INVENTORY' lines 5500 – 5560
'QUIT' line 7500
'GET' lines 6000 – 6060
'DROP' lines 6100 – 6220
'OPEN' lines 5700 – 5730
'SWING' lines 6400 – 6480
'WAVE' lines 6600 – 6720
'READ' lines 7000 – 7020

One final point to be made is about objects in the adventure. If you look at lines 10400 – 10460 you will see that each object has two strings. For example at line 10420 there is 'BRONZE KEY' in one string and then just 'KEY' in another. The reason this is that when commands are being entered only two words will be understood. So if you type 'GET BRONZE KEY' the computer would not understand you. So when a location description is being printed the first string is used and when object names are being used in commands entered by the user the second string is used. One more point about objects is when an object is being carried by the character the object position will be zero for that object.

I hope you enjoy playing Treasure Quest and I hope you also have a try at writing your own adventure, its not very hard. The main thing to remember is keep the adventures small at first and as you learn build up to larger adventures. Well that's about all for now, happy adventuring.


```
0 REM       TREASURE QUEST'BNOC
1 REM       SIMON JONES'BKWC
2 REM       (C) 1985 SIMON JONES'BREE
3 REM 'BARB
5 PRINT CHR$(142) CHR$(8);: CLR : DIM MP%(30,4),OP%(20),
  OD$(20,1),RD$(30)'FVKP
6 NO=5:NR=30:CP=1'DMJJ
10 REM  *** TITLE PAGE ***'BPQB
15 PRINT "[CLR]";'BBDD
20 PRINT "[WHT],[O],[<Y><Y><Y><Y><Y><Y><Y><Y><Y>
   <Y><Y><Y><Y><Y><Y><Y><Y><Y><Y><Y><Y><Y><Y><Y>
   <Y><Y><Y><Y><Y><Y><Y><Y><Y><Y><Y><Y><Y><Y><Y>
   <Y><Y><Y>],[P]"'BAWD
30 PRINT "[<G>,SPACE38,<N>]";'BBDF
40 PRINT "[<G>,SPACE38,<N>]";'BBDG
50 PRINT "[<G>,SPACE38,<N>]";'BBDH
60 PRINT "[<G>,SPACE38,<N>]";'BBDI
70 PRINT "[<G>,SPACE38,<N>]";'BBDJ
80 PRINT "[<G>,SPACE38,<N>]";'BBDK
90 PRINT "[<G>,SPACE38,<N>]";'BBDL
100 PRINT "[<G>,SPACE10,U,CCCCCCCCCCCCCCCC,I,SPACE10,
   <N>]";'BBHN
110 PRINT "[<G>,SPACE10,B,SPACE]TREASURE QUEST[SPACE,
   B,SPACE10,<N>]";'BBXG
120 PRINT "[<G>,SPACE10,J,CCCCCCCCCCCCCCCC,K,SPACE10,
   <N>]";'BBXP
130 PRINT "[<G>,SPACE38,<N>]";'BBDE
140 PRINT "[<G>,SPACE38,<N>]";'BBDF
150 PRINT "[<G>,SPACE38,<N>]";'BBDG
160 PRINT "[<G>,SPACE38,<N>]";'BBDH
170 PRINT "[<G>,SPACE38,<N>]";'BBDI
180 PRINT "[<G>,SPACE38,<N>]";'BBDJ
190 PRINT "[<G>,SPACE38,<N>]";'BBDK
200 PRINT "[<G>,SPACE10]WRITTEN BY S. JONES[SPACE9,
   <N>]";'BBNF
210 PRINT "[<G>,SPACE38,<N>]";'BBDD
220 PRINT "[<G>,SPACE38,<N>]";'BBDE
230 PRINT "[<G>,SPACE38,<N>]";'BBDF
240 PRINT "[<G>,SPACE38,<N>]";'BBDG
270 PRINT "[L,<P><P><P><P><P><P><P><P><P><P><P>
   <P><P><P><P><P><P><P><P><P><P><P><P><P><P><P>
   <P><P><P><P><P><P><P><P><P><P><P><P><P><P><P>
   <P>,@,HOME]";'BBRG
280 FOR I=1 TO 2000: NEXT I'EIYI
500 REM  *** INSTRUCTIONS ***'BSNE
510 PRINT "[CLR]";'BBDB
520 PRINT "[RVS,SPACE9]*** TREASURE QUEST ***[SPACE9,
   OFF]";'BBLK
530 PRINT : PRINT "INSTRUCTIONS[SPACE,
   RVS]Y[OFF]/[RVS]N[OFF,SPACE]? ";'DDDK
540 GET A$: IF A$="Y" THEN PRINT "YES": GOTO 570'GJGJ
550 IF A$="N" THEN PRINT "NO": GOTO 1000'FHIJ
560 GOTO 540'BDIG
570 PRINT "[CLR]";'BBDH
580 PRINT "[RVS,SPACE9]*** TREASURE QUEST ***[SPACE9,
   OFF]";'BBLQ
590 PRINT " YOUR QUEST IS TO FIND THE LOST
   TREASUREOF ZULU.[SPACE2]TO END YOUR";'CCIB
600 PRINT " QUEST[SPACE2]BEFORE[SPACE2]YOUFIND THE
   TREASURE TYPE 'QUIT' OR 'Q' FORSHORT.";'BBOR
610 PRINT "[SPACE3]TO[SPACE2]MOVE[SPACE2]TYPE[SPACE2]
   'GO NORTH',[SPACE2]OR'NORTH', OR SIMPLY 'N'.[SPACE2
   |THERE ARE";'BBJS
620 PRINT "[SPACE2]FOURDIRECTIONS YOU[SPACE2]CAN
   TRAVEL NORTH,SOUTH,EAST, AND WEST.";'BBNT
630 PRINT "[SPACE2]TO GET A DESCRIPTION OFWHAT CAN BE
   SEEN TYPE 'LOOK'.[SPACE2]";'BBFR
632 PRINT "TO[SPACE2]GET ALIST OF[SPACE2]THINGS
   [SPACE2]YOU ARE[SPACE2]CARRYING[SPACE2]
   TYPE'INVENTORY' OR ";'BBVW
634 PRINT "'INV'. ALL OTHER ";'BBGM
640 PRINT "COMMANDSARE TWO WORDS.[SPACE2]EG
   'OPEN CHEST' OR 'READLETTER' OR ";'BBLU
645 PRINT "'GET GUN' OR 'DROP HAT'.";'BBYP
650 PRINT : PRINT : PRINT "[SPACE8]GOOD LUCK ON
   YOUR QUEST !"'DCHO
660 PRINT : PRINT : PRINT "[RVS,SPACE9]PRESS ANY KEY
   TO BEGIN[SPACE9,OFF]"'EDNR
670 POKE 198,0: WAIT 198,1: POKE 198,0'DRVM
1000 FOR I=1 TO NR: READ A,B,C,D:MP%(I,1)=A'FWMB
1010 MP%(I,2)=B:MP%(I,3)=C:MP%(I,4)=D: NEXT I'EGLD
```

```
1020 GOSUB 10200'BFCV
1030 FOR I=1 TO NO: READ A:OP%(I)=A: NEXT I'GQCD
1040 FOR I=1 TO NO: READ A$,B$:OD$(I,0)=A$:OD$(I,1)=B$:
     NEXT I'HJSI
2000 REM *** ADVENTURE ***'BPGX
2010 GOSUB 5000: REM PRINT ROOM CURRENTLY IN'CARD
2015 IF CP=15 THEN 7100'DIOD
2020 MV=0: PRINT : PRINT "COMMAND ? ";:MC=30: GOSUB 9900:
     CM$=TS$:TS$="""HCIJ
2030 GOSUB 9700: REM SEPERATE WORDS'CSOD
2040 IF W1$="MOVE" OR W1$="GO" THEN W1$=W2$'GMXG
2050 IF W1$="N" OR W1$="NORTH" THEN MV=1'GJDH
2060 IF W1$="S" OR W1$="SOUTH" THEN MV=2'GJRI
2070 IF W1$="W" OR W1$="WEST" THEN MV=3'GJVI
2080 IF W1$="E" OR W1$="EAST" THEN MV=4'GJHJ
2090 IF MV<>0 THEN 8000'EHXH
2100 IF W1$="LOOK" AND W2$="" THEN 2010'FKDB
2110 IF W1$="INV" OR W1$="INVENTORY" THEN 5500'FKVF
2120 IF W1$="Q" OR W1$="QUIT" THEN 7500'FKDE
2130 IF W1$="GET" THEN 6000'DHGC
2140 IF W1$="DROP" THEN 6100'DHSD
2150 IF W1$="OPEN" THEN 5700'DHUE
2160 IF W1$="SWING" THEN 6400'DHFF
2170 IF W1$="WAVE" THEN 6600'DHVG
2180 IF W1$="READ" THEN 7000'DHSH
2500 PRINT : PRINT "[DOWN]I DON'T UNDERSTAND YOU":
     GOTO 2020'DGRI
5000 REM *** PRINT INFORMATION ON CURRENT
     POSITION ***'BOVI
5010 PRINT "[CLR]";: PRINT RD$(CP)'CJQB
5020 PRINT "[DOWN]I CAN SEE...": PRINT :I=0:FL=0'EIQG
5030 I=I+1: IF I>NO THEN 5060'FLLF
5040 IF OP%(I)=CP THEN PRINT OD$(I,0):FL=1'FUBI
5050 GOTO 5030'BEFD
5060 IF FL=0 THEN PRINT "NOTHING."'EDOI
5070 PRINT : PRINT "EXITS:[DOWN]":
     IF MP%(CP,1)<>0 THEN PRINT "NORTH"'HMRO
5080 IF MP%(CP,2)<>0 THEN PRINT "SOUTH"'FKAL
5090 IF MP%(CP,3)<>0 THEN PRINT "WEST"'FKUM
5100 IF MP%(CP,4)<>0 THEN PRINT "EAST"'FKYE
5110 PRINT : RETURN 'CBVA
5500 REM *** 'INVENTORY' COMMAND ***'BYPI
5505 PRINT : PRINT : PRINT "YOU ARE CARRYING:":
     PRINT 'EDGO
5510 I=0:FL=0'CGQF
5520 I=I+1: IF I>NO THEN 5550'FLPJ
5530 IF OP%(I)=0 THEN PRINT OD$(I,0):FL=1'FTCM
5540 GOTO 5520'BEJH
5550 IF FL=0 THEN PRINT "NOTHING."'EDOM
5560 GOTO 2020'BEBJ
5700 REM *** 'OPEN' COMMAND ***'BTKJ
5710 IF W2$="DOOR" AND CP=6 AND OP%(1)<>0 THEN PRINT :
     PRINT "[DOWN]THE DOOR IS LOCKED.": GOTO 2020'LTDW
5720 IF W2$="DOOR" AND CP=6 AND OP%(1)=0 THEN PRINT :
     PRINT "[DOWN]OK":MP%(6,2)=7: GOTO 2010'LEAV
5730 GOTO 2500'BEEI
6000 REM *** 'GET' COMMAND ***'BSIC
6010 I=0:FL=0'CGQB
6020 I=I+1: IF I>NO THEN 6050'FLLF
6030 IF OD$(I,1)=W2$ AND OP%(I)=CP THEN OP%(I)=0: PRINT :
     PRINT "[DOWN]OK": GOTO 6060'JIDO
6040 GOTO 6020'BEFD
6050 PRINT : PRINT "[DOWN]I CAN NOT SEE A ";W2$;
     " HERE."'CGKK
6060 GOTO 2020'BEBF
6100 REM *** 'DROP' COMMAND ***'BTNE
6105 IF W2$="COINS" AND CP=16 AND OP%(3)=0
     THEN 6170'HSUO
6107 IF W2$="LOG" AND CP=13 AND OP%(2)=0 THEN 6200'HSJP
6110 I=0:FL=0'CGQC
6120 I=I+1: IF I>NO THEN 6150'FLMG
6130 IF OD$(I,1)=W2$ AND OP%(I)=0 THEN OP%(I)=CP: PRINT :
     PRINT "[DOWN]OK": GOTO6160'JIEP
6140 GOTO 6120'BEGE
6150 PRINT : PRINT "[DOWN]YOU ARE NOT CARRYING A ";
     W2$'CFYM
6160 GOTO 2020'BEBG
6170 PRINT : PRINT "[DOWN]THE[SPACE2]ELF[SPACE2]PICKS
     UP[SPACE2]THE COINS[SPACE2]AND[SPACE2]
     BOWSSLIGHTLY. ";'CCRU
6175 PRINT "HE THEN DISAPPEARS."'BAQQ
```

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6180 OP%(3)=99:MP%(16,4)=21:RD$(16)="YOU ARE IN A THIN
     WELL LIT CORRIDOR."'DDBY
6190 GOTO 2020'BEBJ
6200 PRINT : PRINT "[DOWN]THE LOG MAKES A BRIDGE
     ACROSS THE CHASM.":OP%(2)=99:MP%(13,2)=14'EWBR
6210 RD$(13)="YOU ARE ON THE EDGE OF A[SPACE2]DEEP
     [SPACE2]CHASM. ALOG MAKES A BRIDGE "'BHOR
6220 RD$(13)=RD$(13)+"ACROSS THE CHASM.":
     GOTO 2020'DTKM
6400 REM *** 'SWING' COMMAND ***'BUUH
6410 IF W2$="SWORD" AND OP%(4)<>0 THEN PRINT :
     PRINT "[DOWN]YOU DON'T HAVE A SWORD":
     GOTO 2020'JQWT
6415 IF W2$="STAFF" AND OP%(5)<>0 THEN PRINT :
     PRINT "[DOWN]YOU DON'T HAVE A STAFF":
     GOTO 2020'JQTY
6420 IF W2$="SWORD" AND OP%(4)=0 AND CP=14
     THEN 6440'HSMO
6425 IF W2$<>"SWORD" AND W2$<>"STAFF" AND W2$<>
     "COINS" AND W2$<>"LOG" AND W2$<>"KEY"
     THEN 6480'QTPF
6430 PRINT : PRINT "[DOWN]NOTHING HAPPENS":
     GOTO 2020'DGMM
6440 PRINT : PRINT "[DOWN]YOU[SPACE2]STRIKE THE[SPACE2]
     LION. THE LION VANISHESINSTANTLY."'CBFV
6450 MP%(14,2)=15:RD$(14)="YOU[SPACE2]ARE IN A[SPACE2]
     THIN[SPACE2]CORRIDOR.[SPACE2]LIGHT ISCOMING "
     'CTWY
6460 RD$(14)=RD$(14)+" FROM[SPACE2]THE[SPACE2]
     SOUTHERN[SPACE2]END[SPACE2]OF THECORRIDOR."
     'COIX
6470 GOTO 2020'BEBK
6480 PRINT : PRINT "[DOWN]YOU DON'T HAVE A ";W2$:
     GOTO 2020'DKES
6600 REM *** 'WAVE' COMMAND ***'BTLJ
6610 IF W2$="STAFF" AND OP%(5)<>0 THEN PRINT : PRINT
     "[DOWN]YOU DON'T HAVE A STAFF": GOTO 2020'JQTV
6620 IF W2$="SWORD" AND OP%(4)<>0 THEN PRINT : PRINT
     "[DOWN]YOU DON'T HAVE A SWORD": GOTO 2020'JQWW
6630 IF W2$="STAFF" AND OP%(5)=0 AND CP=3 THEN 6660'HRVQ
6640 IF W2$="STAFF" AND OP%(5)=0 AND CP=29
     THEN 6690'HSZS
6645 IF W2$<>"SWORD" AND W2$<>"STAFF" AND W2$<>
     "COINS" AND W2$<>"LOG" AND W2$<>"KEY" THEN 6480
     'QTPJ
6650 PRINT : PRINT "[DOWN]NOTHING HAPPENS": GOTO 2020
     'DGMQ
6660 PRINT : PRINT "[DOWN]A ROPE LADDERS APPEAS. YOU
     CAN NOW CLIMBTHE CLIFF."'CBLY
6670 MP%(3,1)=22:RD$(3)="YOU ARE AT THE BASE OF A HIGH
     CLIFF.[SPACE4]THERE IS "'CRYC
6680 RD$(3)=RD$(3)+"A ROPE LADDER UP THE CLIFF.":
     GOTO 2020'DREY
6690 PRINT : PRINT "[DOWN]A[SPACE2]BRIDGE[SPACE2]
     APPEARS. IT SPANS ACROSS[SPACE2]THERIVER.
     YOU CAN ";'CCVD
6695 PRINT "NOW HEAD NORTH."'BAOW
6700 MP%(29,1)=30:RD$(29)="YOU ARE AT THE EDGE OF A
     [SPACE2]WIDE[SPACE2]RIVER. ABRIDGE "'CTWV
6710 RD$(29)=RD$(29)+"SPANS THE RIVER."'COCO
6720 GOTO 2020'BEBI
7000 REM *** 'READ' COMMAND ***'BTSD
7010 IF W2$="SIGN" AND CP=17 THEN PRINT : PRINT "[DOWN]
     THE SIGN SAYS:'BEWARE OF QUICK SAND"':
     GOTO 2020'INES
7020 PRINT : PRINT "[DOWN]I CAN'T DO THAT":
     GOTO 2020'DGBH
7100 REM *** END OF QUEST ***'BQLE
7110 PRINT : PRINT : PRINT "[DOWN]CONGRATULATIONS !
     [SPACE2]YOUR[SPACE2]QUEST IS[SPACE2]AT ANEND.
     YOU HAVE FOUND THE "'DCDU
7120 PRINT "LOST TREASURE OFZULU."'BAVI
7130 PRINT : PRINT : PRINT : GOTO 32767'EILH
7500 REM *** 'QUIT' COMMAND ***'BTBJ
7510 PRINT "[CLR]";'BBDG
7520 PRINT "IT IS A[SPACE2]SHAME[SPACE2]YOU[SPACE2]
     DIDN'T[SPACE2]FINISH YOURQUEST[SPACE2]BECAUSE
     YOU WERE SO ";'BBRY
7530 PRINT "CLOSE[SPACE2]TO THEEND. I HOPE YOU WILLTRY
     AGAIN SOON."'BAQU
7540 PRINT : PRINT : PRINT 'DCMK
7990 GOTO 32767'BFUS
8000 REM *** MOVE CHARACTER ***'BTDF
8005 IF MP%(CP,MV)=0 THEN PRINT : PRINT : PRINT "YOU CAN'T
     GO THAT WAY": GOTO 2020'HSAS
8010 CP=MP%(CP,MV): GOTO 2010'CRNG
9700 I=0:WD$="": GOSUB 9800: IF I=LEN (CM$) AND A$=" "
     THEN CM$="": RETURN 'LYBU
9710 GOSUB 9810:W1$=WD$: IF I=LEN (CM$) THEN RETURN
     'HSOR
9720 WD$="": GOSUB 9800: IF I=LEN (CM$) THEN RETURN 'HPWR
9730 GOSUB 9810:W2$=WD$: RETURN 'DMBP
9800 I=I+1:A$=MID$(CM$,I,1): IF A$=" " THEN 9800'HWHS
9805 RETURN 'BAQO
9810 WD$=WD$+A$:I=I+1:A$=MID$(CM$,I,1): IF A$<>" " AND
     I< LEN (CM$)+1 THEN 9810' ONEC
9820 RETURN 'BAQL
9900 GET A$: PRINT "[RVS]?[OFF,LEFT]";: IF A$="" THEN 9900
     'FLKQ
9910 IF CH>MC-1 AND A$<> CHR$(13) AND A$<> CHR$(20)
     THEN 9900'MVUX
9920 IF A$=CHR$(13) AND CH=0 THEN 9900'GNDS
9930 IF A$=CHR$(20) AND CH<1 THEN 9900'GNDT
9940 IF A$=CHR$(20) AND CH>0 THEN 9947'GNLU
9945 GOTO 9950'BEUU
9947 PRINT "[SPACE,LEFT2,SPACE,LEFT]";:CH=CH-1:TS$=
     LEFT$(TS$, LEN (TS$)-1): GOTO 9900'IDBJ
9950 IF A$=CHR$(13) AND CH>0 THEN CH=0: PRINT " ";:
     RETURN 'JPQY
9960 IF A$< CHR$(32) OR A$> CHR$(218) THEN 9900'HRSY
9970 IF A$> CHR$(96) AND A$< CHR$(193) THEN 9900'HRDA
9980 PRINT A$;:TS$=TS$+A$:CH=CH+1: GOTO 9900'GXJC
10000 REM *** DATA ***'BKOS
10005 DATA  3,5,2,4'BHMW
10010 DATA  19,17,0,1'BJHT
10015 DATA  0,1,19,20'BJBY
10020 DATA  20,18,1,0'BJAU
10025 DATA  1,6,17,18'BJMA
10030 DATA  5,0,0,0'BHDU
10035 DATA  6,8,10,0'BIGB
10040 DATA  7,9,0,0'BHOV
10045 DATA  8,0,12,16'BJGC
10050 DATA  0,11,0,7'BIAX
10055 DATA  10,12,0,0'BJRD
10060 DATA  11,13,0,9'BJDY
10065 DATA  12,0,0,0'BIYD
10070 DATA  13,0,0,0'BIAY
10075 DATA  14,0,0,0'BIBE
10080 DATA  0,0,9,0'BHHA
10085 DATA  2,0,0,5'BHFF
10090 DATA  4,0,5,0'BHHB
10095 DATA  0,2,0,3'BHDA
10100 DATA  0,4,3,0'BHFS
10105 DATA  0,0,16,0'BIDX
10110 DATA  0,3,23,24'BJCU
10115 DATA  26,0,0,22'BJAA
10120 DATA  27,0,22,25'BKGV
10125 DATA  0,0,24,0'BICA
10130 DATA  0,23,0,28'BJDW
10135 DATA  0,24,28,0'BJEC
10140 DATA  29,0,26,27'BKOX
10145 DATA  0,28,0,0'BIBD
10150 DATA  0,29,0,0'BICY
10200 REM *** ROOM DESCRIPTIONS ***'BWTY
10205 RD$(1)="YOU ARE SURROUNDED BY OPEN COUNTRY.
     FOURPATHS MEET HERE"'BGEJ
10210 RD$(2)="YOU[SPACE2]ARE ON[SPACE2]THE[SPACE2]
     EDGE OF[SPACE2]A LARGE LAKE.THERE IS A SMALL
     HILL"'BGHF
10212 RD$(2)=RD$(2)+" TO THE NORTH."'CMAD
10215 RD$(3)="YOU ARE AT THE BASE OF A HIGH CLIFF."'BGYD
10220 RD$(4)="YOU ARE IN THE MIDDLE OF A PINE FOREST."
     'BGPB
10225 RD$(5)="YOU ARE ON A PATH THAT HEADS TOWARDS
     THEMOUNTAINS TO THE SOUTH."'BGEN
10230 RD$(6)="YOU[SPACE2]ARE AT[SPACE2]THE[SPACE2]
     BASE OF THE[SPACE2]MOUNTAIN.THERE IS A DOOR IN"
     'BGVG
10232 RD$(6)=RD$(6)+" THE ROCK."'CMYE
10235 RD$(7)="YOU ARE IN A LARGE WELL LIT CORRIDOR."'BGJG
10240 RD$(8)="YOU ARE IN A HUGE CHAMBER."'BGJF
10245 RD$(9)="YOU[SPACE2]ARE IN A THIN[SPACE2]PASSAGE
     AND CAN ONLYCRAWL ALONG."'BGWL
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10250 RD$(10)="YOU ARE IN A[SPACE2]SMALL[SPACE2]
      CHAMBER. THERE IS ASTREAM HERE."'BHUH
10255 RD$(11)="YOU[SPACE2]ARE IN A DARK[SPACE2]
      CORRIDOR.[SPACE2]YOU[SPACE2]HEARNOISES TO THE
      SOUTH."'BHKO
10260 RD$(12)="YOU[SPACE2]ARE IN A[SPACE2]POORLY LIT
      [SPACE2]CHAMBER. BATSFLY AROUND THE CEILING."
      'BHQL
10265 RD$(13)="YOU[SPACE2]ARE ON[SPACE2]THE[SPACE2]
      EDGE OF A[SPACE2]DEEP[SPACE2]CHASMWHICH BLOCKS "
      'BHGN
10267 RD$(13)=RD$(13)+"THE WAY SOUTH."'COZI
10270 RD$(14)="YOU ARE[SPACE2]IN A[SPACE2]THIN[SPACE2]
      CORRIDOR.[SPACE2]LIGHT ISCOMING[SPACE2]FROM
      [SPACE2]THE "'BHNK
10275 RD$(14)=RD$(14)+" SOUTHERN[SPACE2]END[SPACE2]OF
      THECORRIDOR. THERE IS A ANGRY"
10280 RD$(14)=RD$(14)+" LION BLOCKINGTHE WAY SOUTH."
      'COAG
10285 RD$(15)="YOU[SPACE2]ARE IN A[SPACE2]GREAT
      [SPACE2]HALL[SPACE2]FILLED[SPACE2]
      WITHTREASURE BEYOND "'BHBQ
10290 RD$(15)=RD$(15)+"IMAGINATION."'CORD
10295 RD$(16)="YOU ARE IN A THIN[SPACE2]WELL LIT
      CORRIDOR.[SPACE2]ASMALL ELF STANDS "
10300 RD$(16)=RD$(16)+"BEFORE YOU. HE WILL NOTALLOW
      YOU TO[SPACE2]PASS."'COVD
10305 RD$(17)="YOU[SPACE2]ARE ON[SPACE2]THE[SPACE2]
      EDGE OF A[SPACE2]LARGE LAKE.THERE IS A SIGN
      HERE."'BHEK
10310 RD$(18)="YOU ARE IN A PINE FOREST."'BHED
10315 RD$(19)="YOU[SPACE2]ARE AT[SPACE2]THE[SPACE2]
      TOP[SPACE2]OF A[SPACE2]SMALL HILL.YOU CAN
      [SPACE2]SEE A LARGE"'BHEK
10317 RD$(19)=RD$(19)+" LAKE TO[SPACE2]THE[SPACE2]WEST.
      YOU CAN ALSO SEE MOUNTAINS"'COJM
10318 RD$(19)=RD$(19)+" TO THE SOUTH."'COUE
10320 RD$(20)="YOU ARE ON A FLAT GRASSED PLAIN. YOU
      CANSEE A FOREST TO THE "'BHHH
10322 RD$(20)=RD$(20)+"SOUTH."'COCD
10325 RD$(21)="YOU ARE IN A SMALL CHAMBER."'BHCE
10330 RD$(22)="YOU[SPACE2]ARE AT[SPACE2]THE[SPACE2]
      TOP[SPACE2]OF A[SPACE2]HIGH CLIFF.THERE IS A ROPE
      LADDER "'BHNI
10332 RD$(22)=RD$(22)+"DOWN THE CLIFF."'COYB
10335 RD$(23)="YOU[SPACE2]ARE IN A[SPACE2]SMALL
      [SPACE2]VALLEY.[SPACE2]A[SPACE2]STREAMFLOWS
      ALONG THE FLOOR OF"'BHPO
10337 RD$(23)=RD$(23)+" THE VALLEY."'COWF
10340 RD$(24)="YOU ARE ON GRASSED COVERED LEVEL
      GROUND.THERE IS A VALLEY TO"'BHGK
10342 RD$(24)=RD$(24)+" THE EAST."' COSA
10345 RD$(25)="YOU[SPACE2]ARE IN A[SPACE2]HUGE[SPACE2]
      VALLEY.[SPACE2]THERE IS ALAKE IN THE CENTRE."'BHRN
10350 RD$(26)="YOU ARE AT THE[SPACE2]TOP OF A[SPACE2]
      HIGH[SPACE2]MOUNTAINRANGE. THERE[SPACE2]IS A "
      'BHWJ
10352 RD$(26)=RD$(26)+" SMALL VALLEY[SPACE2]TO
      THESOUTH."'COFG
10355 RD$(27)="YOU ARE AT THE PEAK OF A TREELESS HILL."
      'BHSK
10360 RD$(28)="YOU ARE IN A CLEARING IN A[SPACE2]FOREST.
      [SPACE2]YOUCAN[SPACE2]HEAR[SPACE2]FAST[SPACE2]
      RUNNING"'BHUM
10362 RD$(28)=RD$(28)+"[SPACE2]WATER[SPACE2]TO[SPACE2]
      THENORTH."'CONF
10365 RD$(29)="YOU ARE ON THE EDGE OF A WIDE RIVER.
      THERIVER STOPS YOU FROM"'BHOR
10367 RD$(29)=RD$(29)+" GOING NORTH."'COQI
10370 RD$(30)="AROUND YOU IS A[SPACE2]CIRCLE OF[SPACE2]
      ROCKS.[SPACE2]THISAPPEARS[SPACE2]TO[SPACE2]BE
      [SPACE2]SOME "'BHSM
10372 RD$(30)=RD$(30)+" KIND[SPACE2]OF[SPACE2]
      MEETINGPLACE."'COPH
10399 RETURN 'BAQG
10400 REM *** THE OBJECTS ***'BQRY
10410 DATA 2,4,11,30,21'BMRX
10420 DATA "BRONZE KEY","KEY"'BBYB
10430 DATA "PINE LOG","LOG"'BBAB
10440 DATA "GOLD COINS","COINS"'BBAD
10450 DATA "SHINING SWORD","SWORD"'BBOA
10460 DATA "MAGICIAN'S STAFF" ,"STAFF"'BBAB
32767 END 'BACJ
```

ITYPE64

Ian Ingram

A short program to teach keyboard skills.

```
1 REM "ITYPE64"'BANB
2 PRINT "[CLR]": PRINT "##ITYPE##": PRINT 'DCRE
3 PRINT "BY IAN INGRAM # JULY85"'BAWH
4 PRINT "PRESS THE KEY TO MATCH THE CENTRE SCREEN
  CHARACTER.": PRINT 'CBBR
5 PRINT "WATCH YOUR SCORE AND TIME TOP LEFT OF
  [SPACE3]SCREEN * F5 RETURNS TO START."'BAGV
6 PRINT "F7 ENDS.": FOR T=1 TO 7000: NEXT 'FIXK
7 C1=0:C2=0:TI$="000000":X=0'EOUM
8 X=INT (62* RND (1)+33)'FKML
9 M=54272'BGDJ
10 PRINT "[CLR]"'BATX
12 PRINT "[SPACE2]SCORE = ";C2"/"(C1+C2): PRINT 'DKKF
14 PRINT "[SPACE2]TIME[SPACE2]= ";TI$'BEPE
16 IF X=<63 AND X=>33 THEN Y=X'IINK
18 IF X=<96 AND X=>64 THEN Y=X-64'JKTN
19 POKE 1484,Y'BGLH
20 GET X$: IF X$="" THEN 20'EHZC
22 IF X$=CHR$(135) THEN 07: REM F5 RETURNS TO START'FBGK
24 IF X$=CHR$(136) THEN END : REM F7 ENDS'GOCJ
26 IF ASC (X$)=X THEN 30'EHYI
28 C1=C1+1: POKE M,53: POKE M+1,7'FPFM
29 GOTO 32'BCMH
30 C2=C2+1: POKE M,172: POKE M+1,57'FRKF
32 POKE M+24,15'CGID
34 POKE M+5,96: POKE M+6,255'EMKI
36 POKE M+4,33: FOR T=1 TO 150: NEXT T'GNSL
38 POKE M+24,0: GOTO 08'DIWK
```

THE OTHERS

by David Roth

FORTH ARRAY HANDLING

CREATING arrays

Unlike BASIC or PASCAL, FORTH has no native words to handle arrays, yet arrays are required for typical FORTH applications. The FORTH programmer must create them. This article discusses a useful set of array handling utilities. They are not sophisticated, because I have delibrately chosen to use simple FORTH constructs to make them, valuing clarity before complexity.

The first building block I will use is CREATE. If I enter the phrase "CREATE SHIPS", then FORTH adds a new word, SHIPS, to the dictionary. The dictionary entry looks conceptually like this :-

```
FIELD 1    SHIPS    (name field)
FIELD 2    run time code
```

Additional space to store data can be provided using ALLOT. Thus "CREATE SHIPS 2 ALLOT" would give :-

```
FIELD 1    SHIPS    (name field)
FIELD 2    run time code
FIELD 3    data space    (2 bytes)
```

When "SHIPS" is executed, FORTH leaves the data space address on the stack. Therefore I can put data in SHIPS using the "!" (store) command and retrieve data using the "@" (fetch) command, e.g.

```
2 SHIPS !    ( store 2 in SHIPS)
SHIPS @ .    ( read SHIPS data and print it)
```

Additional space for storing data can be added by ALLOTing more space. "4 ALOT" would give 4 bytes of data space, and so on. Thus to CREATE an 'N' element array, with each element 2 bytes (1 cell) long, I would enter :-

```
CREATE SHIPS N 2 * ALLOT.
```

Some FORTHs (e.g. HANDIC, WHITE LIGHTNING do not follow the FORTH-79 standard for CREATE and VARIABLE. It may therefore be necessary to redefine them as follows in order to try out the examples used in this article :-

```
: VARIABLE HERE VARIABLE ;
: CREATE VARIABLE -2 ALLOT ;
```

Accessing array elements

Each 2-byte cell in the CREATEd array can be accessed using the appropriate offset. Thus the element with index 0 (in BASIC "SHIPS(0)") is at offset 0, the element with index 3 ("SHIPS(3)") is att offset 6. The general rule is to multiply the index by 2 to get the offset. Thus the FORTH equivalent of "CARS(3) = 100" is :-

```
100 CARS 3 2 * + !
```

I can define the new words STORE, FETCH and INCR, which respectively store a number, read a number and increment a number held in an array element. The syntax is given in brackets alongside the definitions.

```
: STORE 2 * + ! ; ( value array-address index -----)
: FETCH 2 * + @ ; ( array-address index -----)
: INCR 2 * + 1 SWAP +! ; (array-address index -----)
```

100 SHIPS 3 STORE is now equivalent to "SHIPS(3) = 100" in BASIC.

Initialising Arrays

Values can be given to each array element when it is CREATEd. by using ",", which effectively takes a number from the stack and ALLOTs 2 bytes for it at the end of the "array" word. For example:-

```
CREATE SHIPS 20 , 30 , 40 , 50 , 60 ,
```

This phrase creates a 5 element array SHIPS with the above values (i.e. "SHIPS(4) = 60").

To give all elements of an array the same value, I use a DO LOOP.

```
: RESET ( value array-address #elements ----- )
  0 DO ( for #elements )
    OVER OVER ( save value, array-address on stack )
    I STORE  ( store value at element I )
  LOOP
  DROP DROP ( remove value, array address from stack)
  ;
```

For example, to store a 0 in all 5 elements of SHIPS use "0 SHIPS 5 RESET". Warning – take care to use the correct number of elements. RESET makes no check for this and will quite happily STORE data beyond the end of the ALLOTed space. This could have various unhappy effects, including a system crash. I could have used the FILL method (look it up), but I have preferred a method gives a clear illustration of array handling. Note that I need to save the value and array-address before using them, since STORE removes them from the stack. The final DROP DROP is required since the array-address and value are left on the stack after leaving the DO LOOP

PRINT-ARRAY (print all elements) is similar to RESET.

```
: PRINT-ARRAY ( array-address #elements ----- )
  0 DO ( for #elements )
    DUP ( save array-address )
    I FETCH U. ( get data and print it )
  LOOP
  DROP;
```

Multi-dimensional Arrays

To access a 2-dimensional array , 2 indices are required. To calculate the space required for ALLOT, their maximum values are multiplied together. "CREATE SHIP-TABLE 3 25 * 2 * ALLOT" is the FORTH equivalent of "DIM SH(2,24)". To get the offset of any element, a similar calculation is required, for example :-

```
100 SHIP-TABLE 3 2 * 5 2 * + !    (is equivalent to
"SH(3,5) = 100")
```

A new set of 2-dimensional array words is required – 2STORE, 2FETCH and 2INCR.

```
: 2STORE 2 * SWAP 2 * + + ! ; ( value array-address
index1 index2 ----- )
: 2FETCH 2 * SWAP 2 * + + @ ; ( array-address index1
index2 ----- )
: 2INCR 2 * SWAP 2 * 1 SWAP + +! ; ( array-address
index1 index2 ----- )
```

2RESET and 2PRINT-ARRAY use 2 DO LOOPS.

```
: 2RESET ( value array-address #x-elements #y-
elements ----- )
    TIB ! ( save #y-elements in text-input-buffer )
    0 DO ( for #x-elements )
      TIB @ ( restore #y-elements )
      0 DO ( for #y-elements )
        OVER OVER ( save value array-address )
        I J 2STORE ( I = index1, J = index2 )
      LOOP
    LOOP
    DROP DROP ;

: 2 PRINT-ARRAY ( array-address #x-elements #y-
elements ----- )
    TIB !
    0 DO ( for #x-elements )
      TIB @
      0 DO ( for #y-elements )
        DUP ( save array-address )
        I J 2FETCH U.
      LOOP
    LOOP ;
```

The Printer Page

MAKING A MARK....

Paul Blair

As the number of Commodore computers sold in Australia has increased, so have sales of support devices. Many users who started out with cassette units have moved up to disk drives. Others, whose needs go a bit further still, are shopping around for printers to complete their systems.

Why buy a printer? The reasons will vary with every user– it may be word processing for school, university or business, spreadsheets, graphics.. or, like me, you might find it easier to edit Basic programs on paper, rather than on the screen. And articles such as this review must be finally edited from paper, as it is the only way to see how it reads.

Given that Commodore themselves sell 'house brand' printers, it may seem surprising that many prospective purchasers have opted to buy non-Commodore printers. Not only that, but they have, at the same time, elected to pay out some quite pocket-bending prices for the privilege.

The reasons for these choices are easy to identify – there are many more companies making or cloning high quality printers these days, and interfaces are becoming cheaper and more versatile. It has to be remembered that most of these printers cost more, require (sometimes more) complex techniques to use, and don't work with all software. But as the printers offered by Commodore have had tales of interminable difficulties, needing a string of revisions to 'fix', what option did they have?

Now a sensible option does exist. It's the new EPSON GX80, a 'plug in and go' printer specifically designed to work with the C16, C64, Plus/4 and C128 computers from Commodore. Through the courtesy of Epson, I recently had a prototype model for review.

Epson and Commodore are not strangers to each other. For some years, Epson supplied the mechanisms for Commodore's main printer lines. I still own a 1978 vintage CBM 3022 printer, and make heavy demands on it. It has never put a foot wrong. I could still buy spare parts for it from Epson if it did have a spasm.

More recently, the Epson 100 Model was chosen by IBM as the main printer for the PC. Epson probably held up to 50% of the Australian dot matrix printer market for a while, which is no mean feat. To put it simply, Epson have a long and successful history of producing printers that are held in high renown.

The new printer aims to fill the gap left by withdrawal of the Commodore MPS801 from manufacture. Epson set out to produce an 801 clone, but have gone further than that, because they have included additional print modes – including NLQ.

Some explanations would be in order here. Dot matrix printing is created by moving a print 'head' across the page, firing a series of pins/wires at an ink ribbon, which leaves an impression on that paper behind it. The pins are fired in rapid succession, and the effect is to put enough ink dots onto the paper to make readable characters. The width of the characters, the closeness of the dots when printed, and the shape of the pins themselves all add to (or subtract from) the final print quality. As a general rule, the more pins in the print head, the greater printing clarity and quality that can be obtained. The GX80 has nine wires, which permits very clean printer characters, and very refined graphics.

Let me give you the typical descriptions of print modes that are in use:

PRINT MODES....

Normal print: the base case. Most dot printers print ten characters per line inch (no metrics here yet). Thus, 80 columns of print will use 8 inches of paper width. (Fig 1A)

Compressed print: useful for squeezing more characters onto a line. The more usual spacings fall between 12 and 17 characters per inch. Epson have chosen to use 17, so 8 inches of print will give 136 characters across a page. (Fig 1B) Double strike: doing it twice. The printer makes one pass across the line, then returns to its starting position (left or right) and prints over the line again. The characters come out sharper, with a corresponding drop in output speed. (Fig 1C)

Emphasized print: doing it twice, but with a minute movement of the print head between strikes. This darkens and slightly thickens the printed character. In this mode, the print head makes only one pass across the page. Print speed is only slightly reduced from normal. (Fig 1D)

NLQ: the new buzz words, Near Letter Quality. This is an attempt to permit dot printers to be used for correspondence by producing characters that closely approximate typewriter quality. This mode also requires two distinct passes of the print head to give the requisite fine print output. (Fig 1E)

Enlarged print: extra width characters, usually double normal print, created on one pass of the print head.

Reversed print: white characters printed on a black ground, just as you can get on your computer screen.

Bit mode: by sending the appropriate information to the print head, this mode allows virtually any pattern or design of dots to be printed.

Although not strictly a print mode, I will include hex dump mode here for completeness, and describe its operation a bit further on.

I said earlier that the GX80 was a clone of the MPS801. That was not quite right. The 801 provided only normal, enlarged, bit and reversed print modes. The GX80 provides ALL the modes described above, greatly expanding the versatility of the printer. And it is possible to combine modes, so that you can print double strike and emphasis together.

continued overleaf

THE OTHERS - continued from previous page

The above method could be generalised to 3-dimensional arrays, but some FORTHS do not support nested DO LOOP indices beyond J. Note that I needed to save and restore the inner loop counter in the text input buffer (TIB) since it gets clobbered. Saving it on the stack would require some messy stack manipulation. If this use of TIB is not suitable for your application, define a 'work' variable.

Byte Arrays

If you are wish to use a byte array,then it is not necessary to multiply the number of elements by 2 when ALLOTing space. The byte-acess words "C!" (C-store) and "C@" (C-fetch) can be used to define byte-accessing words along the lines of the above examples.

Further Study

This article is loosely based on Chapter 8 of Leo Brodie's "STARTING FORTH", but I believe that I have used a clearer approach. For more sophisticated ways of handling arrays, consult Chapter 11 which gives examples of array-creating words which make range checks at run time. Since these words make use of the more complex FORTH concepts, I have not discussed them here.

Continued from previous page

Or you can select compressed print then expand it to double width to give slightly wider than normal print, 8.5 characters per printed inch.

ONE WAY OR TWO....

You will also come across descriptions like uni- and bi-directional printing. In simple terms, this means that the printer will either print each line from left to right (uni-), or from left to right on one line, then right to left on the next. Obviously, the second system will save the time needed to return the print head to the start of the next line. In normal print mode, the GX80 operates b-directionally. All other modes operate uni-directionally.

PHYSICALLY....

The GX80 is a small neat unit, housed in a plastic-type casing, with a steel base plate to provide rigidity. There is only one removable cover, at the front, to expose the print head carriage for ribbon cartridge removal/replacement and periodic cleaning. All other controls and switches are externally accessible.

As supplied, the printer is friction feed, so you may use cut paper (letterheads etc) if you wish. A cut sheet feeder is likely to be available. A tractor feed unit can be purchased for $25 if you use continuous stationery. This unit readily clips and unclips from the top of the printer in about 2 seconds. The only other external controls are a paper release lever, and 3 press panel switches on the top front right panel.

The panel also contains some idiot lights to tell you about some non-useful functions (like paper out – as if you need to have a light to tell you).

These switches have multiple functions. The ON LINE (OL) switches applies and removes power as required. The LF and FF switches give line feeds and form feeds. In combination, the OL and FF switches permit print mode selection (normal, compressed, NLQ and so on).

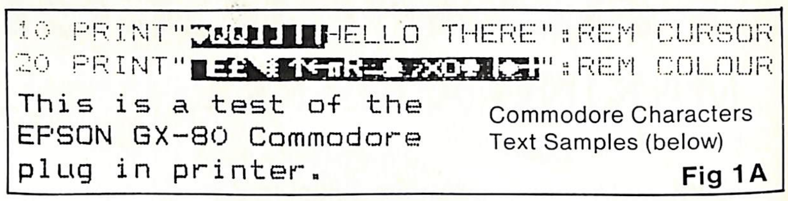
At the rear, hidden by the feed paper, are mini switches that duplicate the OL/FF controls on the top panel, plus a few more – Device 4/5 selection, slashed/plain zero character, page length (11 or 12 inch only. As almost no one uses 12 inch paper, it would be more useful set as an A4 selector), and the paper out buzzer mute are the more useful.

The printer is connected to the computer (or, more likely, the disk drive) by a serial cable that terminates in a plug-in interface. The interface slides into a deep slot at the left rear of the printer, and requires no further connections. This unit apparently contains the software necessary to provide Commodore compatability, plus the character set. The sort of graphics characters that you see on your screen will be printed out with your listing, eliminating those [CLR] and [WHT] and so on translations that have become a (forced) standard. There is no buffer in the cartridge, and it is obvious that, as the C64 can deliver characters quite quickly, the interface does slow things down a bit. Still, at 100 cps, the printer is no slouch.

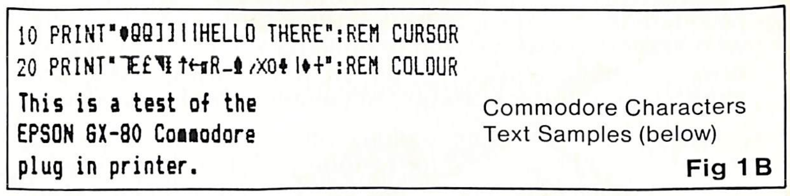
Printer ribbons come in clip-in cartridges, and can be fitted without getting mucky fingers. They seem to contain heaps of ribbon, and should be good for a lot of printing. The ribbon is arranged as a Mobius strip, so it will alternate the impact area with each lap of the ribbon. The cartridges will cost about $8.40 each.

CONTROL CODES....

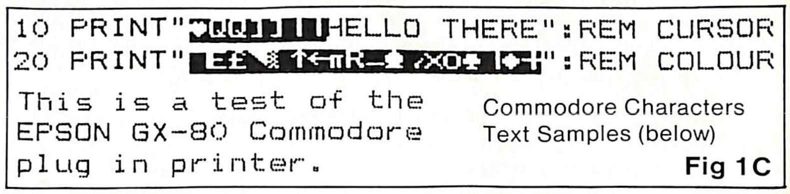
In this department, the GX80 matches the 801 perfectly. These control codes are used from software to take care of case switching (upper case/graphics, or upper case/lower



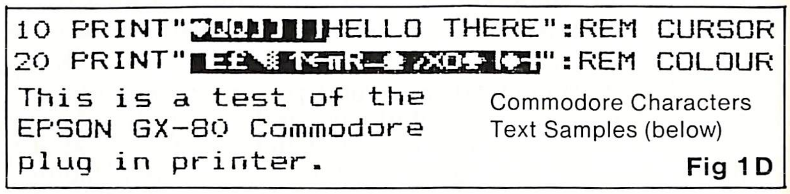
Commodore Characters Text Samples (below) Fig 1A



Commodore Characters Text Samples (below) Fig 1B



Commodore Characters Text Samples (below) Fig 1C



Commodore Characters Text Samples (below) Fig 1D

Commodore Characters Text Samples (below) Fig 1E

case mode), expanded print on or off, print head positioning, line spacing (6 or 9 lines per vertical inch), horizontal positioning (tab), reverse on/off, bit mode and bit image repeat. Having made so many other improvements over the 801, it was disappointing that double strike, emphasized, compressed and NLQ modes could not be controlled from software. And the 6/9 lines per inch restriction prevents production of double spaced drafts.

WHAT DOES IT FEEL LIKE....

Not to put too fine a point on it, very nice. There is no feeling like being able to plug in a printer, turn it on and literally forget it. Once I remembered the bonus gift of serial bus lock up that is free with every Commodore 64 and didn't switch the Epson on until I needed it, the printer and I had a pleasant, albeit brief time together, and I would be happy to have one more permanently. It has very tidy print with well-formed characters and symbols, and its multi-mode capabilities and versatility with different Commodore computers is good.

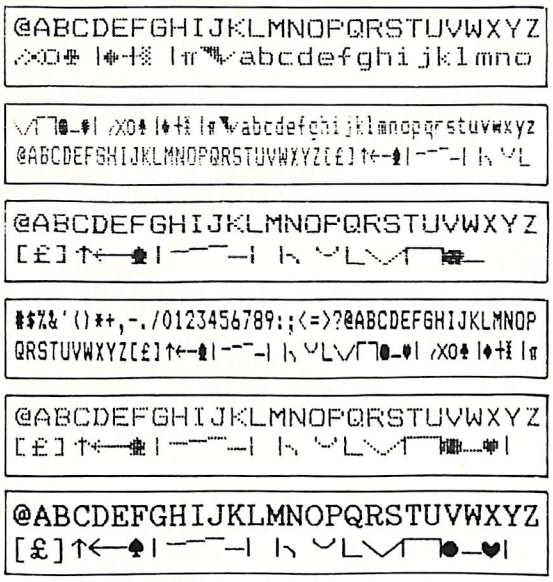
SOME MINOR PROBLEMS....

A couple of things bugged me, but the sample unit was not a final production model, and some of these things will surely be fixed by then.

Noise. The slim plastic housing leaves little space for sound deadening material. I found it hard to hold a phone conversation while the printer was biffing away 2 metres from me.

The paper bail (the bar plus rollers that keeps the paper pressed against the roller) has no lever to place/withdraw it from the paper. This meant fumbling into the innards,

CHARACTER SAMPLES



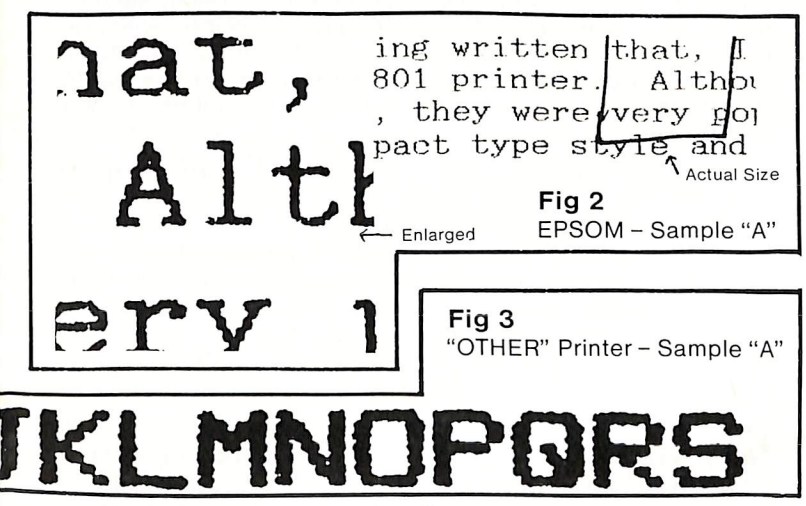


Fig 2
EPSOM – Sample "A"

Fig 3
"OTHER" Printer – Sample "A"

particularly during paper loading.

A stick on 'ruler' on the front panel showing print spacings would be useful. The paper bail has small notches every 10 standard characters, but as the printer can also print at 8.5 and 17 characters per inch, they were not universal.

These are not serious problems, but they do slightly reduce the pleasure of using the printer. I hope Epson can build in software control of character selection in the near future.

NEAR LETTER QUALITY....

This is the big bonus. Not everyone can afford a daisy wheel printer, or a daisy wheel printer for correspondence and a dot matrix printer for programs, drafts etc. Many new printers offer NLQ to make their products more widely appealing, and the marketplace has responded enthusiastically by bringing up in big numbers. No doubt Epson hope to capture the attention of some of those buyers.

As noted earlier, NLQ makes two passes to provide a printing dot density that makes each character stroke or shape smoother.

The sample (Fig 2) has been enlarged, which will make the character look rather rough. Those characters using mainly vertical and/or horizontal lines are fine. The critical test is sloping lines, and there is some jaggedness evident in Fig 2, and that jaggedness is quite visible even at normal size. By and large, that small criticism would not be important if Epson was the only printer on the market offering NLQ. But there are printers that do print smoother sloping lines (Fig 3), and prospective buyers (whose thirst for NLQ is increasing every day) will notice.

The GX80 in NLQ mode produces characters that are a little larger than normal typewriter character size. My old eyes found this quite pleasant, but it has been commented on by people to whom I showed print samples. And it emphasizes a bit more the slight uneveness of the NLQ print.

GRAPHICS....

I found both DOODLE and PRINT SHOP, and came up with some pretty pages of banners, Moire patterns and birthday cards. DOODLE was quick, PRINT SHOP terribly slow (a function of the software). I tried to print double strike to get better clarity, but the switch settings seemed to get over-ridden by the software. At first I thought the printer was being reset by the program, but a few tests proved otherwise. I should mention the extreme accuracy of the printer with these programs. A single line border came out as a straight line, not a series of disjointed graphics characters. Well done!

HEX DUMP MODE....

The value of this feature was lost on me. Epson explained that it was particularly useful for debugging programs that send output to the printer codes, or fancy formatting, but there are not too many to use on this printer. The point is still lost on me.

The mode is switched in by holding down all the control buttons at power on. I then tried to make it do something useful, but was not really satisfied with the result. An ordinary Basic program to print a single line on the screen comes out as a mixture of carriage returns and hex equivalents of the ASCII string. It is certainly not a direct translation of the line of Basic (links, line numbers and so on). A monitor program will do better, and give more useful results.

THE BOTTOM LINE....

Printer buyers at all levels have become very sophisticated. They comparison shop very keenly, and User Group meetings abound with little clusters of people of all ages swapping print samples, prices and interface details. At times, emotions run high....

Any new product will find the going tough out there. An established name will help, and good service arrangements will reinforce any advantage. The popularity of any printer could be made or broken by the cost of ribbons, as we have seen recently.

The Epson will be popular because it plugs straight in, requires no set up, wedges or hang-on doodads, and will run with any software that recognizes Commodore printers (and that's most everything on the market that uses a printer). RRP is mooted to be $475, which will be judged by the customers. Few printer buyers seem to pay RRP these days.

The small business market will certainly look at the GX80, because of its no-fuss attributes. People new to computing will also take a good long look, because the GX80 overcomes the major hassles of hooking up a Commodore to a printer. The middle ground is difficult to assess. The lack of quality printers has forced them to learn to live with Centronics printers, and many will remain committed to that standard. But they should have a look at the GX80, because many of its features will appeal to them, too. I know I would consider one for myself.

AND A THANK YOU....

Last but not least, a thank you to the folks at Epson, especially Norma Mackenzie and Robin Sanders who arranged the loan of the prototype. It takes courage to let a 'warts and all' preliminary model to go out for review, because there will always be changes before product release.

Setting up a BBS

by Greg Perry

Just when many of us were getting a bit bored with the latest software releases, (especially the scenarios which involve defending the US from the never ending range of subversives in black hats and brown shoes), something new has appeared to recapture our interest – telecomputing and the appearance of a network of local Bulletin Boards Services (BBS)in several major cities (even Brisbane!).

At times, these can provide just as much fun as adventure games (and are often far more cryptic) as well as providing access to the latest public domain software, rapid access to opinions of other users, and up-to-date information on a wide range of topics from user group activities to special sales of equipment and software. On line adventure games are even available on some boards!

Although there has long been a network of CP/M bulletin boards operating throughout Australia, the decreasing price of Commodore compatible modems combined with the recent availability of suitable software has seen somewhat of an explosion of bulletin boards catering specifically for Commodore users.

Most of these BBSs are able to be accessed by anyone with a modem and a suitable micro running one of the many public domain terminal programs (See our May Edition for details).

If your local user group is like most in Australia, it probably will have a fair sum of money just sitting in the bank collecting mildew. Why not set up your own BBS for your members and/or the general public? Some individuals are even setting up specific closed services for special interest groups such as schools, real estate agencies and the like.

Available BBS programs

To operate a BBS, one needs a minimum of a C64, a 1541 and a 300 baud autoanswer modem. The three boards above vary considerably in their price, complexity of operation, and power.

If you are interested in obtaining software and assistance in setting up a BBS, you should contact one of the local sysops for more information.

A word of warning: Do not attempt to set up a board with pirated software. It is a very public operation and the writers as well as distributors will find out very quickly. Some BBSs may even have special inbuilt passwords which are known only to the program writers or distributors!

Apart from those published in 'Compute!', to the best of my knowledge there are three main programs for Commodore BBSs now available and operating in Australia. These are Telemessage, The Steve Punter C64 BBS, and a Canadian C64 BBS ComBoard. All of these may be accessed with almost any terminal program. Other BBSs include SYDCOM's RCOM, a custom written board which requires a special terminal program for access, and Sentry BBS.

All of the BBS programs discussed below support at least 100 members, 100 messages, electronic mail to individual members, help menus, software download and special information areas.

Telemessage

Telemessage is the easiest of all the boards to use, both from the user and from sysop's point of view. (Sysop = the poor b!#. who has taken it upon himself to operate the system.)

The program suite is designed to operate on two 1541s. The main program is written in Basic and while not being easy to change it is possible to modify the program to a limited extent to suit your own needs. (The program would appear to have been written by a room full of monkeys each with their own C64! But it actually works!)

Telemessage supports up to 100 messages, 100 members, and allows downloading of software using the X-Modem protocol. A few of us at CCUGQ have modified the program to run on dual drives and to fix a couple of minor annoyances. This compiled version operates extremely quickly and is only limited by the 300 baud modem speed. Price about $100.00 from Graham Lee.

ComBoard

This Canadian Commodore BBS is probably the most powerful board available locally with a wide range of features. Ideally, it should be run on a dual drive such as a 4040 or better still the 2-Megabyte 8250 with an appropriate Commodore 64 to parallel IEEE interface. However, it may be run on anything from a single 1541 up to the 10 Megabyte Commodore hard disk drive (anyone ever seen one?)

This board supports both uploading and downloading of programs and files with either X-Modem, Punter, or ASCII transfer methods, making it compatible with just about most terminal programs. When used with the larger capacity disk drives it can support a large membership with message files, special interest areas and a vast amount of software in numerous designated areas. It also has the feature of allowing several different boards on special topics to be available only to specific users.

Reliable sources have suggested that Commodore themselves are planning to set up several boards around the country for educational institutions using this program. Price about $150.00 from Graham Lee.

Punter C64 BBS

Having written several of the original American BBS programs and program transfer routines way back in the days of the Commodore PETs, Steve Punter is probably the father of Commodore BBSs. These programs are only available directly from Punter's company in the US, apparently they like to keep a check on their boards around the world. However, the purchaser of a Punter board is guaranteed continued access to the latest developments.

This board requires a minimum of a parallel drive (4040,8050,8250), and apparently has problems working with the non-Commodore dual drives. It is roughly intermediate in complexity and power between the two programs above. I find some of the commands a bit obscure though. One minor problem is that it only supports Punter protocol for downloading software. Price about US $100.00 plus direct from the US.

Availability

Several people around Australia have been instrumental in getting the Commodore BBSs operating. However, I must mention Graham Lee in Sydney.

Although not attached to any of the major user groups, or even involved in computers for a living, Graham has imported a number of BBS programs from the US and Canada and spent a large amount of time (and money!) getting them into operation. What's more, has now the Australian distributorship for two of the main BBS programs (Telemessage and ComBoard.) Anyone is interested in

obtaining further information on these programs may either contact him on 02-6650111 (day) or via his BBS (see below).

A short history of a BBS

Like many other user groups, we at CCUGQ, have been interested in setting up a BBS for about 12 months. We now have a system on line 24hrs a day.

After finding someone to volunteer to be the Sysop, we started out running the original version of Telemessage on two 1541 drives with an autoanswer modem of our own design. The difficulties we encountered included getting the modem – especially the autoanswer – working correctly with the program, understanding what the program did, and the best way to utilise its facilities. In the process several members learned a lot about RS232 interfacing and modem operation.

(Did you know that if you get a specific telephone line installed for a BBS, Telecom will not allow it to be listed in the white pages! Apparently, the exchange might think it is a faulty line! RESET NKO X.25 reset, possible data loss. 8250 2-Megabyte dual drive using the brilliant Buscard II IEEE interface. We plan to update to software to the more powerful ComBoard when funds permit and when members have gained experience with the simpler Telemessage. Alternatively, we may continue to modify the Telemessage program further to our own requirements. This will eventually allow us to put up to eleven(!) 1541 disks worth of public domain club software on the system.

Visitors are encouraged and may leave messages but cannot download software nor access several information areas.

At present we plan to charge user group members a $10.00 joining fee plus $10.00/year with special lifetime memberships available for an introductory period. We estimate that in the not to distant future the total cost of setting up the board will be paid for by BBS members and will not be a drain on club funds. (Remember, 50 people at $20 = $1000!) Non-user group members are also welcome but we use the board to encourage membership to the club. Members and visitors of the BBS are fairly active, averaging more than 100 calls per week.

The board is proving to be extremely useful in promoting club activities and informing members of special sales of Commodore software, as well as enabling members to leave messages for each other and the Club committee members.

Commodore BBSs in Australia

The following is a list of all the Commodore Boards which I am certain exist. If any readers know of others I would interested to hear from them. Either send me a letter via the magazine or leave a message for me on the CCUGQ BBS, or on Viatel mailbox 738329500.

All the boards are in Sydney bar one! What's wrong with the other states? I have heard rumours of other boards but have no specific information. Any sysops out there please contact either myself or Graham Lee as we would love to hear what you are doing.

Refer page 50
for Commodore BBSs in Australia

EASYSCRIPT/ 1520 printer

Peter Davies

Very few word processors, as far as I can ascertain, work with the 1520 printer. Those from magazines, written in basic, can easily be adapted but suffer from being slow and the editing facilities tend to be very limited. The simple process described below will link EASYSCRIPT to the 1520 and it may well work with some of the others.

The 1520's default printing mode is uppercase with shifted lowercase. Wordprocessing requires the reverse and the required secondary address for switching the 1520 to lowercase – shifted uppercase cannot be entered from within EASYSCRIPT. The answer is to send the secondary address to the 1520 before loading EASYSCRIPT:

```
OPEN6,6,6:PRINT#6,1 <RETURN>
```

The number of characters per line on the 1520 defaults to 40. If you wish to change this then, again in direct mode, enter:

```
OPEN3,6,3:PRINT#3,[character size no.]
```

and press RETURN. The character size no. is 0 for 80 chars/line. 1 is the default value for 40, 2 for 20 and 3 for 10. Note that all of your document will be printed in the size you select and that it cannot be altered once EASYSCRIPT is loaded.

Now select the colour in which you wish to print using the colour change switch. Again changes cannot be made under program control but they can be made so long as the printer is not operating. A pause printing command at appropriate places in the text should enable colour changes to be made.

Load EASYSCRIPT as normal. When the initial screen is displayed respond to the PRINTER TYPE? prompt with 0. Now use the program as usual.

To print your text, press F1 then 0 (for output). the status line responds with Output. Respond with D and Device No is requested. Enter 6 then press return and the status line responds with Output once again. Press P and printing commences.

The default value for page length is 66 and for text length is 60, so printing will cease after 60 lines have been printed. Press C to print the next page. An alternative is to specify the page and text length in a format command using the line counter on the staus line as a guide.

I personally prefer to specify continuous printing by entering C then P on the second Output prompt and then every 60 lines (or whatever you specify with pl and tl) a form feed occurs which gives a few blank lines between pages. The paper 'roll' can then be fan-folded at these places.

All the commands that I need to use, lm, rm, ju, cn, pl, tl, sp, and fp work correctly but I haven't tried TABing or some of the more specialised commands. The user defined characters will obviously not work as this is only for dotma -trix printers.

This article was printed on the 1520. One advantage is that the output format of 40 characters/line is fairly close to the 50 or so that most magazines use so you get a good idea on how the published work will look!

The MICROTEX 666 - VIATEL PACKAGE
for the Commodore 64

by Mervyn Beamish

Only a quick glance through this and other Computer enthusiast publications will tell you that telecommunications is the "in thing"!

The concept and practice of communications via the telephone has been available to all of us who could affor the equipment for some time. Commencing first with the accoustic coupler (generally used quite illegally) and now the direct connect modem with auto-answer and auto-dial facilities becoming more available.

But to many it is an area surrounded by mystery – BAUD RATES, NULLS, DUPLEX, STOP POINTS etc. etc.

The **MICROTEX 666** package put together by Computer Publications has demistified telecommunications. The kit comes in an attractive yellow box which contains a SENDATA 300/300 or 1200/75 Baud modem, suitable for accessing most general purpose and club Bulletin Boards (BBS) and Telecom's VIATEL system. Operators manual, VIATEL & MICROTEX 666 application forms and software on disk or cassette. In short, all that is necessary for Commodore 64 owners to access VIATEL & MICROTEX 666 with download facilities to both disk and cassette.

CLUB 64

Along with the package comes membership of the exclusive Club 64, available only to the first 1000 purchasers. This closed user group features a variety of free software and a chance to find the mystery frame and win $1000 of software and peripherals from Ozi-Soft Pty. Ltd.

CLUB 64 gives full access to all public information on VIATEL and to MICROTEX 666

O.K. we've all heard of VIATEL, but what is MICROTEX 666? MICROTEX is the largest database accessed through VIATEL.

Currently it is only available to C64 users but moves are afoot to expand into other computer types. Members can access Microtex 666 through Telecom's telephone network from your home. Simply connect to a modem (which then plugs straight into your telephone socket) and dial 01955. This connects your computer to Viatel. To access Microtex 666, key *666# and you're in a world of features and services that previously you could only dream about.

By becoming a member of Microtex 666 you can enjoy the following features:

Telesoftware Library

forget the days when to get a good program meant the daunting task of keying in hundreds of lines of code, or paying exorbitant prices for commercial software. Now you are able to download your selected program, store it on your own tape or disk and then use it whenever you wish. The list of programs is constantly being added to so that there is always something new for you to supplement your own software collection.

Gametalk

Never again need you be trapped in a game with no hope of escape. Now simply send a message for help to the Gametalk Question selection and a fellow games player will supply the answer. There is a top twenty list showing the most popular games software over the last two months, and if you are thinking of buying a new game, check out our review section first...chances are there will be a review there to guide your purchase.

Tips and Hints

This service ensures you will get the very best from your computer by supplying an ever increasing quantity of useful suggestions from our panel of experts.

Questions and Answers Column

Now you can take advantage of the knowledge and experience of hundreds of fellow members. If you're stuck on a problem, simply state it on a response frame and other members will respond with answers.

PACKAGE FEATURES

Each component of the package is packed with features:

The modem, attractively finished in beige, silver and black, plugs directly into your Commodore 64 via a flexible cable, enabling the modem to be placed away from the computer when desk space is scarce. The direct connection also means that you will not need an RS 232 interface.

The modem comes with a push button telephone (with auto re-dial facility) which can be used as a second phone. You can sit it on the modem or mount it on your wall with the wall bracket provided.

The Viatel communications software, in both disk and cassette versions, currently provides the following features:

- Software download full compatible with the telesoftware protocol as recommended by Viatel and implemented by Microtex 666. The protocol provides for the down loading of 'tokenised' programs and sequential or user files directly from the original disk image.
- Seven colour foreground/background, character/graphics display.
- Full implementation of Viatel features: double height, separated and continuous mosaics and flashing characters.

- Two hardcopy functions: full high resolution graphics dump for 801 or 1521 printers and text dump for ALL printers.
- RAM memory frame store in a 12 page carousel Facilities include store frame, forward and backward frame review.
- 26 user defined key page sequences, for fast page access.
- The tape version saves programs in TURBO format which when reloaded will auto run.
- The disk version enables disk directory access while on line.
- Saves any downloaded file (program, sequential, or user) to disk.
- Single pages or the complete 12 page carousel can be saved to disk and recalled later.
- User defined keys can be saved to disk and reloaded later.
- User identity can be saved to disk and transmitted for auto log on. Password is entered manually for security.
- The terminal communication software for disk and cassette is provided giving a complete communications capability to the Commodore 64.
- Modem 64: allowing 300/300 baud communication at either full or half duplex between Commodore 64 users or with Bulletin Boards. Software transfer is fully supported using Xmodem protocol.
- Xmodem.C: allowing downloading of files from local Bulletin Board services.

Commod

The Hows and

by Greg Perry

For some time now many micro users have been facinated by films such as 'War Games', where a teenager uses his home micro to patch into the Pentagon defence system computer and almost starts WW III. Even non-computer people have heard news reports of several young 'hackers' in both the US and the UK gaining illegal access to restricted information. (In the UK, someone even 'broke-in' to Prince Charles's restricted areas on Prestel and left polite messages. After this episode all the passwords on the system had to be changed.)

Fortunately for most of us, real life is not quite as depicted in the movies and on TV news, but a number of Commodore users have caught the telecomputing bug and are turning to a hobby which holds the real promise (promise?) of the bringing the information revolution into the home.

IN AUSTRALIA

In Australia, telecomputing for users of home micros is still in its infancy, with many of the services aimed at the commercial user (where cost is primarily related to the availibility of fast access to information resources). However, especially with the introduction of Telecom's Viatel service, combined with the increasing number of Bulletin Board Services promoted through local user groups, the home user has a large range of information at his or her fingertips. Just a phone call away.

But don't believe all the hype a first sight. It is easy to run up a fair sized bill if you are not careful and Telecom's STD and ISD charges can be expensive!

In this article (contuining next month) I will attempt to explain some of the jargon and provide a general guide through the maze which confronts the newcomer.

The World of Telecomputing

Before looking in depth at the what is needed for telecomputing, let's summarise the range of facilities currently available in one form or another for the home uses.

- Information – news, weather, encyclopedias, dictionaries, bibliographies.
- Personal and Business – travel reservations, shopping, home banking.
- Electronic Mail (EMAIL)- fast personal and business mail, immediate communications.
- Personal Computing – talking to other users, free programs, commercial training courses..

ore Telecomputing

Whys Part I

- Publishing – fast manuscripts delivery, editing and typesetting (supposedly!) – *ED get back into line there!...*
- Bulletin Boards Systems (BBS)- access to programs, classified adds, help with computer programs.
- Working from home via your own terminal. University and technical studies. Work(!)

Don't worry if all this appears somewhat daunting. Most users begin by simply communicating with friends or local bulletin boards. To get started, find another user with a communications package and dial them up one cold rainy night. Then, you can try out various terminal programs, talk to each other, and swap programs. Once you've established a network of friends, you can call each other every so often and swap your latest programs without leaving the comfort of your home.

Although Laurence looked at many of the available systems earlier in the year, things are changing rapidly and it is worth mentioning the two most popular services again.

Bulletin Boards (BBS) and Public Access Message Systems (PAMS)

A Bulletin Board System (a BBS) is a system which some individual, group, or organization has set up as a service to other users. Most BBS allow free access and are often run by one person (known as the SYSOP). These are generally financed by donations or with the help of a user group or local computer shop. Sometimes the financial burden is too great and a small membership fee in the order of $10-$25 per year is charged. Even so, these systems usually allow reasonable free access for visitors. Some BBS issue a simple password to regular users in an effort to limit the nuisence callers. Be responsible when using one of these systems. Users who try to disrupt the systems will rapidly find themselves banned from most boards in their area.

What does a BBS offer? The prime functions of most BBS are twofold – to provide a bulletin board for users to swap information and to act as a store for public domain programs. Got a problem with a program? Want to tell other users or some special event or find out the latest gossip on a new piece of equipment such as the new Commodore 128? Simply leave a message on the bulletin board and check back every few days to see if anyone has answered your call. BBSs provide an excellent way of keeping up to date on some of the latest information.

The second main function of the bulletin board system is to allow users access to public domain software. Users may generally either upload (send) their programs onto the system or download (receive) a range of programs from the system to their own computer and disk.

In the education field, Commodore has recently been instrumental in setting up a national network of commodore educational centres which will all be linked into a main centre in Goulburn. Goulburn will then be linked by satellite via OTC to Commodore educational centres in Canada and have access to the hugh store of educational material available in Canada and the US. After downloading programs and other material, this will be available nationally to the other education centres.

At present there are several public Commodore BBSs operating in Australia. (See our back page.) If anyone has any information about Commodore specific systems please drop us a line. Hopefully more will appear in the near future.

Telecom's Viatel

In February, Telecom brought on line its national videotext system based on the English Prestel. This displays colour, graphics and text. (A 1980's version of Seventel). Although still in its infancy the system gained more than 3000 subscribers in the first 3 months and is growing exponentially. Not yet up to the level of it's parent Prestel system, which has more than 300,000 pages of information, Viatel currently provides information from theatre guides to commodity prices and allows electronic mail, shopping, banking, travel bookings, free software, electronic magazines and other services. In the U.K., Commodore have established a special network within Prestel especially for Commodore users. I believe Commodore in Australia has plans for a dealer network and suggestions have been made for a national user group network (pretty please Nigel?).

The cost of Viatel is almost unbelievably low at roughly $2.50/month membership and $0.08c (8am-6pm) or $0.05c (a.h.) per minute connection time. Costs for commercial users who wish to supply information pages are also extremely low. As the system developes, we should expect a vast range of services from 'telesoftware' to electronic magazines to appear rapidly. Enthusiasm and expectations for Viatel are very high at the moment but we will have to wait to see exactly how the system develops.

It would seem to be an ideal system for home users in Australia where vast distances and therefore expensive telephone costs are often a limiting factor. The only minor problem is that a special modem and software must be used to access the system. I have heard that Commodore will be marketing their own special auto dial cartridge modem with built-in software in the near future.

Let's look at the various problems in entering the world of telecomputing and see if some of the jargon can be demistified.

First of all the telephone connection.

The Modem

When a communication link must be established between computers located a some considerable distance from each other, the existing world-wide telephone network provides a ready made solution. The telephone, however, is almost the antithesis of the computer, having been specifically designed for the transmission of the human voice. It carries analog signals within the range of 300 to 3400 Hertz. (In fact, certain internal signal requirements prohibit the transmission of continuous tones above 2400 Hz, therefore the usable bandwidth is 300-2400Hz.)

Voice communication is an analog process which conveys information in audio tones using oscillating signals which vary in amplitude and frequency. The computer, on the other hand, produces a series of digital signals (square waves) which carry information using a on/off sequence of binary digits. Successful transmission of fast moving serial bit pulses would require the telephone to respond to all tones between 0 and 300000 Hz.

This problem is overcome by the MODEM, a relatively simple device which converts the digital pulses from the computer into audible tones and transmits them down the phone line just like any other sound. It also receives the incoming analog tones, extracts the digital information and passes it to the computer.

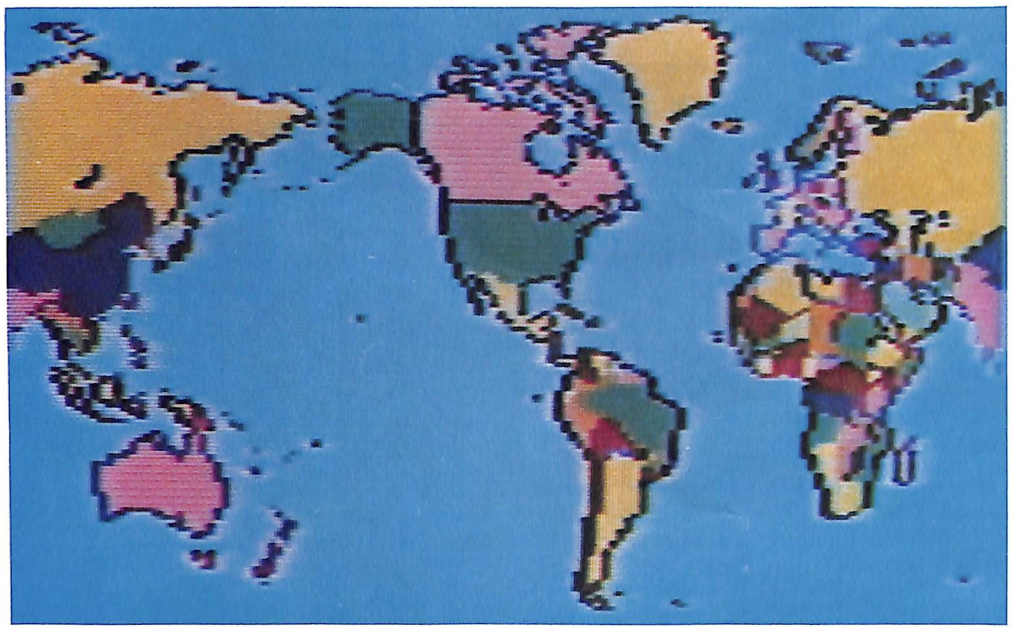
In the simplest mode, the modem accomplishes this task by using two tones, one to represent a binary 1 (called a MARK), and another to represent a binary 0 (a SPACE). If both modems use the same pair of tones, the transmission is known as HALF-DUPLEX, where a modem may either transmit or receive but not both at once. In a similar manner to person to person communication or as with CB radio, one modem transmits data while the other listens. At the end of the message, the transmitting modem signals that transmission is complete (like 'over' in CB) and switches to receive while the receiving modem switches to talk. Such 'handshaking' sequences allow alternate transmission in both directions. This method is seldom used nowdays.

For most applications, simultaneous bi-directional data transfer is required. This is known as FULL-DUPLEX. Here, two pairs of tones (called ORIGINATE and ANSWER) are used, one pair for sending data and another for receiving data. The usual low speed modem used by micro users operates in FULL-DUPLEX and has a switch which allows the user to select which pair of tones to use for the outgoing signal. Usually the modem on the system which initiates the call

Continued on page 49

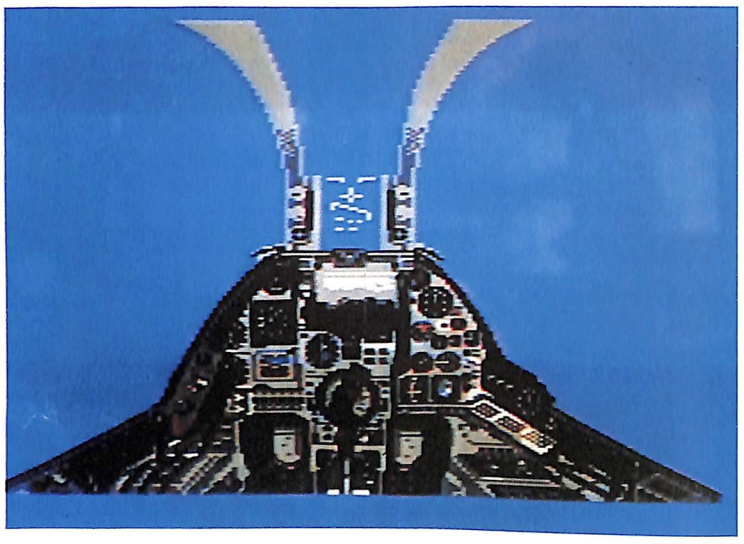
Graphics Library

by Harold T Salive, PhD
– Kiwisoft Programs Ltd



This article includes a C64 BASIC program to generate multicolour picture and a second BASIC program to display the picture and print them in full colour on an Okimate 10 printer or screen.

At the time of writing I do not believe that the Okimate 10 is available yet but there is no harm in being prepared. When you finish typing in the programs, you will have the picture featured on the front cover of this magazine. WORLDMAP (issue 29) can also be displayed by the DISPLAYPRINT program. It is our intention to supply additional pictures so that readers can build up a library. Both cassettes and disk drives are supported.



Two BASIC programs which will generate picture files on tape or disk are included (MAP-GEN was in issue 29). Both programs read in the pictures from DATA statements and save the picture as a picture file to tape or disk. The MAP-GEN program will generate a WORLDMAP picture file. The CPIT-GEN program will generate a COCKPIT picture file.

The two picture generation programs are only needed because they generate the picture files. Type them in very carefully and then RUN the programs. Each program, when RUN, first checks all of the DATA statements to make sure you have made no mistakes. (The program prints "#"s as it works.) Line numbers with mistakes are reported to you. The program stops after checking all DATA statements if any errors were found; this allows you to recheck your entry and fix the mistakes and RUN the program again. Eventually the program will finish the checking without finding any errors. Then it will begin storing the picture file, first asking whether you want to save the picture to tape or to disk. After you answer "T" or "D", the program proceeds to open the picture file and write all of the DATA values into the file printing "%"s as it works. If you are using a disk drive, be sure you do not already have a file on disk with the picture name. Once the picture files WORLDMAP and COCKPIT have been saved and displayed, you can throw out the generator programs.

The third BASIC program, DISPLAYPRINT, will display the two pictures and print them in full color if you have an Okimate 10 color printer. This program can read picture files from either disk or tape and quickly load them to the screen as you watch. If you have a disk drive, you can type "*" to see a directory list of files on the current disk.

Once you specify a file name and the file is loaded in with DISPLAYPRINT, you have a number of options you can type in while looking at the picture. First, you can type "-" to change the border color around the picture; every time the "-" key is hit, the border color cycles on to the next color. Second, you can type "P" to print the picture on the Okimate 10 color printer. Be sure you have a color ribbon in the Okimate. The Okimate will print as you watch. When the picture print is finished, you can print it again or select one of the other options. The third display option is hitting "N" for Next which takes you back to the text screen to choose the next picture to display. The fourth and last display option is "Q" for Quit. You can also quit from the text screen by just hitting RETURN by itself when the program asks for a picture file name.

Carefully type in and save DISPLAYPRINT. The program checks the DATA statements when you RUN it and tells you the line number of any bad DATA. DISPLAYPRINT contains graphics screen clear and picture load code in DATA statements in lines 900 to 950. Lines 1000 to 1650 contain the Okimate 10 printing code. If you do not have an Okimate 10, then you can eliminate lines 115 to 145, 275, 280, and 1000 to 1650 and just have an high-speed load and display program.

Okimate 10 color prints are made using a 3 by 2 pattern of red, yellow, and blue to produce the full 16 C-64 colors. Overprinting and pattern rotation help produce a very accurate and smooth set of colors. Printouts of WORLDMAP and COCKPIT are included here to show you the quality of the pictures you will get. The two dots at each end of every picture line are not printed to avoid printer problems. The 6in (14cm) by 8in (20cm) color prints take only 25 minutes to print.

DISPLAYPRINT can also be used with your own graphics pictures produced with CADPIC which is available as shown in the listings. Picture files from other graphics packages including KOALA, DOODLE!, Peripheral Vision, and many public domain high resolution pictures can be displayed and printed in color by DISPLAYPRINT after conversion with the CADPIC picture conversion utility program.

Use DISPLAYPRINT to provide background displays for games or teaching lessons. COCKPIT is an ideal picture for your own flying game. The WORLDMAP picture is ideal for a geography lesson. When you use DISPLAYPRINT as the

start of your own program, be sure to change the POKEs in line 60 from 40 to 90 to allow the maximum room for your own BASIC code. Sprites could then be specified from 23296 up to Screen Memory beginning at 23552. Bit Map Memory begins at 24576.

DISPLAYPRINT

```
10 REM MULTICOLOR CADPIC PICTURE DISPLAY AND COLOR PRINT BY KIWISOFT
   PROGRAMS'BLUP
15 REM 'BARC
20 REM CADPIC AVAILABLE THROUGH:'BXPF
25 REM 'BARD
30 REM 'BARY
35 REM     KIM BOOKS'BIMG
40 REM     82 ALEXANDER STREET,'BSSF
45 REM     CROWS NEST, NSW 2065'BRVK
50 REM     PH (02) 439 1827'BNAE
55 REM 'BARG
60 POKE 52,40: POKE 56,40: CLR 'DMWG
65 BK$=CHR$(144):BL$=CHR$(31):CS$=CHR$(19)+ CHR$(147):DN$=CHR$(17)'KMNV
70 JT=37376:BO=53280'CPQH
75 PRINT CS$DN$DN$DN$BK$ TAB(12)"PICTURE DISPLAY"'CSFR
80 PRINT : PRINT : PRINT "*****WORKING*****"'DCPJ
85 IX=JT: FOR I=1 TO 21:SUM=0: PRINT "*";'GQPR
90 READ X: IF X<500 THEN SUM=SUM+X: POKE IX,X:IX=IX+1: GOTO 90'KCES
95 IF SUM<>X-5000 THEN GOSUB 475'GLCQ
100 NEXT I'BBCU
105 PRINT : IF BAD THEN PRINT : PRINT :"##FIX ERRORS##": STOP 'GHJI
110 IF IX<>37566 THEN PRINT "WRONG NBR OF DATA LINES":BA=1: GOTO 105'HPAK
115 READ X: READ IX:SUM=IX:IX=256*IX'FSHJ
120 FOR I=1 TO 66: REM LOAD OKIMATE PRINT ROUTINES'EEGH
125 PRINT "#";'BBWC
130 READ X: IF X<500 THEN SUM=SUM+X: POKE IX,X:IX=IX+1: GOTO 130'KDWL
135 IF SUM<>X-5000 THEN GOSUB 475'GLCJ
140 SUM=0: NEXT I: IF BAD GOTO 105'ENJE
145 IF IX<>35606 GOTO 110'EKYI
150 GOSUB 320: REM SET BORDER AND BACKGROUND COLORS'CHAK
155 SYS 37532: REM CLEAR GRAPHIC SCREEN TO BG'CDMN
160 PRINT CS$DN$DN$DN$BL$ TAB(12)"DISPLAY PICTURES"'CSKL
165 PRINT "[SPACE7]"DN$"## PAINTED WITH "BK$"CADPIC"BL$"##"'BJTP
170 PRINT " " TAB(18)"AND": PRINT " " TAB(6)"COLOR PRINT WITH OKIMATE 10"'DN$'EJJO
175 IF DEV=0 THEN GOSUB 330: REM SET FOR TAPE OR DISK'FYRQ
180 ID$="": PRINT "ENTER FILE NAME OR *";: INPUT ID$: IFID$="" THEN END 'HNXP
185 IF ID$="*" THEN GOSUB 370: GOTO 180: REM DO DIRECTORY'GWIR
190 PRINT : PRINT "PICTURE WILL DISPLAY UNTIL YOU HIT:"'CBJP
195 PRINT "[SPACE4]-[SPACE2]CHANGE BORDER COLOR"'BALP
200 PRINT "[SPACE4]P[SPACE2]PRINT ON OKIMATE 10"'BAYC
205 PRINT "[SPACE4]N[SPACE2]NEXT PICTURE"'BAUG
210 PRINT "[SPACE4]Q[SPACE2]QUIT PROGRAM"'BAXC
215 PRINT : PRINT "##HIT RETURN TO DISPLAY: "ID$'CEAK
220 T$="": GOSUB 360'CGMA
225 GOSUB 255: REM LOAD AND DISPLAY'CSAI
230 T$="": GOSUB 360: IF T$="P" THEN GOSUB 275: GOTO 230: REM PRINT AND WAIT'IEGL
235 IF T$="-" THEN GOSUB 325: GOTO 230'FJJJ
240 IF T$="N" THEN GOSUB 305: GOTO 150'FJPF
245 IF T$="Q" THEN GOSUB 305: END 'FGPJ
250 GOTO 230'BDEC
255 CLOSE 1: OPEN 1,DEV,SA,ID$: GET #1,A$: IF A$<>"P" THEN PRINT "NOT PICTURE":
   END 'JYHU
260 GOSUB 285'BDSD
265 GET #1,A$:UB=ASC (A$+ CHR$(0)): POKE BO+1,UB: SYS JT: CLOSE 1:U=FRE (0)'LHNV
270 RETURN 'BAQD
275 OPEN 1,4: PRINT#1, CHR$(27);"B": POKE 35604,UB: SYS 34816: REM GO PRINT'GJOT
280 PRINT#1: PRINT#1: PRINT#1: PRINT#1: PRINT#1: CLOSE 1: RETURN 'HMRK
285 POKE 53272,120: POKE 53265, PEEK (53265) OR 32: REM TURN ON GRAPHICS
   SCREEN'FVVX
290 POKE 53270, PEEK (53270) OR 16'DPNJ
295 POKE 56578, PEEK (56578) OR 3: POKE 56576,( PEEK (56576) AND 252) OR 2'HJXV
300 RETURN 'BAQW
305 POKE 53272,21: POKE 53265, PEEK (53265) AND 223: REM TURN ON TEXT SCREEN'FRKP
310 POKE 53270, PEEK (532. J) AND 239'DQLD
315 POKE 56578, PEEK (56578) OR 3: POKE 56576,( PEEK (56576) AND 252) OR 3'HJYO
320 POKE BO,6: POKE BO+1,14: RETURN : REM SET BORDER AND BACKGROUND'FKTL
325 POKE BO,( PEEK (BO)+1) AND 255: RETURN : REM CYCLE BORDER'GBUO
330 PRINT : PRINT "ENTER STORAGE DEVICE: T=TAPE, D= DISK"'CBCL
335 INPUT "STORAGE (T/D)";B$:B$=LEFT$(B$,1)'DMWM
340 IF B$<>"T" AND B$<>"D" GOTO 330'HHJH
345 PRINT "WE WILL LOAD PICTURES FROM ";'BBHO
350 IF B$="T" THEN DEV=1:SA=0: POKE 37529,96: PRINT "TAPE": RETURN 'IVEN
355 DEV=8:SA=2: POKE 37529,208: PRINT "DISK": RETURN 'FUEP
360 GET T$: IF T$="" GOTO 360'EIQH
365 RETURN 'BAQI
370 IF DEV=1 THEN PRINT "NO DIRECTORY ALLOWED": RETURN 'FFBO
375 PRINT "#HIT ANY KEY TO PAUSE, Q TO QUIT#"'BATS
380 CLOSE 1: OPEN 1,DEV,0,"$0": IF ST GOTO 460'EQHL
385 GET #1,A$,B$: PRINT CHR$(18);'DOQO
390 GET #1,A$,A$,A$,B$:C=0: IF A$<>"" THEN C=ASC (A$)'IAMQ
395 IF B$<>"" THEN C=C+ ASC (B$)*256'ILNS
400 PRINT MID$( STR$(C),2); TAB(3);'ELWC
405 GET #1,C$: IF ST THEN 455'DLGH
410 IF C$<> CHR$(34) GOTO 405'FJVD
415 GET #1,B$:C$=C$+B$: IF B$<> CHR$(34) GOTO 415'IWEN
420 PRINT C$;'BDIB
425 GET #1,B$: IF B$=CHR$(32) GOTO 425'FPFL
430 PRINT TAB(22);:C$="""DHLE
435 C$=C$+B$: GET #1,B$: IF B$<>"" GOTO 435'HSFO
440 PRINT LEFT$(C$,3)'CGTE
445 GET T$: IF T$<>"" GOTO 465'FIAL
450 IF ST=0 GOTO 390'DGGG
455 PRINT " BLOCKS FREE"'BATL
460 CLOSE 1: RETURN 'CCCF
465 IF T$="Q" GOTO 460'DFQM
470 GOSUB 360: GOTO 450'CHEH
475 GOSUB 480: PRINT "BAD VALUE IN LINE";L0+256*L1:BAD=1: RETURN 'GSNW
480 L0=PEEK (63):L1=PEEK (64): RETURN 'FOMM
900 DATA 162,1,32,198,255,160,0,132,253,6193'BKTK
902 DATA 169,216,133,254,169,219,32,83,146,6421'BNMM
905 DATA 165,252,201,219,144,245,169,6395'BHWO
907 DATA 231,197,251,176,239,132,253,169,92,133,254,7127'BWAT
910 DATA 169,95,32,83,146,165,252,201,6143'BIQK
912 DATA 95,144,245,169,231,197,251,176,239,132,6879'BSBO
915 DATA 253,169,96,133,254,169,127,32,6233'BJRQ
917 DATA 83,146,165,252,201,127,144,245,169,63,6595'BRJT
920 DATA 197,251,176,239,72,72,104,104,6215'BJIM
922 DATA 76,204,255,141,193,146,32,207,255,141,6650'BRSP
925 DATA 190,146,32,207,255,141,191,146,6308'BKDR
927 DATA 32,207,255,141,192,146,160,0,24,173,6330'BPDU
930 DATA 191,146,101,253,133,251,173,6248'BHHM
932 DATA 192,146,101,254,133,252,173,190,146,145,253,6985'BXSR
935 DATA 230,253,208,9,230,254,173,193,6550'BJDS
937 DATA 146,197,254,144,195,165,254,197,252,208,7012'BTFW
940 DATA 232,165,253,197,251,208,226,6532'BHRN
942 DATA 165,144,208,179,96,160,0,132,253,169,96,6602'BTAS
945 DATA 133,254,169,192,133,251,169,6301'BHOS
947 DATA 224,133,252,152,145,253,230,253,208,2,230,7082'BVQX
950 DATA 254,230,251,208,244,230,252,208,240,96,7213'BSIQ
1000 DATA ,136,169, ,141,29,139,168,162,1,32,201,6178'BRLB
1010 DATA 255,169, ,141,31,139,169,27,32,210,255,169,6597'BVAD
1020 DATA 25,32,210,255,169,8,32,210,255,169, ,141,6506'BTBE
1030 DATA 34,139,169,12,141,22,139,169,128,32,210,255,6450'BXGF
1040 DATA 206,22,139,208,246,173,29,139,24,109,31,139,6465'BXSG
1050 DATA 41,1,10,141,27,139,73,2,141,28,139,169,5911'BSGG
1060 DATA 2,141,32,139,41,1,240,2,169,3,141,33,5944'BQUH
1070 DATA 139,173,31,139,240,2,169,3,24,109,29,139,6197'BUTJ
1080 DATA 141,30,139,32,69,138,173,27,139,32,136,137,6193'BWQK
1090 DATA 141,23,139,169,1,32,136,137,141,24,139,173,6255'BWFL
1100 DATA 28,139,32,136,137,141,25,139,169,2,141,26,6115'BVGD
1110 DATA 139,173,31,139,240,37,206,26,139,173,23,139,6465'BXSE
1120 DATA 106,41,1,141,23,139,173,24,139,106,41,1,5935'BTXE
1130 DATA 141,24,139,173,25,139,106,41,1,141,25,139,6094'BVAG
1140 DATA 173,29,139,201,196,240,18,238,30,139,32,57,6492'BWUH
1150 DATA 137,238,30,139,32,57,137,238,30,139,32,57,6266'BVUI
1160 DATA 137,32,21,137,238,32,139,173,32,139,201,158,6439'BXLJ
1170 DATA 240,3,76,74,136,169,13,32,210,255,238,34,6480'BUJK
1180 DATA 139,173,34,139,201,3,240,3,76,36,136,169,6349'BURL
1190 DATA 13,32,210,255,238,31,139,173,31,139,201,2,6464'BVSM
1200 DATA 240,3,76,16,136,173,29,139,24,105,7,141,6089'BTNE
1210 DATA 29,139,201,203,240,3,76,11,136,169,15,32,6254'BUXF
1220 DATA 210,255,169,27,32,210,255,169,65,32,210,255,6889'BXUG
1230 DATA 76,204,255,173,23,139,9,128,32,210,255,173,6677'BWVH
1240 DATA 24,139,9,128,32,210,255,173,25,139,9,128,6271'BUOI
1250 DATA 32,210,255,173,27,139,141,28,139,73,2,141,6360'BVBJ
1260 DATA 27,139,96,32,45,137,32,69,138,173,27,139,6054'BUFK
1270 DATA 32,136,137,32,114,137,109,23,139,141,23,139,6162'BXWL
1280 DATA 169,1,32,136,137,32,114,137,109,24,139,141,6171'BWYM
1290 DATA 24,139,173,28,139,32,136,137,32,114,137,109,6200'BXBN
1300 DATA 25,139,141,25,139,238,26,139,238,26,139,96,6371'BWFF
1310 DATA 141,22,139,173,26,139,141,17,139,14,22,139,6112'BWXG
1320 DATA 206,17,139,208,248,173,22,139,24,96,133,251,6656'BXWH
1330 DATA 10,24,101,251,109,34,139,133,251,173,21,139,6385'BXSI
1340 DATA 10,10,10,109,21,139,101,251,105,181,133,251,6321'BXOJ
1350 DATA 160, ,152,105,137,133,252,177,251,240,7,201,6815'BWQK
1360 DATA 3,240,3,77,33,139,96,3,3,3,3,3,5606'BKMJ
1370 DATA 3,3,3,3, , , , , , , ,5012'BUNH
1380 DATA ,1,3, ,2,3, ,1,3, ,1, ,5014'BXLI
1390 DATA 2,2, ,1, , ,2, ,1,2, ,2,5012'BXHJ
1400 DATA 1, ,3, ,3, ,2,3, ,1,3, ,5016'BXPB
1410 DATA 2, ,1,3, ,2,3, ,1,3,3, ,5018'BYRC
1420 DATA ,3, , ,3, , ,3,2, ,3,1,5015'BWPD
1430 DATA ,3,2, ,3,3,2,3,3,1,3,3,5026'BBOF
1440 DATA 2, ,2, , ,1, ,2,2, ,2,2,5013'BXJF
1450 DATA 3,3,1,3,2,2,2,2,2,2,1,1,5024'BDGH
1460 DATA 1,2,2,2,1, ,2,2, ,1,1, ,5014'BABI
1470 DATA 2, , ,2, , ,1, , ,2, ,2,5009'BVOI
1480 DATA , , ,1,2, , ,173,30,139,32,250,5627'BGVL
1490 DATA 138,141,17,139,160, ,140,18,139,32,233,138,6295'BVGP
1500 DATA 173,17,139,133,251,173,18,139,133,252,169,2,6599'BXAH
1510 DATA 32,235,138,32,1,139,173,32,139,32,252,138,6343'BVDI
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1520 DATA 141,17,139,140,18,139,32,1,139,165,251,141,6323'BWWJ
1530 DATA 17,139,165,252,141,18,139,32,233,138,173,30,6477'BXPK
1540 DATA 139,41,7,24,109,17,139,133,253,173,18,139,6192'BVQL
1550 DATA 105,96,133,254,177,253,141,19,139,173,32,139,6661'BYQN
1560 DATA 73,3,41,3,24,42,240,19,168,173,19,139,5944'BRUM
1570 DATA 106,136,208,252,41,3,208,13,173,20,139,141,6440'BWNO
1580 DATA 21,139,96,173,19,139,24,144,239,160, ,201,6355'BULP
1590 DATA 3,208,14,165,252,24,105,216,133,252,177,251,6800'BXUQ
1600 DATA 41,15,24,144,226,72,165,252,24,105,92,133,6293'BVCI
1610 DATA 252,104,201,2,240,236,177,251,32,250,138,106,6989'BYCJ
1620 DATA 24,144,229,169,3,141,22,139,14,17,139,46,6087'BUPK
1630 DATA 18,139,206,22,139,208,245,96,24,106,24,106,6333'BWIL
1640 DATA 24,106,96,24,173,17,139,101,251,133,251,173,6488'BXKM
1650 DATA 18,139,101,252,133,252,96, , , , ,5991'BKIL
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CPIT-GEN

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1 REM PROGRAM TO MAKE COCKPIT PICTURE IN CADPIC FORM'BOAL
2 REM CPIT-GEN SUPPLIED BY KIWISOFT PROGRAMS LTD'BMIL
10 DIM X(99),VX(11):L=0'CPYB
12 PRINT : PRINT "CHECKING DATA STATEMENTS""CBGH
15 I=0'BCRD
20 GOSUB 400: READ X(I): IF X(I)<1000 THEN I=I+1: GOTO 20'IXIH
30 IF I<>12 THEN GOSUB 450: GOSUB 500:PRINT I+1;"VALUES INSTEAD OF 13": GOTO 15'JRVN
40 FOR I=0 TO 11:X(12)=X(12)-X(I):VX(I)=VX(I)+X(I): NEXT 'IKNN
50 IF X(12)<>5000 THEN GOSUB 500: PRINT " BAD VALUE ON LINE": GOTO 15'HQCN
60 K=K+1: PRINT "#";: IF K<395 GOTO 15'GMRI
65 IF L GOTO 95'CDFI
68 IF X(1)<>207 THEN PRINT : PRINT "##TOO MANY DATA LINES": GOTO 95'HLAW
70 FOR I=0 TO 11: GOSUB 400: READ X(I)' FN QI
80 IF X(I)<>VX(I) THEN K=0: GOSUB 500: PRINT " BAD POSITION";I+1;"SOMEWHERE""IUFU
90 NEXT : IF K GOTO 100'DFVH
95 PRINT : PRINT "###PLEASE FIX ERRS###": STOP 'DCFR
100 PRINT : PRINT "DATA STATEMENTS ARE CORRECT""CBOD
110 PRINT : PRINT "BEGIN STORING COCKPIT PICTURE": PRINT 'DCIG
120 PRINT "ENTER T FOR TAPE OR D FOR DISK STORAGE": INPUT "[SPACE2](T/D)";A$'CEWK
130 A$=LEFT$(A$,1): IF A$="T" THEN DEV=1:SA=1:B$="": GOTO 150'JBGJ
140 DEV=8:SA=2:B$=",S,W": IF A$<>"D" GOTO 120'HRSI
150 OPEN 1,DEV,SA,"COCKPIT"+B$'CLJF
160 RESTORE : READ K: READ K:A=2:PRINT#1,"P";CHR$(K);: REM EMBER 2 SEMICOLONS'HHON
170 FOR I=1 TO 395'DFQE
175 FOR J=A TO 6'DDBJ
180 D=0: READ C: READ B: IF C=0 THEN D=1'HLDJ
185 PRINT#1, CHR$(B); CHR$(C); CHR$(D);: REMEMBER 3 SEMICOLONS'FGAT
190 NEXT J: READ K: REM THROW OUT CHECKSUM'DUCL
195 A=1: PRINT "%";: NEXT I'DGRM
200 CLOSE 1'BBIV
205 PRINT : PRINT "COCKPIT SAVED": END 'DCJG
400 L0=PEEK (63):L1=PEEK (64): RETURN 'FOME
450 IF I=1 AND X(0)=782 THEN PRINT : PRINT "##MISSING DATA LINES": GOTO 95'INDQ
455 RETURN 'BAQI
500 L=1: PRINT : PRINT "#ERR LINE";L1*256+L0;"-";: RETURN 'GPUI
1000 DATA 68,14,182, , , , , ,2,9,38, ,5313'BCMX
1010 DATA 2,9,73, ,1,9,18, ,1,2,20, ,5135'BDFY
1020 DATA 1,9,18, ,1,2,1,8,35, ,1,11,5087'BEBB
1030 DATA 29, ,2,9,5, ,2,9,30, ,2,9,5097'BCVB
1040 DATA 24, ,82,252, ,252,3,28,37,252,3,28,5961'BMQE
1050 DATA 37,252,3,28,37,252,3,28,77,252,4,241,6214'BQNG
1060 DATA 1,252,1,242,1,241,29,252,4,251,5,252,6531'BQPH
1070 DATA 2,241,26,252,2,188,10,251,1,250,1,241,6465'BRQI
1080 DATA 1,248,24,252,2,188,1,244,6,251,1,252,6470'BQDJ
1090 DATA 1,27,1,28,1,251,2,252,2,242,23,252,6082'BOSJ
1100 DATA 2,188,1,28,1,252,2,118,1,252,4,251,6100'BOSB
1110 DATA 1,252,4,251,1,241,2,251,20,252,2,188,6465'BQSD
1120 DATA 1,28,1,181,1,245,4,252,1,245,2,251,6212'BORD
1130 DATA 1,252,2,242,1,245,2,252,3,251,19,252,6522'BQPF
1140 DATA 1,188,1,252,1,188,2,28,3,252,1,251,6168'BOHG
1150 DATA 1,245,1,37,1,220,1,251,1,114,1,242,6115'BODG
1160 DATA 1,30,1,252,2,28,3,251,17,252,1,251,6089'BOXH
1170 DATA 3,188,1,252,1,28,3,252,2,251,1,219,6201'BOWI
1180 DATA 1,252,1,251,1,252,1,246,2,252,2,28,6289'BOCJ
1190 DATA 1,16,3,251,14,252,1,251,2,43,2,188,6024'BOTK
1200 DATA 1,44,1,252,2,251,4,252,1,251,4,252,6315'BOQC
1210 DATA 1,251,4,252,1,28,1,27,2,43,1,203,5814'BMRD
1220 DATA 10,252,1,251,3,43,1,251,2,28,2,252,6096'BOTE
1230 DATA 1,251,1,203,4,252,1,251,3,252,2,251,6472'BPHG
1240 DATA 4,252,1,28,1,27,1,251,3,43,1,251,5863'BMAG
1250 DATA 8,252,1,203,1,43,1,251,7,252,1,203,6223'BOMH
1260 DATA 2,252,1,249,1,251,1,252,1,251,2,252,6515'BPMJ
1270 DATA 1,11,1,251,2,252,1,28,2,252,4,251,6056'BNNJ
1280 DATA 1,43,1,203,9,252,1,251,8,252,1,192,6214'BOVK
1290 DATA 1,240,1,249,1,251,1,27,1,28,1,27,5828'BMCL
1300 DATA 1,249,1,201,1,9,8,252,1,242,1,246,6212'BNTD
1310 DATA 1,251,5,252,72, ,1,5,1,1,6, ,5595'BGED
1320 DATA 3,85,1,21,1,5,1,1,2, ,7,85,5212'BFVE
1330 DATA 1,21,16,85,3, ,3,64,2,80,75, ,5350'BHHF
1340 DATA 3,1,2,5,23,85,1,84,3,85,1,84,5377'BIXG
1350 DATA 1,80,1,64,2, ,1,80,1,64,174, ,5468'BHJH
1360 DATA 1,21,1,5,2,1,4, ,5,85,2,21,5148'BFTI
1370 DATA 1,5,8,85,2,80,4,84,2,85,71, ,5427'BHBJ
1380 DATA 1,1,1,5,3,21,17,85,1,84,4,80,5303'BIBK
1390 DATA 1,64,197, ,1,5,2,1,5, ,5,85,5366'BFQL
1400 DATA 3,21,8,85,2, ,4,64,2,80,56, ,5325'BGND
1410 DATA 2,1,4,5,2,21,12,85,2,84,2,80,5300'BIUE
1420 DATA 2,64,214, ,2,5,3,1,3, ,8,85,5387'BFNF
1430 DATA 2,80,4,84,2,85,54, ,2,1,2,21,5337'BHIG
1440 DATA 12,85,2,84,3,64,229, ,3,21,4,5,5512'BJHI
1450 DATA 1,1,8,85,5, ,3,64,40, ,5,1,5213'BEBI
1460 DATA 3,5,8,85,3,80,4,64,233, ,3,1,5489'BHYJ
1470 DATA 5, ,6,85,1,101,1,102,4,64,2,80,5451'BJXK
1480 DATA 1,144,1,80,40, ,4,5,2,21,1,25,5324'BIOL
1490 DATA 1,22,3,85,3,84,2,100,248, ,1,25,5574'BKCN
1500 DATA 1,22,1,25,1,22,2,25,1,6,1,5,5112'BHGE
1510 DATA 1,144,1,80,3,144,1,164,1,100,1,164,5804'BOLG
1520 DATA 40, ,1,25,1,22,1,25,1,26,1,25,5168'BIRG
1530 DATA 1,105,1,102,1,105,1,144,1,80,1,144,5686'BOJI
1540 DATA 1,80,2,144,2,64,248, ,6,6,2,1,5556'BIMI
1550 DATA 1,100,7,164,40, ,1,102,5,106,2,105,5633'BNEK
1560 DATA 6,64,250, ,8,1,1,164,4,169,1,150,5818'BLLL
1570 DATA 2,85,1, ,2,20,4,148,1,212,2, ,5477'BHAL
1580 DATA 1,85,1,1,6, ,2,1,2, ,2,16,5117'BDVL
1590 DATA 2, ,1,84,6, ,2,81,2,89,1,90,5358'BFSN
1600 DATA 1,89,1,93,1,105,4,169,1,89,2,85,5640'BLYG
1610 DATA , ,8,1,1,117,1,85,1,150,2,170,5536'BIYG
1620 DATA 1,150,2,85,8,212,1, ,1,1,2, ,5463'BGRH
1630 DATA 1,20,1,17,1,16,1, ,1,16,1,69,5144'BHQI
1640 DATA 2,16,1, ,1,64,1,20,1,1,7, ,5114'BENI
1650 DATA 1,64,2,93,4,94,2,93,1,117,1,85,5557'BKWL
1660 DATA 1,89,2,169,1,89,2,85, , ,8,1,5447'BGHL
1670 DATA 1,85,1,89,1,150,2,170,1,149,1,110,5760'BNYN
1680 DATA 1,119,7,212,1,148,2, ,1,5,3, ,5499'BHIN
1690 DATA 1,5,4, ,1,17,2, ,1,20,1, ,5052'BCKN
1700 DATA 3,16,5, ,2,93,3,94,1,93,1,94,5405'BHSG
1710 DATA 1,91,1,85,1,149,1,89,2,169,1,89,5679'BLOI
1720 DATA 1,229,1,117,253, ,1,5,1,31,1,125,5765'BLUJ
1730 DATA 4,1,1,21,1,125,1,173,1,95,1,102,5526'BLKK
1740 DATA 1,119,1,110,1,149,1,106,2,101,1,255,5847'BPIM
1750 DATA 4,148,3,84,1,255,6, ,1,15,1,250,5768'BKMM
1760 DATA 6, ,1,255,1,170,6, ,1,192,1,191,5824'BJBN
1770 DATA 1,90,1,91,1,90,1,89,1,86,2,85,5538'BJXO
1780 DATA 1,255,1,101,1,117,1,229,1,89,1,165,5962'BOAQ
1790 DATA 2,101,1,255,4, ,2,80,1,245,1,175,5867'BLBQ
1800 DATA 7, ,1,64,230, ,1,2,1,3,1,213,5523'BGLH
1810 DATA 1,23,1,27,1,47,2,191,1,254,1,251,5800'BMQJ
1820 DATA 1,53,1,223,2,255,1,234,1,191,2,255,6219'BOWK
1830 DATA 1,85,1,255,1,181,1,191,1,186,1,250,6154'BOCL
1840 DATA 1,245,1,254,1,85,1,223,1,90,1,154,6057'BNYM
1850 DATA 2,157,1,89,1,229,1,78,1,254,2,171,5986'BNDN
1860 DATA 2,90,2,85,1,186,1,154,2,171,2,170,5866'BNNO
1870 DATA 2,85,1,213,1,255,1,58,1,170,2,149,5938'BNNP
1880 DATA 3,85,1,255,2,170,2,87,2,86,1,85,5779'BLHQ
1890 DATA 1,127,1,85,1,111,2,106,1,85,1,187,5708'BNDR
1900 DATA 1,215,1,241,1,221,2,255,1,175,1,235,6349'BPNK
1910 DATA 1,250,1,128,1,208,1,112,1,64,1,128,5896'BOYK
1920 DATA 1,224,1,240,1,248,222, ,1,2,1,3,5944'BKLL
1930 DATA 1,11,2,15,1,62,1,190,2,251,2,239,5777'BMYM
1940 DATA 2,191,3,255,1,247,1,214,2,255,1,223,6395'BPYO
1950 DATA 1,239,1,191,1,255,1,71,2,254,2,255,6273'BOBP
1960 DATA 1,254,1,250,1,181,1,117,1,127,1,165,6100'BPBQ
1970 DATA 2,229,1,165,1,37,2,101,1,229,1,170,5939'BOEQ
1980 DATA 1,85,4,170,1,105,1,85,1,170,1,85,5709'BMHR
1990 DATA 4,170,1,165,1,85,1,170,1,85,2,170,5855'BNJS
2000 DATA 2,169,1,106,1,86,1,170,1,85,1,165,5788'BNTB
2010 DATA 1,169,1,165,1,105,1,169,1,85,1,171,5870'BOFD
2020 DATA 2,255,3,172,1,187,1,178,1,253,1,141,6195'BPEE
2030 DATA 1,189,1,141,1,189,1,249,1,247,1,159,6180'BPKF
2040 DATA 1,252,1,124,1,95,2,87,1,85,1,245,5895'BMTF
2050 DATA 1,189,3, ,1,128,1,192,1,224,1,240,5981'BMCG
2060 DATA 1,184,208, ,1,11,2,15,2,62,1,59,5546'BKAH
2070 DATA 1,251,2,239,2,191,1,255,3,253,1,245,6444'BPXJ
2080 DATA 1,213,2,85,1,63,1,255,1,254,1,251,6128'BNWJ
2090 DATA 1,247,1,185,2,85,2,255,1,175,1,123,6078'BOHL
2100 DATA 1,247,1,121,1,125,1,103,3,229,1,230,6063'BPZD
2110 DATA 1,231,2,101,2,165,2,170,1,239,1,175,6090'BPIE
2120 DATA 3,85,1,86,1,150,1,170,1,171,1,255,5925'BNFE
2130 DATA 2,85,1,149,1,106,1,186,3,255,2,85,5876'BNYF
2140 DATA 1,105,1,174,1,254,3,255,3,85,1,169,6052'BOAH
2150 DATA 1,174,2,254,1,255,1,177,1,185,1,186,6238'BPJI
2160 DATA 2,187,3,185,1,76,1,123,2,127,1,123,5831'BOEI
2170 DATA 2,127,1,123,1,236,1,187,2,127,1,123,5931'BPOK
2180 DATA 2,255,1,251,1,124,2,110,2,91,1,87,5927'BNAK
2190 DATA 1,182,1,165,5, ,2,192,1,240,192, ,5981'BLEL
2200 DATA 1,1,2,3,1,15,1,13,1,14,1,30,5083'BHCC
2210 DATA 1,53,1,239,1,95,2,191,1,127,3,255,5969'BNVE
2220 DATA 1,245,1,233,2,213,1,229,1,117,1,217,6261'BPIG
2230 DATA 1,233,2,239,1,214,1,250,1,246,1,214,6403'BPEH
2240 DATA 2,239,2,206,1,61,1,127,1,255,1,253,6149'BOBH
2250 DATA 1,255,1,254,3,231,2,229,1,234,1,229,6441'BPRJ
2260 DATA 1,234,1,239,1,175,1,239,1,234,2,191,6319'BPAK
2270 DATA 2,170,3,255,1,170,2,255,1,191,1,171,6222'BPLL
2280 DATA 3,255,1,170,7,255,1,170,2,255,1,254,6374'BPCM
2290 DATA 1,250,3,255,1,170,2,255,2,170,3,185,6297'BPBN
2300 DATA 2,249,1,248,2,250,1,76,1,95,1,87,6013'BMME
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2310 DATA 1,85,1,1,1,236,1,42,1,235,1,204,5809'BLSF
2320 DATA 1,61,1,245,1,85,1,106,2,110,1,106,5720'BNHG
2330 DATA 1,165,1,229,1,85,1,185,2,237,1,253,6161'BOCI
2340 DATA 1,185,1,240,1,112,2,124,1,108,3,95,5873'BOXI
2350 DATA 6, ,1,128,181, ,1,1,2,3,1,7,5331'BFQI
2360 DATA 1,59,1,123,1,251,3,239,1,107,1,174,5961'BODK
2370 DATA 1,254,1,253,2,254,1,253,1,255,1,247,6523'BPTM
2380 DATA 1,255,1,245,1,185,1,181,2,249,1,213,6335'BPVN
2390 DATA 1,101,1,149,1,247,1,251,1,254,1,175,6183'BPOO
2400 DATA 1,187,1,251,1,185,1,85,1,247,1,123,6084'BOBG
2410 DATA 1,175,3,255,2,85,1,229,2,231,3,229,6216'BOEH
2420 DATA 1,85,1,101,1,85,1,82,1,72,1,79,5510'BKAH
2430 DATA 1,47,1,61,2,189,1,106,1,154,1,230,5794'BNEI
2440 DATA 1,193,1,249,1,241,1,125,1,253,1,239,6306'BPRK
2450 DATA 1,255,1,247,1,239,1,255,1,170,2,255,6428'BPCL
2460 DATA 2,191,1,179,2,127,2,85,1,105,2,253,5950'BODM
2470 DATA 1,13,2,253,2,85,1,165,1,248,2,250,6023'BNTM
2480 DATA 5,249,1,234,1,255,1,50,1,206,1,9,6013'BMTN
2490 DATA 4,85,1,149,1,177,2,254,1,222,1,221,6118'BOCO
2500 DATA 1,185,1,84,1,86,1,167,1,244,1,54,5826'BMQG
2510 DATA 1,246,1,164,1,85,1,235,3,119,1,183,6040'BOYH
2520 DATA 1,182,1,134,1,86,2,224,2,192,3,240,6068'BOBI
2530 DATA 1,252,176, ,1,15,1,13,2,30,1,54,5546'BKQJ
2540 DATA 1,58,1,122,1,218,1,171,1,154,3,110,5841'BONK
2550 DATA 1,126,1,254,1,186,1,181,1,238,3,175,6168'BPEM
2560 DATA 2,191,1,183,1,85,1,170,1,85,1,213,5934'BNFM
2570 DATA 1,121,1,249,1,253,1,53,1,64,1,69,5815'BMDN
2580 DATA 2,18,1,28,1,31,1,21,1,31,1, ,5136'BHJN
2590 DATA 1,85,1,24,2,170,1,10,1,245,1,92,5633'BLRP
2600 DATA 2,229,4,101,2,105,1,40,1,190,1,188,5864'BOXH
2610 DATA 1,62,1,188,1,15,1,104,1,90,1,241,5706'BMRI
2620 DATA 1,61,1,141,1,49,1,249,1,197,1,229,5932'BNKJ
2630 DATA 1,149,1,255,2,190,1,170,1,85,1,93,5949'BNRK
2640 DATA 1,91,1,94,1,105,1,109,1,85,2,105,5596'BMGL
2650 DATA 1,109,1,85,1,213,1,165,1,181,1,85,5844'BNFM
2660 DATA 2,166,1,182,2,87,2,249,1,248,5,250,6195'BOQO
2670 DATA 1,85,1,33,1,252,1,238,1,247,1,154,6015'BNVO
2680 DATA 1,191,1,254,1,85,1,83,1,76,1,99,5794'BLBP
2690 DATA 1,127,1,85,1,127,1,99,1,86,1,23,5553'BLMQ
2700 DATA 1,198,1,37,1,244,1,197,1,245,1,38,5965'BNWI
2710 DATA 1,117,1,85,1,117,1,149,1,164,1,235,5873'BOCK
2720 DATA 1,67,1,87,2,252,1,255,1,170,1,255,6093'BNIK
2730 DATA 1,186,1,239,1,186,4, ,1,192,1,176,5988'BMAL
2740 DATA 1,252,1,170,161, ,1,161,1,3,1,35,5787'BLTM
2750 DATA 1,7,2,15,1,13,1,235,2,234,1,107,5619'BLQN
2760 DATA 2,169,1,170,1,154,2,170,1,174,1,170,6015'BPLP
2770 DATA 1,234,1,122,1,90,1,154,1,181,1,183,5970'BOTP
2780 DATA 1,126,3,255,1,247,1,255,3,253,1,181,6327'BPXR
2790 DATA 1,253,1,249,1,121,1,229,1,155,1,159,6172'BPTS
2800 DATA 1,158,1,155,1,149,1,170,1,85,1,125,5848'BOGK
2810 DATA 1,255,1,254,1,239,1,254,1,85,1,170,6263'BOEK
2820 DATA 2,85,5,105,1,169,2,89,1,85,1,165,5710'BMSL
2830 DATA 1,85,1,255,2,85,2,215,1,87,1,175,5910'BMNM
2840 DATA 1,127,1,254,1,250,1,233,1,229,1,167,6266'BPSO
2850 DATA 1,235,1,251,2,187,1,175,1,255,1,253,6363'BPXP
2860 DATA 1,255,1,181,1,229,1,245,1,239,1,229,6384'BPEQ
2870 DATA 1,237,1,253,1,238,3,87,1,255,1,87,6165'BNRQ
2880 DATA 1,235,1,251,1,119,1,249,1,245,1,213,6318'BPOS
2890 DATA 1,91,1,109,1,127,1,125,1,121,1,238,5817'BOTS
2900 DATA 1,185,1,85,1,249,1,125,1,253,1,61,5964'BNLK
2910 DATA 1,141,1,92,1,91,1,85,1,191,1,255,5861'BMFL
2920 DATA 1,240,1,233,1,234,1,229,1,149,1,87,6178'BOAN
2930 DATA 1,235,2,251,1,186,1,183,1,87,1,119,6068'BOFO
2940 DATA 1,151,1,183,1,167,2,87,1,151,1,190,5936'BOCP
2950 DATA 1,171,1,251,1,90,1,127,1,245,1,247,6137'BOUP
2960 DATA 2,255,1,191,1,239,1,186,1,187,1,171,6236'BPFR
2970 DATA 1,251,1,91,1,192,1,240,1,252,1,168,6200'BOLR
2980 DATA 1,253,2,255,1,171,6, ,2,192,144, ,6027'BLWS
2990 DATA 1,14,1,30,2,62,1,54,1,122,1,250,5539'BLJT
3000 DATA 1,234,1,167,2,169,1,171,3,170,1,122,6042'BPLD
3010 DATA 1,171,2,235,2,167,2,175,1,159,3,255,6173'BPFE
3020 DATA 2,254,1,251,2,246,1,85,2,255,1,169,6269'BOLF
3030 DATA 1,105,1,89,1,105,1,249,1,190,1,255,5999'BOLG
3040 DATA 1,170,1,153,1,85,1,221,1,255,1,221,6111'BOEG
3050 DATA 1,85,1,255,1,170,1,153,1,85,1,221,5975'BNGH
3060 DATA 1,255,1,221,1,89,1,253,1,169,1,153,6146'BOEI
3070 DATA 1,85,1,221,1,253,1,221,2,91,1,30,5908'BMQJ
3080 DATA 1,222,1,94,1,174,2,158,2,155,1,79,5890'BNQK
3090 DATA 1,143,1,111,1,175,1,111,1,127,1,255,5928'BPIM
3100 DATA 1,215,1,213,1,245,1,237,1,246,1,244,6406'BPKE
3110 DATA 1,248,1,111,1,175,2,91,1,171,1,155,5958'BOBF
3120 DATA 1,91,1,27,1,87,1,71,1,119,2,87,5489'BKVF
3130 DATA 1,167,1,103,1,102,2,121,1,117,1,121,5738'BPXH
3140 DATA 1,125,1,127,1,109,1,191,2,173,1,93,5825'BOBH
3150 DATA 1,173,1,189,1,253,1,121,1,255,1,234,6231'BPLJ
3160 DATA 2,233,1,230,1,250,1,255,1,191,1,255,6421'BPEK
3170 DATA 1,183,1,182,1,181,2,245,1,229,1,255,6283'BPAL
3180 DATA 1,167,1,86,1,85,1,80,1,67,1,77,5568'BKBL
3190 DATA 1,245,1,215,2,255,1,191,1,111,1,223,6247'BPHN
3200 DATA 1,251,1,126,1,95,1,123,3,250,1,249,6102'BONE
3210 DATA 2,250,1,185,1,143,1,103,1,187,1,221,6096'BPLG
3220 DATA 1,222,1,221,2,254,1,192,2,224,3,252,6375'BPLH
3230 DATA 1,240,1,252,133, ,1,3,1,15,1,60,5708'BKHH
3240 DATA 1,3,1,15,1,12,1,51,2,206,1,57,5351'BJMH
3250 DATA 2,233,1,234,1,170,1,233,1,169,3,250,6298'BPTK
3260 DATA 1,110,2,174,1,190,1,250,1,106,1,170,6007'BPVL
3270 DATA 1,169,1,159,1,191,3,127,1,255,1,247,6156'BPHM
3280 DATA 1,213,2,246,1,231,1,229,2,234,1,255,6416'BPMN
3290 DATA 1,251,1,169,1,105,1,89,1,105,1,245,5970'BODN
3300 DATA 1,171,1,255,1,159,1,119,1,153,1,187,6050'BPSG
3310 DATA 1,85,4,255,1,119,1,153,1,187,1,85,5893'BNWG
3320 DATA 4,255,1,117,1,153,1,185,1,85,1,213,6017'BOXH
3330 DATA 1,245,1,253,1,255,1,190,1,175,1,171,6295'BPWJ
3340 DATA 1,71,1,103,1,85,2,101,1,127,3,191,5687'BNWJ
3350 DATA 1,254,1,234,1,255,1,127,1,245,1,230,6351'BPIL
3360 DATA 1,229,1,181,1,185,2,254,1,255,1,91,6202'BOYL
3370 DATA 1,111,1,175,1,110,1,189,1,177,1,246,6014'BPJN
3380 DATA 1,229,1,230,2,166,1,86,1,150,1,87,5955'BNLN
3390 DATA 2,159,1,85,1,255,1,211,1,65,4,255,6040'BNBO
3400 DATA 1,85,1,170,1,187,1,85,4,255,1,85,5876'BMBG
3410 DATA 1,191,1,183,1,106,1,255,1,249,2,254,6245'BPVI
3420 DATA 1,85,1,255,1,119,1,170,1,255,1,90,5980'BNHI
3430 DATA 1,86,1,85,1,93,1,183,1,29,1,199,5681'BLAJ
3440 DATA 1,249,1,174,1,171,1,170,1,215,1,117,6102'BPFL
3450 DATA 1,221,1,117,1,213,1,87,1,153,1,231,6028'BOJL
3460 DATA 1,251,1,239,1,122,1,95,1,215,1,117,6045'BOQM
3470 DATA 1,221,1,119,1,253,1,59,1,103,1,207,5968'BOYN
3480 DATA 1,255,1,254,1,126,1,94,1,203,1,243,6181'BOSO
3490 DATA 1,232,1,234,2,166,1,251,1,153,1, ,6043'BMHP
3500 DATA 1,192,1,240,1,60,1,143,1,179,1,236,6056'BOUH
3510 DATA 1,235,5, ,1,192,1,240,1,60,101, ,5837'BKNI
3520 DATA 1,3,1,15,1,60,1, ,1,3,1,15,5102'BFZI
3530 DATA 1,60,1,243,1,202,1,63,1,255,1,242,6071'BNHK
3540 DATA 1,207,1,63,1,239,1,173,1,45,1,237,5970'BNFL
3550 DATA 1,239,1,137,3,251,3,123,1,249,6,250,6264'BPXN
3560 DATA 1,254,1,173,2,169,2,167,1,149,1,158,6078'BPNO
3570 DATA 1,94,1,218,1,215,2,87,2,95,1,93,5810'BLNO
3580 DATA 1,126,1,182,1,238,1,170,1,150,2,190,6063'BPIQ
3590 DATA 2,170,1,150,1,127,2,123,4,122,1,126,5829'BPIR
3600 DATA 6,255,2,190,2,255,1,187,1,170,1,85,6155'BOIJ
3610 DATA 1,255,1,85,1,86,2,255,1,187,1,43,5918'BMUJ
3620 DATA 1,107,1,255,2,107,1,111,1,101,2,102,5791'BPVL
3630 DATA 1,101,1,117,2,118,1,255,1,159,2,215,5973'BPRM
3640 DATA 1,91,1,154,2,223,2,251,1,237,1,175,6139'BOYM
3650 DATA 1,249,1,191,1,254,1,253,1,255,1,183,6391'BPAO
3660 DATA 1,149,1,255,1,247,1,174,1,94,1,95,6020'BNGO
3670 DATA 2,159,1,158,2,222,1,223,2,222,2,255,6249'BPUQ
3680 DATA 1,238,1,138,1,149,1,255,1,149,1,153,6088'BPGR
3690 DATA 2,255,1,239,1,175,1,95,1,255,2,91,6118'BNNR
3700 DATA 2,255,1,254,1,251,1,255,1,251,2,235,6509'BPSK
3710 DATA 1,90,1,89,1,153,1,149,2,150,2,149,5788'BNTK
3720 DATA 1,254,1,119,1,117,4,85,1,149,1,181,5914'BODM
3730 DATA 1,185,1,238,1,107,1,122,1,94,1,86,5838'BNLM
3740 DATA 1,85,1,221,1,119,1,93,1,149,1,229,5902'BNEN
3750 DATA 1,181,1,169,1,174,1,218,1,86,1,93,5927'BNSO
3760 DATA 1,119,1,221,1,119,1,93,1,87,1,231,5876'BNGP
3770 DATA 2,170,1,111,1,219,1,118,1,221,1,118,5964'BPIR
3780 DATA 1,226,2,175,1,239,3,237,1,239,1,143,6268'BPGS
3790 DATA 1,243,1,252,1,251,1,122,1,120,1,123,6117'BPQT
3800 DATA 1,251,1, ,1,192,1,240,1,60,1,207,5956'BLPK
3810 DATA 1,163,1,252,1,255,5, ,1,192,1,240,6112'BMKL
3820 DATA 1,61,69, ,1,3,1,15,1,60,1, ,5213'BFOL
3830 DATA 1,3,1,15,1,60,1,243,1,206,1,58,5591'BKQN
3840 DATA 1,234,1,243,1,205,1,40,3,255,2,215,6201'BOEO
3850 DATA 1,191,3,181,2,191,1,170,1,191,1,239,6172'BPTQ
3860 DATA 1,234,3,239,1,237,1,174,1,255,1,251,6398'BPFR
3870 DATA 1,171,1,255,1,231,2,183,1,215,1,87,6149'BOBR
3880 DATA 1,245,1,214,1,218,1,234,2,171,1,151,6240'BPCT
3890 DATA 1,251,1,171,1,174,1,186,1,191,2,234,6214'BPNU
3900 DATA 1,85,1,219,1,251,1,121,1,122,1,191,5995'BOYL
3910 DATA 2,234,1,213,1,166,1,254,1,126,1,170,6170'BPGN
3920 DATA 1,255,2,170,1,89,1,105,3,126,1,110,5864'BOXN
3930 DATA 2,111,2,95,6,174,2,171,2,85,1,89,5740'BMPO
3940 DATA 3,85,1,150,1,149,7,107,1,91,1,117,5713'BNEP
3950 DATA 1,127,2,85,1,90,4,95,1,255,2,87,5750'BLTQ
3960 DATA 1,167,1,255,1,195,1,207,1,254,1,255,6339'BPES
3970 DATA 1,181,1,245,1,181,1,191,1,240,1,255,6299'BPVT
3980 DATA 1,110,1,255,2,85,1,170,1,255,2,63,5946'BNCT
3990 DATA 2,222,6,94,2,149,1,150,3,149,1,153,5932'BODV
4000 DATA 1,85,6,91,1,79,1,126,3,235,1,171,5800'BMJD
4010 DATA 4,175,2,149,3,85,1,90,1,107,1,154,5772'BNOE
4020 DATA 1,106,1,85,2,87,1,90,1,170,2,255,5801'BMCF
4030 DATA 1,170,1,85,2,119,1,170,1,250,1,175,5976'BOBH
4040 DATA 1,191,1,171,1,90,2,118,1,170,1,250,5997'BODH
4050 DATA 1,175,1,188,1,149,1,229,1,185,1,190,6122'BPCJ
4060 DATA 1,174,1,171,1,250,1,126,1,214,1,90,6031'BOGJ
4070 DATA 1,91,1,107,2,175,2,254,1,239,1,234,6108'BOAK
4080 DATA 1,255,1,123,2,94,1,87,1,165,1,251,5982'BNLL
4090 DATA 1,171,3,251,1,123,1,186,1,231,1,254,6224'BPGN
4100 DATA 3,94,2,254,1,170,1,254,1,207,1,115,6103'BOPE
4110 DATA 1,40,3,255,2,215,1, ,1,192,1,240,5951'BLOF
4120 DATA 1,60,1,207,1,179,1,156,1,155,5, ,5767'BLIG
```

'PRINT@' FOR C64

Tony Atkinson

Here is a simple little machine language wedge routine which will add the following statements to your BASIC:-

```
PRINT@X,Y"text"
INPUT@X,YA$
INPUT@X,Y"prompt text";A$
```

You can use numbers directly in these statements, e.g. PRINT@34,12"text". Or you can use the variable names and calculate the values of X and/or Y elsewhere in the program.

You can put X and/or Y in various loops, so that it can be a fast way to draw lines on the screen. Also PRINT@X,Y" " (print space) provides a quick and useful Plot/Unplot routine for your graphics.

If you have a number of consecutive PRINT@ statements, you can use-(line No.) PRINT@X,Y"text";@X,Y"text";@X,Y"text" etc.. This does not work with the INPUT statement but you can, of course, have several full INPUT in the one BASIC line as normally. The value of Y is limited to the range 0 to 24. Values outside this range will return an illegal Quantity error report.

The value of X is not limited. Normally your X values would range from 0 to 39. However, since screen addresses run consecutively, values of X above 39 will wrap-around the screen. For example, looping X from 0 to 255 will produce 6 and a bit lines across the screen. Could be handy in graphics.

The INPUT@X,Y statement works similar manner but remember just like the normal INPUT can't be used in direct mode. This is a very useful statement for games and business programs where you want input to happen at a particular position on the screen such as in input questionnaires.

Listing 1 is a BASIC loading program for the C64. The routine is stored in the cassette buffer from 828.

Call SYS 828 to enable the PRINT@ routine. One call only is needed as the routine will continue to operate each time '@' occurs.

Call SYS 893 will disable the routine and return the CHRGET routine to normal. (CHRGET is the BASIC routine which reads in the characters from BASIC program).

This would be necessary if you propose to use '@' for other purposes elsewhere in your program. Personally, I very rarely use '@' in programs and to date I have not needed the disabling call. Consequently, I delete lines 50038 and 50039 from my loading program. Saves a little time and memory. BUT make sure to add -1 to the end of line 50037.

To adapt the loading program in Listing 1 to suit the VIC-20 the following chages are necessary:-

(1) In lines 50034 and 50035 change 183 to 215
(2) In line 50037 change 178 to 215. (These changes are due to the different locations of BASIC ROM in the two machines)
(3) In line 50036 change 25 to 24 to reduce limit of Y.
(4) Change the program line numbers to suit your VIC-20

LISTING 1

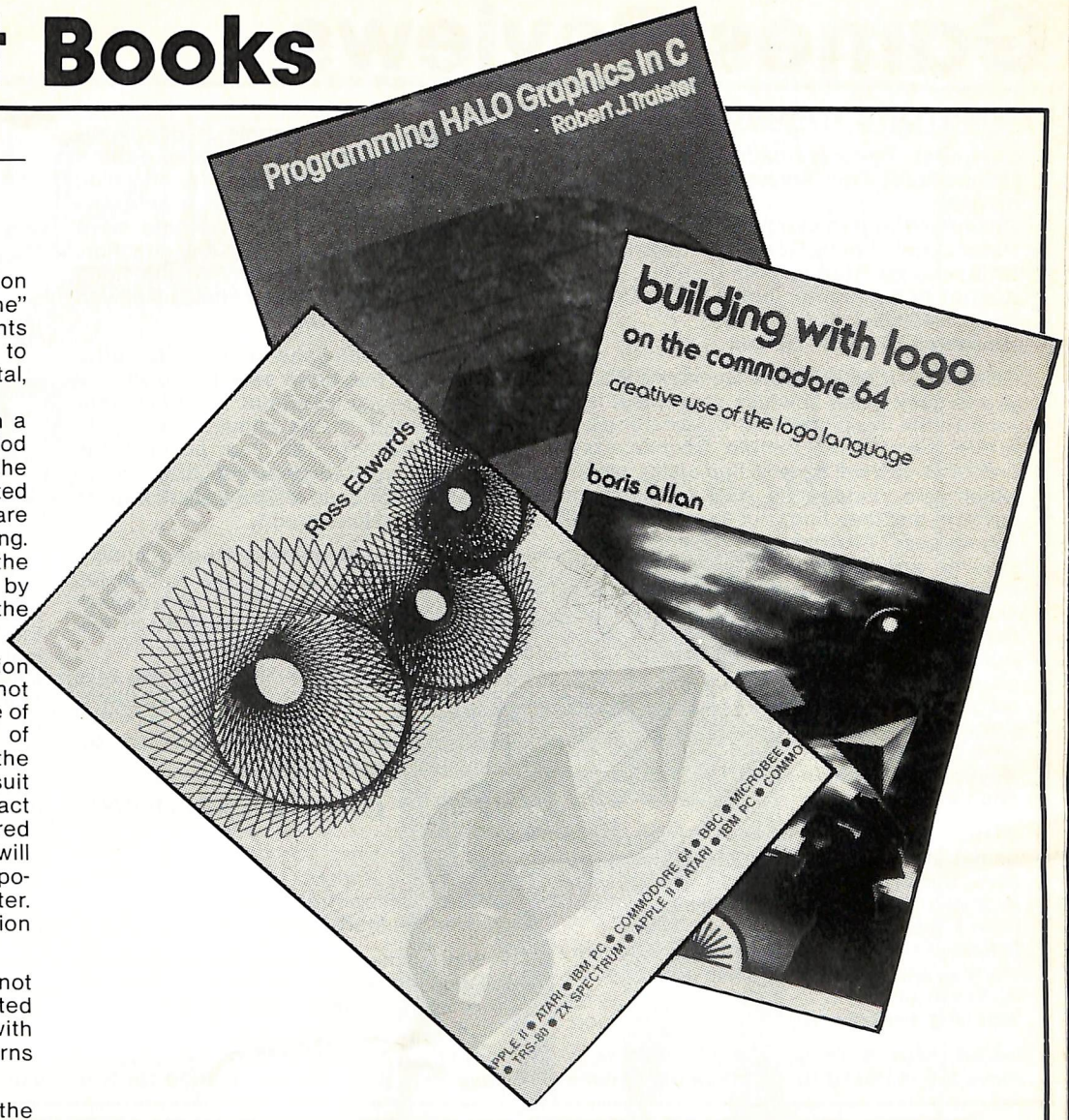
```
1 GOSUB 50000: PRINT CHR$(147)'DLJD
5 :'ABHD
10 FOR X=10 TO 30'DFRY
20 PRINT @X,8"[<U>]""BECA
30 PRINT @X,18"[<O>]": NEXT 'CGJC
```

Continued on page 47

Continued from previous page

```
4130 DATA 1,192,1,240,1,61,37, ,1,3,1,15,5553'BJUG
4140 DATA 1,60,1, ,1,3,1,15,1,60,1,243,5387'BHQH
4150 DATA 1,206,1,54,1,234,1,243,1,207,1,62,6012'BNGJ
4160 DATA 1,250,2,174,1,171,1,91,1,170,1,254,6117'BOQK
4170 DATA 2,238,1,254,1,171,1,173,1,190,1,215,6248'BPSM
4180 DATA 2,255,1,106,1,255,2,253,1,254,1,191,6322'BPNN
4190 DATA 1,190,1,186,2,170,1,171,1,173,1,190,6087'BPUO
4200 DATA 1,254,1,249,1,246,1,218,1,107,1,191,6271'BPTG
4210 DATA 1,222,1,126,1,111,1,187,1,215,1,234,6101'BPUH
4220 DATA 1,255,1,95,1,174,1,125,1,238,1,255,6148'BODI
4230 DATA 1,245,1,255,2,171,1,110,1,238,1,190,6216'BPIJ
4240 DATA 1,250,2,233,2,165,2,150,1,153,1,89,6049'BOYJ
4250 DATA 2,102,2,154,1,122,1,105,1,169,1,233,5893'BPKL
4260 DATA 2,165,2,150,2,90,3,95,2,91,1,87,5690'BLQL
4270 DATA 1,86,1,87,2,171,1,170,1,232,1,235,5988'BNOM
4280 DATA 1,238,1,246,1,250,1,213,1,117,1,222,6292'BPHO
4290 DATA 1,251,1,253,3,255,1,83,1,111,1,187,6148'BOYO
4300 DATA 1,239,1,127,3,255,4,95,1,87,1,95,5909'BMEG
4310 DATA 1,223,1,222,1,254,1,174,1,110,1,174,6163'BPBI
4320 DATA 2,254,1,62,2,175,6,111,2,255,1,175,6046'BOCI
4330 DATA 1,159,1,175,1,253,2,255,1,15,1,92,5956'BNNJ
4340 DATA 2,95,1,94,1,95,1,111,2,127,1,85,5615'BLKK
4350 DATA 1,149,1,235,1,254,1,151,3,255,1,14,6066'BOWL
4360 DATA 1,238,1,54,1,242,1,249,1,248,1,253,6290'BOEM
4370 DATA 1,254,1,174,4,190,1,253,2,249,1,154,6284'BPCO
4380 DATA 2,166,2,169,1,170,1,106,1,90,1,255,5964'BOEP
4390 DATA 2,191,2,175,1,107,1,171,1,153,1,255,6060'BPLQ
4400 DATA 1,235,1,134,1,190,1,235,2,255,1,85,6141'BOTH
4410 DATA 1,253,1,251,1,252,1,255,1,253,2,255,6526'BPQJ
4420 DATA 1,85,1,79,1,251,1,15,1,255,1,215,5906'BMFJ
4430 DATA 2,255,1,85,1,127,1,150,1,229,1,249,6102'BOWK
4440 DATA 1,121,2,254,1,87,1,234,1,190,1,167,6060'BOTL
4450 DATA 1,173,1,122,1,218,1,150,1,149,1,185,6003'BPFN
4460 DATA 1,170,1,238,1,127,1,87,1,149,1,165,5942'BOFO
4470 DATA 1,169,1,254,1,126,1,94,1,150,1,167,5966'BOIP
4480 DATA 1,233,1,122,1,222,1,215,2,255,1,169,6223'BPEQ
4490 DATA 1,255,1,127,1,95,1,191,4,155,1,91,5923'BNKQ
4500 DATA 1,217,1,245,1,213,1,207,1,243,1,252,6383'BPJJ
4510 DATA 1,219,1,106,1,170,1,174,1,187,1,64,5926'BOAK
4520 DATA 1,208,1,244,1,61,1,207,1,179,1,172,6077'BOBK
4530 DATA 1,171,4, ,1,64,1,208,1,244,1,61,5757'BKYL
4540 DATA 9, ,1,3,1,15,1,60,1,243,1,206,5541'BIQL
4550 DATA 1,58,1,250,1,243,1,206,1,58,1,234,6055'BNUN
4560 DATA 1,139,1,170,1,154,1,86,2,171,1,187,5914'BODP
4570 DATA 1,238,1,191,1,254,1,186,1,170,1,90,6135'BOAP
4580 DATA 1,86,1,215,1,254,1,190,1,170,1,234,6155'BOUQ
4590 DATA 1,174,2,255,2,191,2,175,2,171,1,126,6102'BPOS
4600 DATA 2,127,1,191,1,223,1,159,1,223,1,255,6185'BPSK
4610 DATA 2,249,1,229,1,230,1,166,1,167,2,171,6220'BPQL
4620 DATA 1,122,1,185,1,253,1,213,2,235,2,171,6187'BPNM
4630 DATA 1,123,1,251,1,239,1,213,2,170,2,171,6175'BPHN
4640 DATA 2,186,1,255,1,213,2,233,2,170,2,89,6156'BOBO
4650 DATA 2,102,1,154,1,158,2,106,2,169,1,165,5863'BPWP
4660 DATA 1,167,1,166,1,155,1,95,1,127,1,106,5822'BOEP
4670 DATA 1,107,2,235,1,251,3,255,1,90,1,94,6041'BNTQ
4680 DATA 3,222,1,158,1,111,1,123,1,171,1,175,5968'BPQS
4690 DATA 6,171,1,243,1,251,3,255,1,243,1,251,6427'BPQT
4700 DATA 1,255,1,162,1,174,3,170,1,162,1,174,6105'BPLL
4710 DATA 1,170,1,220,1,222,5,223,1,218,2,174,6238'BPHM
4720 DATA 1,190,3,254,2,86,1,172,2,111,1,108,5931'BOWM
4730 DATA 2,111,2,101,1,243,1,175,1,151,1,175,5964'BPIO
4740 DATA 1,179,1,63,1,95,1,90,1,120,1,123,5676'BMEO
4750 DATA 3,122,1,120,1,123,1,122,1,168,1,171,5834'BPAQ
4760 DATA 3,170,1,168,1,171,1,170,1,171,1,170,6028'BPKR
4770 DATA 6,171,8,250,1,90,1,86,1,150,1,166,5931'BNIR
4780 DATA 2,169,1,149,1,153,1,170,1,165,2,169,5983'BPMT
4790 DATA 5,170,1,85,1,106,1,127,1,94,1,95,5687'BMRT
4800 DATA 1,151,1,167,1,170,1,85,1,170,1,255,6004'BOPL
4810 DATA 1,170,1,255,1,223,1,247,1,170,1,85,6156'BOWM
4820 DATA 1,170,1,255,1,171,1,255,1,127,1,223,6207'BPIO
4830 DATA 1,169,1,85,1,170,2,255,1,250,1,174,6110'BOUO
4840 DATA 1,255,1,229,1,101,1,169,2,255,1,63,6079'BOAQ
4850 DATA 1,239,1,255,1,123,1,94,1,119,2,213,6050'BORQ
4860 DATA 2,245,1,253,1,87,1,149,1,165,1,233,6139'BODS
4870 DATA 1,123,1,95,2,87,1,165,2,233,1,238,5949'BNRS
4880 DATA 1,183,1,182,1,151,1,159,1,218,1,214,6113'BPJU
4890 DATA 1,221,3,222,1,218,1,222,1,254,1,191,6336'BPFV
4900 DATA 1,175,1,107,1,218,1,230,1,237,1,239,6212'BPJN
4910 DATA 1,234,1,186,1,238,1,251,1,254,1,191,6360'BPRO
4920 DATA 1,174,1,106,1,207,1,179,1,172,1,171,6015'BPLP
4930 DATA 1,226,3,170,1,64,1,208,1,244,1,61,5981'BNAP
4940 DATA 1,207,1,179,1,172,1,175, , , , ,5737'BHHP
4950 DATA 782,62281,2108,62451,1722,58867'BGXQ
4960 DATA 1440,58465,1280,62503,1456,61655'BHNR
```

A Look At Books



MICROCOMPUTER ART

Title: Microcomputer Art
Author: Ross Edwards
Publisher: Prentice-Hall
Price: RRP $19.95

This book shows how to simulate the motion of a "Geometric Pen" or "Geometric Lathe" on the computer screen. These instruments were used in the nineteenth century to engrave geometric patterns on wood, metal, and even glass.

The patterns illustrated are drawn from a number of books published in the period 1851 to 1884, on the operation of the Geometric Lathe. The patterns are generated by programs (written in BASIC) which are rarely more than half a dozen lines long. Most patterns can be generated by the alteration of only one program line, by reference to the tables at the back of the book.

The book is written for general application with any small personal computer. It is not written specifically for any particular type of computer. The information at the end of Chapter 3 should assist you to convert the three or four program commands to suit most popular computers. However, the fact that so few BASIC commands are required to generate any pattern means that you will have little difficulty converting the hypothetical commands to any microcomputer. You need merely refer to the high-resolution graphics section of your user manual.

With the directions given in this book, not only will you be able to copy any illustrated pattern, but you can also experiment with your own patterns. The variety of patterns that can be produced is infinite.

This book is unique in combining two of the most ingenious of nineteenth and twentieth century technologies: nineteenth century geometric engraving and twentieth century computer graphics. It is hoped that this will give you a new direction in which to apply the remarkable graphic capabilities of your personal computer.

BUILDING WITH LOGO

Title: Building With Logo On The Commodore 64
Author: Boris Allan
Publisher: Sunshine Books

Logo is the computer language of the future. In schools around the world it is Logo that is introducing young people to computers and, as they progress, helping them to realise the power at their fingertips. With advanced features that set it far in advanced of other micro languages Logo is a tool for beginners and experts alike.

The author shows how Logo can liberate the full potential of your Commodore 64. The built in procedures for sound effects, the superb graphics capabilities and the ability to manipulate sprites are fully discussed together with a section on writing your own adventures.

For teachers, students and home micro owners who want to go beyond BASIC, Boris Allan's book is an essential guide book for the journey.

HALO GRAPHICS

Title: Programming HALO Graphics in C
Author: Robert J. Traister
Publisher: Prentice-Hall
Price: RRP $33.95

The phrase, "A picture is worth a thousand words," is especially true of computer programming. At the present time, programmers are emphasizing graphics programs and graphics as an essential part of today's software market. The market includes everything from games to highly sophisticated scientific programs.

In this new book, Robert J. Traister offers the experienced programmer material that will serve as a reference manual for HALO and for calling HALO functions from C programs. For the beginner, the author describes each HALO function in great detail and then lists and discusses the working of C programs practically on a line-by-line basis.

The combination of C and HALO is one of the most powerful programming packages available to the microcomputer user. Using these tools, even the least experienced microcomputer programmer can produce sophisticated programs to process data and represent it in professional graphic screen writes.

When you learn to use these tools, you will be able to explore programming environments to an unlimited degree.

MACHINE CODE ROUTINES

Title: 40 Best Machine Code Routines For The Commodore 64
Author: Mark Greenshields
Publisher: Duckworth

This book provides 40 excellent machine code routines which can be incorporated into both Basic and machine code programs. The routines include useful utilities, such as: Print at: no more need for those weird cursor symbols! Move: move an area of memory to another area. Pause: stop a listing at any time by pressing the shift key.

Function keys: program the function keys. Copy: copy any part or all of the character ROM into RAM. Doke: POKE a 16 bit number into memory. Deek: PEEK the 16 bit number. List alter: list programs in any width to screen or printer. Old: recover a NEWed program. Invert: invert all or part of the high res screen. Organ: play music while running another program. Scroll message: scroll a message across the screen while running another program. Flash characters: put flashing text on the screen. Split screen: divide the screen into text and high res. Sound: make sounds easily without pokes. Envelope: allow complex sounds to be created without pokes.

A listing of Extramon is also included. Mark Greenshields is the author of Mastering the Commodore 64 and Mastering Machine Code on the 64, and a regular contributor to Your 64.

Games Reviews

GEMSTONE WARRIOR

Computer fantasy/arcade game for the Commodore 64 and Apple(64K), both versions on disk.
Designer/Programmers:
Peter Lount, Trouba Gossen, & Kevin Pickell.
Produced by: Strategic Simulations, INC.
Australian distributor: Jedko Game Co.
Price: $49.95
Reviewed by: John Yiannis

GENERAL DESCRIPTION: Gemstone Warrior is a fantasy game in which your quest is to recover the five pieces of the Gemstone and return them to the temple. Sounds easy? first of all you will have to find all the pieces which are hidden in 90 underground caverns, and then find your ay out again. Still sounds easy? Also hidden in the underground caverns are contagious shamblers which carry all sorts of infections, sword wielding skeletons, exploding gas plants, ghosts and the demons who stole the Gemstone. Against this horde you have your trusty crossbow, magic fireballs, and various magical items which will be found scattered throughout the caverns, (if only you knew what they all did).
Keyboard or keyboard/joystick combination can be used.

STRONG POINTS- For people who found games like Ultima and Temple of Apshai too slow, the action in this game will get your joystick really moving. Most games will take from 1/2 to 2 hours.
Different levels are available, Beginner, Normal, and Kamikaze. A save game option is also available.
Scrolling display and good use of animation.

WEAK POINTS- Pressing the fire button to move (as opposed to shooting) may take a while to get used to.
Being able to fire in only 8 directions, straight up, down, to each side, and the 4 diagonal directions. This makes good timing essential if you don't want to waste any arrows. With the joystick I would have preferred to be able to fire in any direction, but I suspect that they limited the firing directions so that the game could be played entirely with the keyboard.

In most games with a save game option, after your position has been saved on disk, you can immediately continue on from your current position in the game. However, in Gemstone warrior, once your position has been saved, you are returned to the main menu and to continue on you have to wait for the program to load again.

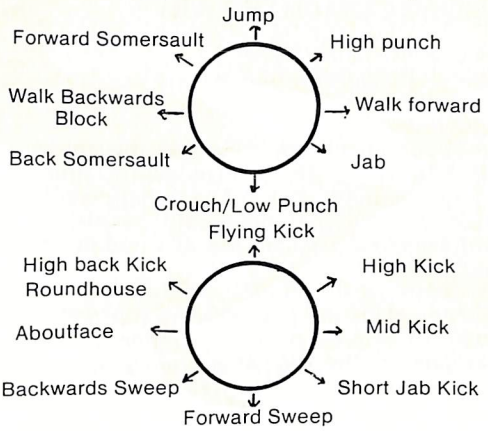
SUMMATION - The game is of equal quality to other arcade games on the market for both computers, and so will probably appeal more to people who are interested in the fantasy theme.
With the drop of the Australian dollar, any game from overseas is going to be fairly expensive. But Gemstone warrior is in the same price range as other arcade games and so worth consideration.

THE WAY OF THE EXPLODING FIST

Author: Gregg Barnett
Publisher: Melbourne House
Reviewed by: Mark Yates (13)

The Way of the Exploding fist is a karate simulation game, for the Commodore 64, and is controlled either from the keyboard or joystick.
It is optional to have one or two players, however two joysticks are needed for two players to play simultaneously.
Each joystick controls eighteen separate manoeuvres. These include punches, jabs, kicks, sweeps, somersaults and blocks.
The game is very absorbing and is great fun to play either by yourself against the computer or especially against a friend.

Direction of joystick with fire button not pressed



Direction of joystick with fire button pressed.

The graphics and oriental background music plus the realistic sound effects of the karate blows add to the atmosphere. (A Buddha-like figure holds up a red or white flag to denote the winner of each round.)

There are eleven skill levels progressing from Novice to Tenth Dan. (I was only able to reach the level of 5th Dan after two weeks regular practice-leaving me plenty of room for improvement).
Points are scored not on which action has been taken but on how well each move was executed.

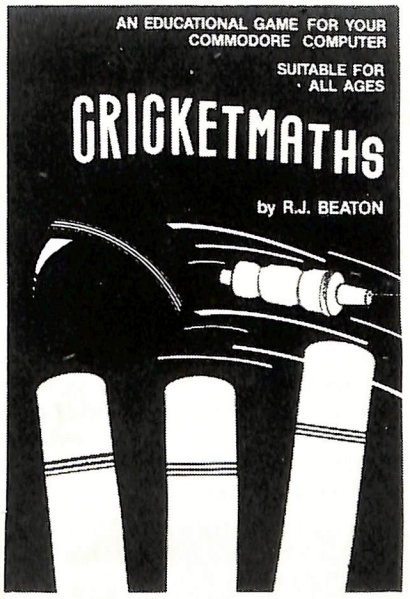
PES

PITMAN EDUCATION SOFTWARE

EDU-KIT

Software for Australian Primary Schools

Mathematics



★ **Cricket Maths**
Players practise their Maths facts whilst playing against the computer in a cricket setting.

★ **Number Maze**
To get through the maze you must know your tables!

★ **Number Snake**
A game similar to Snakes an Ladders that fosters the learning of number facts at varying levels of difficulty.

English

★ **Wordmaster**
The computer challenges you to spell the words correctly!
With Wordmaster you can compose and store your own word lists.

★ **Save Our Sal**
Choose the correct homophone and save Sally from the dreaded shark Knaws!

★ **Funky Punky**
The player types the missing punctuation marks into sentences on the screen.
Capital letters, full stops, commas, question marks, apostrophes or any combination of these.
Compose and store your own passages!

★ **Zap the Letter**
A strategy game which challenges the player to unjumble the words in a block puzzle.

Available on disk for Commodore 64
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Home Library - Part 3

PROGRAMMER'S NOTES

by Bob Hoffman

This third and final part of a series on my home library program explains how the program works and gives some help to those who would like to customize it for their own use. The first part (Commodore Magazine, Vol 5, No 1) gave an introduction and the listing for the Commodore 64 version. Versions for all Commodore computers (VIC 20, Commodore 64, Commodore 16, and the PLUS/4) are available from the magazine. The second part (Commodore Magazine, Vol 5, No 2) gave a complete user's guide.

NOTE: If you have the Commodore 64 version, make sure that it contains the following line:

5 POKE 53280,1: POKE 53281,1

Otherwise, you may find that your screen goes blank later in the program. I will leave it to debugging detectives to work out why! My apologies for leaving this line out of the version published in the magazine.

FILE TYPE

The first decision was the type of file to use: sequential, relative, or random access. The random access file held a certain attraction at first but I ultimately decided that I lacked the expertise and that the paucity of information available on this file type (at the time – there have been some helpful books published since then) made it unlikely that I would succeed in creating a workable system.

Relative files can be used to store more information than can be held in computer memory and each record can be individually read or written to without having to look at the rest of the data on the disk. However, there are a few drawbacks. The chief one, from my point of view, is that the disk has to be accessed repeatedly and the 1541 disk drive is painfully slow. In operations like sorting and searching, a number of records have to be examined and consequently a long time is taken in execution. As a high priority was speed, a relative file did not seem a good choice.

Before establishing a relative file you must fix the maximum length of each field. This meant, for example, that I would have had to decide that an author's name could only be so many characters long. If the name were any longer than this, it would have to be shortened. Unfortunately, the length of both authors' names and titles vary considerably. If I chose limits that were low (e.g. twenty characters for the author and fifty for the title), there would frequently be cases where the full details could not be put in. On the other hand, high limits (e.g. fifty for the author and eighty for the title) also have a disadvantage. Space is reserved on the disk for records having a length which is based on the total of their maximum field sizes. This tends to erode some of the advantages of the large amount of storage available on the disk when there is little uniformity in the length of data in the various records.

Relative files cannot be stored on tape and total reliance would have been placed on the disk drive.

Sequential files seemed more attractive but they too have a drawback. The whole file must be contained in computer memory and this limits the amount of information that can be contained. On the other hand, having the entire database in memory means that searches, sorts, and other operations can be very fast. The choice between relative and sequential files really came down to deciding which was more important: having large data files or having speedy operation. I went back to my priorities and decided that, as speed was most important, sequential files must be used.

This meant my books had to be divided into sections small enough to be held in the memory of the computer and explains the limitations that are placed on the number of books that each computer can handle.

One of the advantages of sequential records is that back-ups can be made easily by saving to two or more disks. A save to tape can also be made so that you can carry on if your disk drive is out of operation.

Sequential files do not require specification of maximum lengths for fields and do not pad out fields to the same length with a resulting waste of memory. (There is, however, a limit of eighty characters per field resulting from another decision.)

SORT INDEXES

Another decision which did much to establish the character of the program concerned the method of sorting.

I wanted the records to be permanently sorted in two ways – by author and by title. This was to happen automatically as each record was typed in. I had suffered from systems which made it necessary to sort the entire database from scratch repeatedly because the sort order was lost each time a new record was added. This meant very long delays once the file was of a reasonable length.

Having a file constantly sorted means that displays or print-outs in author or title order are available instantly on request. Furthermore, searches can be run much faster on a sorted file than an unsorted one; the binary chop search (described in Commodore's Introduction to BASIC, Part 2 and many other places) can be used to great effect.

Each time a book is added, deleted, or its details changed, the sort routine is called up. This results in small pauses which are tolerable.

Another feature of the sort procedure used is that it does not, unlike most sorts described for Commodore computers, involve string swapping. The string swapping method of sorting would change an array like this:

A$(1) HARRISON, HARRY
A$(2) SMITH, E E
A$(3) ASIMOV, ISAAC

into order by rearranging the strings to this:

A$(1) ASIMOV, ISAAC
A$(2) HARRISON, HARRY
A$(3) SMITH, E E

Of course, all of the other fields (e.g. title) have to be moved at the same time. You also need a few temporary variables to hold strings that are being replaced until they can be put into their new homes.

All of this moving strings about plays havoc with the somewhat inefficient way the Commodore 64 and the VIC 20 store string variables. Discarded strings are left in memory until the entire area available is used up; then everything is tidied up in a time consuming operation aptly called "garbage collection". There is no warning that this is about to take place or indication that it is going on when it occurs. The computer just seems to suspend operations.

Garbage collection is brought on all too soon and too often by programs which rely on string swapping to sort data. It is the main reason that sorting on some systems

seems to take forever – I remember one database program which was so bad that I would set it to sort just before I went to bed so that I could use it in the morning. The much more sophisticated Plus/4 and Commodore 16 do not have garbage collection problems but there is another reason for avoiding string swapping as a sort mechanism.

The other limitation of string swapping sorts is that, by definition, you may only have one order at a time. I wanted two sequences: author and title. The only way to do this would be to have everything duplicated so that each book had its author and all other details in two sets of arrays each arranged in a different order. Aside from being incredible wasteful of memory, the other complications involved would boggle the imagination. To avoid these problems, I have employed sort indexes. These are simply arrays which list the order in which string arrays are to be looked at; the strings themselves do not move. For example, in the following case:

A$(1) HARRISON, HARRY	T$(1) STARWORLD
A$(2) SMITH, E E	T$(2) GALACTIC PATROL
A$(3) ASIMOV, ISAAC	T$(3) I, ROBOT

the above stay where they are but two new arrays are used to list the record numbers:

AUTHOR ORDER	TITLE ORDER
A%(1) 3	T%(1) 2
A%(2) 1	T%(2) 3
A%(3) 2	T%(3) 1

Swapping numbers in arrays does not create garbage collection problems and there is, of course, no barrier to having two or even more as integer arrays (those indicated by percentage signs) are very efficient in their use of memory.

The actual mechanics of sorting are exactly the same as string swapping except that you exchange record numbers in the integer arrays instead of moving strings.

The process of using the sort order can be a little confusing at first. For example, to display the above three records in author order:

```
10 FOR E = 1 TO 3
20 PRINT A$(A%(E))
30 PRINT T$(A%(E))
40 NEXT
```

To simplify matters, I usually add an extra line to transfer the record number from the sort index to a new variable:

```
10 FOR E = 1 TO 3
15 A = A%(E)
20 PRINT A$(A)
30 PRINT T$(A)
40 NEXT
```

To get a title order:

```
10 FOR E = 1 TO 3
15 T =)
20 PRINT T$(T)
30 PRINT A$(T)
40 NEXT
```

Once you understand the theory behind sort indexes you should have no difficulty working out how the sort (beginning at line 2000) works. The fact that only one record is sorted at a time makes the process very simple.

VARIABLES

This is a complete list of the variables used in the program. Some variables are not used in all versions.

The way in which variables have been used is a result of the history of the programming. When I was originally working with the VIC 20, memory considerations loomed large and I adopted several strategies to conserve memory usage. Only single letters were used as variable names and whenever possible variables were used for more than one purpose. These practices also gave some slight speed advantages. They do, however, make understanding and changing the program less easy and I must admit that I now sometimes regret this decision.

A	Pointer to records (usually derived from author index)
B	Significant length of title (i.e. excluding initial articles)
C	Count variable
D	Length of search string
E	Temporary variable used in FOR/NEXT loops
F	File size–maximum number of records which can be held
G	Pointer to sorted indexes
H	High number of range
I	Indicator that a search has been successful; also used as a FOR/NEXT variable
J	Indicator that a string retrieved in a keyword search is a word or the beginning of a word (rather than the middle or end of a word)
K	Position of a keyword in a string
L	Low number in a range; also used as a pointer to records being saved or loaded
M	Midpoint of range
N	Number of records actually on file
O	Temporary variable to hold number of index entries to be updated
P	Pointer to records
Q	Number of possible choices in menu
R	Number of records in print list during keyword searches; also pointer to index entries being updated
S	Pointer to records used in comparisons
T	Pointer to records (usually derived from title index)
U	Significant length of comparison string during sorting; also beginning point of section of long string being displayed; also starting point of significant portion of title during search
V	Length of string portion to be displayed; also indicator that author index entry is to be updated
W	Length of string portion being examined for a space in display; also FOR/NEXT variable; also indicator that title index entry is to be updated
X	Menu choice
Y	[Unused]
Z	Multipurpose temporary variable

String variables

A$	Author (temporary string)
D$	Search string
F$	File name
L$	Headline for print-out
R$	Return character
T$	Title (temporary string)
X$	Multipurpose string variable. Its most significant use is to hold menu choice
Y$	String built up from GET statements
Z$	Multipurpose string variable

Arrays

A$()	Authors
S$()	Subjects
T$()	Titles
A%()	Author index
B%()	Significant lengths of titles
K%()	Print-list used in keyword searches
T%()	Title index

MODULES

In order to make the program easy to understand and change when necessary, it was plotted out beforehand as a

Continued overleaf

series of modules:

Module	Start Line	Machines
Initialization	10	All
Menu	200	All
Re-start	500	Plus/4
End	700	All
Pause	800	All
Get Number	900	All
Select Field	950	All
Input	1000	All
Get String	1500	C16, Plus/4
Sort	2000	All
Display	2500	All
Print-out	3000	All
Load File	3500	All
Save File	4000	All
Search	5000	All
Modify	6000	All
Delete	6500	All
Redefine Characters	7000	Plus/4
Error Trap	8000	C16, Plus/4

INITIALIZATION – This dimensions array, asks for a file name and performs other set-up tasks that only have to be done once.

MENU – A list of options is put on the screen and the relevant module is called up. When the subroutine called up is finished, the menu is printed again.

RE-START – It is very handy to be able to go back to running a program after it has been stopped for any reason. If RUN is used, all the variables are cleared. This is easily avoided, on all machines other than the Plus/4, by entering GOTO 200 in direct mode; you are put in the main menu and can go on from there. If you have not changed a line of the program or taken any other action which automatically clears variables, all of your data will be intact.

The situation with the Plus/4 is more complicated because it uses a redefined character set. Restart with GOTO 500 to return to this. Otherwise you will be using the standard character set in ROM and get such weird results as a flashing comma instead of a cursor.

END – This is executed at the completion of the session and ensures that all files are closed. On the Plus/4 it also restores the standard character set.

PAUSE – A pause is often required to allow people using the program to read something. Despite my general feeling that POKEs are best avoided in programs, I have indulged in one here to clear the keyboard buffer before GET (in the VIC 20 or Commodore 64) or GETKEY (in the Commodore 16 or Plus/4). Unless this is done a key typed before entering this module will be accepted and cause the program to carry on without any discernable pause. Failure to provide for this is the reason that otherwise well-designed programs will sometimes flash important instructions past your eyes with blinding speed or give you no chance to savour your score after your best ever effort at an arcade-type game.

GET NUMBER – Choices from menu displays are made by typing a number. A check is made to ensure that a number between one and the highest number used in the particular menu is typed. Before calling this subroutine, the highest valid number is placed in the variable Q.

Notice that a string variable (X$) is used to take the user's response. This ensures that the cryptic 'REDO FROM START' message does not appear; instead a more meaningful sentence is put on the screen to explain exactly what is required.

SELECT FIELD – At several points throughout the program, the user must select the author or title field to be operated upon. This short module simply saves these lines being repeated.

INPUT – The entry of records is accomplished fairly simply in a loop which continues until '0' (zero) is entered in response to a prompt for the author or the maximum number of records has been reached. Any other symbol, character or word could be used instead of the zero.

One of the features that keeps one sane during the entry of a large number of books by the same author is line 1040 which automatically puts in the last author entered if return is pressed in response to the author prompt. It is exceptionally useful if you are doing novels and you have some favourite authors – particularly if some member of your family is stuck on Enid Blyton and has all four hundred odd of her books. It is less functional if you are cataloguing non-fiction and have few books by any one author. In that case, you may find that you prefer to change this line to help you cope with the many books you have with no author specified:

```
1040 IF A$(N) = "" THEN A$(N) = "[ANON]"
```

Once a title is entered, the sort subroutine is called up. After returning from this (and adding any additional fields) a check is made to ensure that the database is not full (or approaching it) and a loop is made back to the start of this routine for the next book.

GET STRING – Using GET rather than the INPUT command gives more control over what is put into the data base as each key pressed can be looked at and accepted, rejected, or transformed as desired.

Originally I wanted to use this method in all versions but garbage collection after a large number of record entries in the VIC 20 and Commodore 64 led me to restrict it to the new machines. Thus you can type keys by mistake on the older machines that create problems. A comma or colon will cut off part of your input. Quotation marks will put you in quotes mode with several possible pitfalls for the unwary. The home key (or up down cursor) will confuse input altogether. Incidentally, the way to recover from this last disaster is to clear the screen; then type in your input from the beginning.

The procedure is started in the Commodore 16 and Plus/4 by creating an empty string and clearing the keyboard buffer. A flashing cursor is simulated and the key pressed is looked at by obtaining its ASCII value. If this is a character such as a comma which could cause problems, it is either ignored (Commodore 16) or transformed (Plus/4) to a look-alike (from the new character set) which does not have the dangerous properties of the original.

Acceptable characters are then shown on the screen and added to the string which actually defines the input.

A special internal subroutine handles the delete key.

The loop is executed until the return key is pressed or eighty characters (maximum acceptable in this program) have been put in the string.

SORT – This module is called by several subroutines and sorts one record at a time. The number of the record to be sorted must be specified in the variable P before using GOSUB 2000.

The title sort is performed first and this begins by calling up an internal subroutine to determine if the title starts with an article ('a', 'an', or 'the') so that this can be ignored in the sort. A binary chop search is then carried out to find the correct place in the title index for the item taking care to cater for identical titles by subsorting these by author. If both title and author are identical (i.e. two copies of the same

book) the second entered is placed after the first. Three or more copies of a book are treated in the same way.

This takes place very quickly indeed. It is the next step that can take time. Once we know where to put the item in order, we must insert it. For example, we may have an index that looks like this:

index	record number	title
T%(1)	2	The Naughtiest Girl In The School
T%(2)	5	Naughty Amelia Jane!
T%(3)	1	The Ragamuffin Mystery
T%(4)	4	The Six Bad Boys
T%(5)	3	Those dreadful children

We do our search and find that our new item (the sixth to be added to the database) should now come third in title order. We cannot simply place a six in T%(3) because there is already something there so what is in T%(3) now must go to T%(4) which must be transferred to T%(5). This final record number is put in the new element T%(6). The outcome should be:

T%(1)	2	The Naughtiest Girl In The School
T%(2)	5	Naughty Amelia Jane!
T%(3)	6	The Put-em-rights
T%(4)	1	The Ragamuffin Mystery
T%(5)	4	The Six Bad Boys
T%(6)	3	Those Dreadful Children

The easiest way to accomplish this is to work from the highest number down to the place where the new entry is to be inserted. A FOR/NEXT loop with a negative STEP does this nicely. The sequence of events is:

```
T%(6)=T%(5)
T%(5)=T%(4)
T%(4)=T%(3)
```

The number six can now be put into T%(3) and the business is ended.

In a large database with hundreds of entries this can take enough time to be noticeable. There are a number of strategies which can be used to cope with this. Unfortunately, these tend to involve using extra money; this is fine in computers with large internal memories but even the Plus/4 is niggardly compared to the types of computers which use these procedures. Another strategy would be to use machine code but I prefer to stick to BASIC so that my programs can be understood and changed when necessary by ordinary mortals. The delays involved are never more than a few seconds in any event.

The author sort is similar but a bit less complicated because there is no need to take account of initial articles. There are far more instances of books with the same author than books with the same title so the subarrangement, this time by title, is especially important.

The author index is then updated. I noted in my last article that the delay after entering a record could be cut down by putting on books in author order. This is because the time taken to amend the author index is shortened. Since the update works from the end of the list back to the place where the new item is to be inserted, an item near the end of the sequence is more quickly processed than one at the beginning. By putting books on the database in alphabetical order, each new addition is the last (or nearly the last if you don't worry about the title order of the author's works – and it does not save enough time to be worth doing this).

DISPLAY – Showing selected records on the screen is a relatively simple task. The order desired is selected and the appropriate sort index is then used. A range of numbers is employed to indicate the first and the last record to be shown. In the case of a complete listing this will go from one to the total number of records on the file; in other cases the search module will establish the range.

An internal subroutine is called up if a field is longer than a screen line. This will divide up a string into groups of words that will fit on single lines so that no word is split.

PRINT-OUT – This works in a very similar way to the display module except that a file is opened to the printer. A heading is put at the head of the list in enhanced printing.

When a page is full or the end of the print-out is reached, an internal subroutine advances the paper to the start of the next page.

LOAD FILE – Reading a file into the computer first requires an indication of whether a tape or disk is being used. An OPEN statement is then employed to establish a link with the chosen device. Notice that pauses have been built into the sequence to allow the user time to prepare for the operation and that an opportunity is given to 'bail out' and return to the main menu before anything is done.

Each record is then read field by field. In the disk version the error channel is checked repeatedly.

The number of records on the file is also established in this operation.

SAVE FILE – This is the reverse of the load module and there are a number of similarities. It is absolutely essential that records and fields are loaded and saved in exactly the same sequence. Remember this if you add any fields to the database.

Because both loading and saving take some time, it is a good idea to put something on the screen to show that something is happening and how quickly things are going. I usually put a descriptive message (e.g. 'SAVING') together with the record count.

Continued overleaf

Continued from previous page

SEARCH – In common with several of the other modules, this begins with a menu. There are at least two and can be four or five search types to be selected from. Once this selection is made, the user is asked to specify what is to be searched for. The program operation then jumps to a subroutine to do the actual search. If the search retrieves any records they are shown on the screen (using the display module) and the option is given to print them out (using the print-out module) with a heading.

There are basically two categories of searches: binary chop and sequential.

Binary chop searches are faster and use the sort indexes. They use the same procedure found in the sort module to find the place in the sort index for a new record. The mid-point in the range is checked. If the search string comes earlier in the alphabet then the lower half becomes the new range and the mid-point of this is checked. If the search string comes later in the alphabet the top half is used instead. This process continues with each check halving the size of the range until a match is found or there is nothing more to be checked.

If a match is encountered, a check is made to determine if the record below it also matches. If so the search continues until the lowest matching record is found. Then a check is made to find the highest matching record. Thus a new range is established containing all records which meet the search criteria.

Only authors and titles can be searched in this fashion because only they are blessed with sort indexes. Furthermore, titles must be searched from their beginnings (although initial articles can be ignored as usual).

The second category of search (only used on the Commodore 16 and Plus/4) looks at each record in turn and checks through the appropriate field for a match (which can be anywhere – not just the beginning). Should a hit be made, the record is displayed on the screen and the hunt continues.

The powerful but somewhat unheralded INSTR function in BASIC 3.5 is used for this. This function returns the starting position of a string found in another string. In my program it is used like this:

```
K = INSTR(T$(T),D$)
```

A FOR/NEXT loop is used so that each title in T$() is checked for the search string stored in D$. The titles are searched in author order (using the author index to generate record numbers in the correct sequence) and each time the keyword is found (i.e. K equals something other than zero), a subroutine is used to determine if a word has actually been found or if a false drop has occurred because of a chance sequence of letters within another word. To illustrate this, we will examine what happens in a sample search:

Step 1. Each title is checked:

D$ = "MAN"

T	T$(T)	K
3	THE ANDROMEDA STRAIN	0
1	THE BICENTENNIAL MAN	18
10	FIRST LENSMAN	11
8	GLORY ROAD	0
11	THE INVISIBLE MAN	15
12	THE MAN FROM BEYOND	5
5	NECROMANCER	6
2	NINE TOMORROWS	0
6	REBEL IN TIME	0
7	STAR BEAST	0
9	STARMAN JONES	5
4	THE TERMINAL MAN	14
13	WANDERERS OF TIME	0

Step 2. Each item with K not equal to zero is checked to determine if the character before the keyword string is a space (or if it is the beginning of the title) or another letter. If accepted an entry is made in the print-list.

T	T$(T)	ACCEPT?	R	K%(R)
1	THE BICENTENNIAL MAN	YES	1	2
10	FIRST LENSMAN	NO	–	–
11	THE INVISIBLE MAN	YES	3	5
12	THE MAN FROM BEYOND	YES	4	6
5	NECROMANCER	NO	–	–
9	STARMAN JONES	NO	–	–
4	THE TERMINAL MAN	YES	2	12

Step 3. The resulting records are displayed on the screen:

ASIMOV, ISAAC
THE BICENTENNIAL MAN

CRICHTON, MICHAEL
THE TERMINAL MAN

WELLS, H G
THE INVISIBLE MAN

WYNDHAM, JOHN
THE MAN FROM BEYOND

Each of these steps is carried out for each record until it is eliminated from consideration or printed on the screen. Although the time taken for this type of search is much longer than for an indexed search using the binary chop method, this is not particularly noticeable because the records are displayed as they are found in this method and the search goes on as the user reads.

Once all records have been searched, the print-list can be used if a print-out of the result is requested. To save memory, the array holding this was only made a fifth of the size of the maximum number of possible records. I have always found this adequate but it can be changed (by altering line 30) if a particular application often leads to search results greater than this.

MODIFY – It is sometimes necessary to change details that have been put on the database – usually because of a typing mistake during entry.

To establish records to be modified, the search module is called up and each item by the author indicated is displayed. New entries can then be made for each field.

If the author or title are changed, the existing index entries pointing to the record are found and deleted in an operation that causes a bit of delay. Then the sort routine is used to enter new index entries.

DELETE – It is important to be able to remove records when they are no longer wanted. This module establishes the items to be considered with an author search and gives the user the option to keep or remove each item. If deleted, the record is obliterated by replacing it with the details of the last book put on the system. The index entries are updated to reflect the changes made and the number of records on the system is reduced by one (thus the last record, which has now been duplicated with a lower record number, is treated as nonexistent and will be ignored until overwritten).

REDEFINE CHARACTERS – One of the problems which most exercised my mind was deciding upon the best method to include commas, colons, and quotation marks in entries for authors and titles.

These characters all cause some problems at input but this can be easily circumvented (at least for commas and colons) by using a technique to put the entry on using quote mode. The real problem is disk storage: commas are treated as separators and it is not possible to use INPUT# to reliably read a file with data containing inbedded commas. GET# can be used but it is painfully slow.

The method I chose to handle this was to redefine the character set. The creation of this is described in the programming notes for the Plus/4 in the first of this series of articles. Memory limitations make this solution impractical for other computers so you can forget about commas or colons on them.

The new character set has things that look like these punctuation marks but which actually are the equals sign, greater than symbol, the less than symbol. The get string module catches any keystrokes for the prohibited punctuation marks and substitutes their look-alikes.

ERROR TRAP – This routine comes into play whenever an error is encountered. It is essential on the Plus/4 to ensure that the computer is extricated from the redefined character set by directing the program to the END subroutine.

In fact, this module could be developed to correct common errors and resume operation where the error was encountered.

CHANGING THE PROGRAM

It is relatively easy to make versions of this program to cater for different categories of books. I use four versions of the program on my Plus/4 and as soon as I finish writing this article, I intend to work on a fifth.

In general, the best approach to make is to write down the features you want and then to examine each module in the program to determine what changes need to be made.

Sometimes changes can be made very simply indeed. For example, to get the maximum number of records on my Plus/4, I use the Commodore 16 version and alter line 30 to set F to 1200. This means that I am limited to the facilities of the Commodore 16 program (e.g. no listing in title order) but that I can enter more than twice as many books on one file.

Other modifications are more complex. For history books, I have added a pair of date fields. One is for the earliest year covered and the other for the latest. I can search and get a list of all history books covering a particular year. One way or another, most major modules had to be changed to allow this.

Don't forget that adding extra fields will reduce the number of items that you can have on the database – this is the main reason that I usually restrict myself to author and title on machines with less memory than the Plus/4. Always adjust the value of F in line 30 when you make a change like this. Otherwise you will waste memory by dimensioning arrays that can never be filled.

If you want to add a field to an existing file, it is useful to have a conversion program. This has all the new changes except for the load module (which must be unchanged so that the old file can be loaded). I then put a conversion module starting at line 9000 which either 1) displays each record and allows me to enter the new field, or 2) automatically puts something into the new field. The file is then saved and can be used with the new version of the program. Change the load module and delete the module starting at line 9000.

QUERIES

I am quite happy to attempt answering any questions readers may have about the Home Library program. Address your letters to: Bob Hoffman, C/- Kim Books, 82 Alexander St., Crows Nest NSW 2065

EPROM PROGRAMMER

Adapting the Microbee Eprom Programmer for the VIC & C64

by Paul Markowski

Well as promised in the last issue, here is the software to enable the Microbee EPROM Programmer to be used with the Commodore 64. The software performs exactly the same as that provided for the VIC, so the instructions given in the last issue also apply to the 64. There is one minor modification to the interface between the 64 and the programmer. Because the designers of the 64 wanted the USER PORT to be software compatible with the VIC USER PORT (RS232 interface) and the 64 uses a different interface chip to do the job, some CIA #2 pins have been moved around at the 64 USER PORT. The PC2 pin of the CIA which performs much the same function in the 64 as the CB2 pin of the VIA found in the VIC, comes out on pin 8 of the 64 USER PORT. You must therefore connect pin 8 of the 64 USER PORT to the wire shown in the kit instructions as going to pins 7 and 15 of the Microbee PIO port. I have listed the connections again below so there can be no confusion.

EPROM PROGRAMMER	64 USER PORT
pin 8 (GND)	8N (GND)
pin 7 & 15 (STROBE)	8 (PC2)
pin 13 (FROM R1)	C (PB0)
pin 5 (FROM R2)	D (PB1)
pin 12 (FROM R3)	E (PB2)
pin 4 (FROM R4)	F (PB3)
pin 11 (FROM R5)	H (PB4)
pin 3 (FROM R6)	J (PB5)
pin 10 (FROM R7)	K (PB6)
pin 2 (FROM R8)	L (PB7)

I have also included a diagram of the READ/PROGRAM switch, as there are some modifications required to the connections to overcome random pulses while using the switch, upsetting the EPROM programmer's address generator. This modification applies to both the VIC and 64.

Listing 1 is the pulse measuring program for the 64. Connect the programmer up as follows, with your 12 way connector in the USER PORT (remember to switch off your 64)-

a. connect pin 8 of the USER PORT to the wire shown as going to pins 7 and 15 of the Microbee PIO port

b. connect pin L of the 64 USER PORT to pin 14 of the 16 pin personality socket (see diagram for IC pin numbering). I used a small piece of wire pushed into the socket.

Now turn on your 64 and EPROM programmer and type in Listing 1 and save it. Now run the program and you will be informed if the programming pulse is of the correct duration, too short or too long. If the pulse is too short then you will have to increase the size of capacitor C2 (up to 120nF or 130 nF). If the pulse is too long then C2 will need to be decreased (down to 83nF or 75nF). If the pulse is right then congratulations, you can now type in the rest of the software.

The main software is supplied in two parts. One is a BASIC program to handle the keyboard input and screen display, the other is a BASIC program to generate the machine code portion of the software. Type in listing 2 exactly as it appears and save it. You may have to use the abbreviated keywords for some lines. Now type in Listing 3 and save it. Have your Datasette connected up with a fresh cassette because when you run Listing 3 the machine code will be saved automatically to tape. After running Listing 3 and saving the machine code to tape, turn your 64 off and then on again to reset it.

Now load the BASIC portion and then the machine code portion with the following command LOAD "MACHINE CODE",1,1. Now when you save the program the machine code will be saved right along with the BASIC portion. There is one limitation, you must not modify the BASIC portion of the program as you will corrupt the machine code by doing so. If you want to change the BASIC portion you will have to relocate the machine code higher in memory and change all the SYS commands in the program. The machine code currently lives between $0CE1 and $0EEC (3297 and 3820 decimal). The program sets top of BASIC at 6656 so you should be left with plenty of workspace for programming data. I have used the MONAD monitor in conjunction with this program with no problems. A reminder, it is a good idea to switch the EPROM programmer off when inserting or removing EPROMs. This saves damage to these sensitive chips. The construction instructions given for the VIC also apply to the 64 and the instructions supplied with the kit show how you should use the programmer. I hope you have many hours of fun with your programmer. In future articles we will look at how we can use the EPROMs we have programmed with the VIC and 64. Happy programming!!

LISTING 1

```
5 PRINT "[CLR,WHT]64 PULSE MEASURER": POKE 55,0: POKE 56,
  192'DMOM
10 S=49152:F=49198'CNYB
20 FOR I=S TO F: READ A: POKE I,A: NEXT 'GKDD
30 POKE 49166,0: POKE 49168,36: SYS 49152'DWAF
40 IF PEEK (49198)=67 THEN PRINT "PULSE TO SHORT":
   END 'GKFJ
50 FOR X=1 TO 1000: NEXT : REM WAIT FOR PULSE'FUYJ
60 POKE 49166,0: POKE 49168,43: SYS 49152'DWXI
70 IF PEEK (49198)=72 THEN PRINT "PULSE TO LONG":
   END 'GKEM
80 PRINT "PULSE WITHIN 45 - 55 MILLISECONDS"'BAEN
1000 DATA  72,138, 72,152, 72,169, 0,141, 3,221,173, 1,221,162, 85,
     160'BDCD
1001 DATA  85,202,208,253,136,208,250,173, 1,221, 48, 7,169, 76,141,
     46'BFOF
1002 DATA 192,208, 5,169, 72,141, 46,192,104,168,104,170,104, 96,
     0'BCSF
```

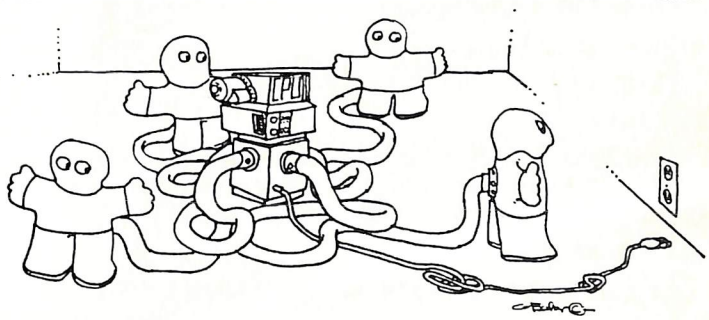
LISTING 2

```
5 POKE 55,0: POKE 56,26: DIM B(4): PRINT "[WHT]"
10 SYS 3314:A=1: PRINT "[CLR]64-PROM BY P MARKOWSKI"'DIZH
15 PRINT "COMMANDS ARE:-"'BALG
20 PRINT "[SPACE7,RVS]1[OFF,SPACE]- PROGRAM"'BAUC
25 PRINT "[SPACE7,RVS]2[OFF,SPACE]- READ"'BAWG
30 PRINT "[SPACE7,RVS]3[OFF,SPACE]- STEP"'BAAD
35 PRINT "[SPACE7,RVS]4[OFF,SPACE]- TEST"'BAFI
40 PRINT "[SPACE7,RVS]5[OFF,SPACE]- VERIFY"'BAGE
45 GET A$: IF A$="" THEN 45'EHQI
50 IF A=1 THEN PRINT "[HOME,SPACE23]"A=0'FEFI
55 ON VAL (A$) GOSUB 100,200,300,400,500'DXOM
60 GOSUB 600: GOTO 15'CGAE
100 GOSUB 600: PRINT "PROGRAM": PRINT "[DOWN]EPROM
    PROGRAMMER SET[SPACE2]TO PROGRAM Y/N?"'DFTK
105 GET A$: IF A$<>"Y" THEN 105'FIRF
110 GOSUB 700: SYS 3484: RETURN 'DJAY
200 GOSUB 600: PRINT "READ": PRINT "[DOWN]EPROM
    PROGRAMMER SET[SPACE2]TO READ Y/N?"'DFVJ
205 GET A$: IF A$<>"Y" THEN 205'FISG
210 GOSUB 700: SYS 3542: RETURN 'DJUA
300 GOSUB 600: PRINT "STEP": PRINT "[DOWN]EPROM
    PROGRAMMER SET[SPACE2]TO READ Y/N?"'DFCK
```

```
305 GET A$: IF A$<>"Y" THEN 305'FITH
310 GOSUB 800: SYS 3597: RETURN 'DJGB
400 GOSUB 600: PRINT "TEST": PRINT "[DOWN]EPROM
    PROGRAMMER SET[SPACE2]TO READ Y/N?"'DFGL
405 GET A$: IF A$<>"Y" THEN 405'FIUI
410 GOSUB 800: SYS 3634: RETURN 'DJXC
500 GOSUB 600: PRINT "VERIFY": PRINT "[DOWN]EPROM
    PROGRAMMER SET[SPACE2]TO READ Y/N?"'DFHM
505 GET A$: IF A$<>"Y" THEN 505'FIVJ
510 GOSUB 700: SYS 3680: RETURN 'DJXD
600 PRINT "[CLR]": SYS 3746: PRINT "[HOME,DOWN]": RETURN
    'EHBE
700 PRINT "START ADDRESS IN HEX": PRINT : INPUT B$: IF LEN
    (B$)<>4 THEN 700'INNO
705 GOSUB 900: POKE 247,(AD-( INT (AD/256))*256):
    POKE 248,( INT (AD/256))'JNMT
710 PRINT "END ADDRESS IN HEX": PRINT : INPUT B$:
    IF LEN (B$)<>4 THEN 710'INKO
715 GOSUB 900: POKE 249,(AD-( INT (AD/256))*256):
    POKE 250,( INT (AD/256)): RETURN 'KOBV
800 PRINT "NUMBER OF BYTES IN HEX": INPUT B$:
    IF LEN (B$)<>4 THEN 800'HMXO
805 GOSUB 900: POKE 247,(AD-( INT (AD/256))*256):
    POKE 248,( INT (AD/256)): RETURN 'KOGV
900 FOR X=1 TO 4'DDWF
905 IF MID$(B$,X,1)<":" THEN SU=48: GOTO 915'GQTP
910 SU=55'BEUF
915 B(X)=ASC ( MID$(B$,X,1))-SU'EQEP
920 NEXT X:AD=4096*B(1)+256*B(2)+16*B(3)+B(4):
    RETURN 'JFCR
```

LISTING 3

```
5 POKE 55,0: POKE 56,128: PRINT "[CLR]LOADING CODE"'DMLL
10 S=32768:F=33291'CNQB
20 FOR I=S TO F: READ A: POKE I,A: NEXT 'GKDD
30 POKE 55,225: POKE 56,12: PRINT "RELOCATING CODE"'DNXH
40 S=32768:F=33291:M=0'DQVF
50 FOR I=S TO F: POKE 3297+M, PEEK (I):M=M+1: NEXT 'JSAK
60 PRINT "SAVING[SPACE,RVS]MACHINE CODE[RVS]": SYS 3762:
   END 'DGXK
1000 DATA 32, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 1, 2, 3, 4, 5'BRBB
1001 DATA 6,72,138,72,152,72,169,8,141,15,221,162,0,169,0,157'BBPE
1002 DATA 0,212,232,224, 25,208,248, 32, 17, 13,104,168,104,170,104,
     96'BGNG
1003 DATA 169, 0,141, 3,221, 96,169,255,141, 3,221, 96,234,234, 32,
     47'BDPG
1004 DATA 13,162, 0,160, 45,202,208,253,136,208,250,234,234, 96,165,
     247'BIBI
1005 DATA 162, 39, 32, 62, 13,165,248, 32, 62, 13,160, 0, 96,141,225,
     12'BCCI
1006 DATA  41, 15,168,185,226, 12,157, 0, 4,169, 1,157, 0,216,202,
     173'BCFJ
1007 DATA 225, 12, 41,240, 74, 74, 74, 74,168,185,226, 12,157, 0, 4,
     169'BCXK
1008 DATA 1,157,0,216,202,96,72,169,9,141,5,212,169,15,141,24'BBJL
1009 DATA 212,104,240, 12,169, 18,141, 0,212,169, 11,141, 1,212,208,
     10'BFVM
1010 DATA 169,177,141, 0,212,169, 25,141, 1,212,169, 33,141, 4,212,
     32'BEVE
1011 DATA  29, 13,169, 0,141, 4,212,141, 24,212, 96, 72,138, 72,152,
     72'BCGF
1012 DATA  32, 23, 13,160, 0,165,248,197,250,240, 19,177,247,141, 1,
     221'BFWH
1013 DATA 32,29,13,230,247,208,244,230,248,76,166,13,230,247,177,
     247'BIQI
1014 DATA 141, 1,221, 32, 29, 13,165,247,197,249,144,240, 32, 17, 13,
     104'BFVJ
1015 DATA 168,104,170,104, 96, 72,138, 72,152, 72, 32, 17, 13,160, 0,
     165'BEIJ
1016 DATA 248,197,250,240, 19,173, 1,221,145,247, 32, 47, 13,230,247,
     208'BHHL
1017 DATA 244,230,248, 76,224, 13,230,247,173, 1,221,145,247, 32, 47,
     13'BGYM
1018 DATA 165,247,197,249,144,240,104,168,104,170,104, 96, 72,138,
     72,152'BKQO
1019 DATA  72, 32, 17, 13,165,247,240, 10,173, 1,221, 32, 47, 13,198,
     247'BDFN
1020 DATA 208,246,165,248,240, 5,198,248, 76, 25, 14,104,168,104,170,
     104'BIRG
1021 DATA  96, 72,138, 72,152, 72, 32, 17, 13,165,247,240, 14,173, 1,
     221'BDLG
1022 DATA 201,255,208, 16, 32, 47, 13,198,247,208,242,165,248,240, 10,
     198'BIPI
1023 DATA 248, 76, 62, 14,169,255, 32,103, 13,104,168,104,170,104, 96,
     72'BGKJ
1024 DATA 138, 72,152, 72, 32, 17, 13,160, 0,165,248,197,250,240, 21,
     32'BEDJ
1025 DATA 47, 13,173, 1,221,209,247,208, 29,230,247,208,242,230,248,
     76'BHKL
1026 DATA 106, 14,230,247, 32, 47, 13,173, 1,221,209,247,208, 8,165,
     247'BFDM
1027 DATA 197,249,144,238,240, 5,169,255, 32,103, 13,104,168,104,
     170,104'BJFN
1028 DATA  96, 72,138, 72,152, 72,169, 0, 32,103, 13,104,168,104,170,
     104'BFYO
1029 DATA  96, 72,138, 72,152, 72,169, 8,162, 1,160,255, 32,186,255,
     169'BEKP
1030 DATA  12,162,224,160, 14, 32,189,255,169,225,133,247,169, 12,
     133,248'BJNH
1031 DATA 169,247,162,178,160, 14, 32,216,255,104,168,104,170,104,
     96, 77'BJUI
1032 DATA  65, 67, 72, 73, 78, 69, 32, 67, 79, 68, 69, 32'BKPF
```



THE VIC MAGICIANS APPRENTICE

Michael Spiteri

GEOGRAPHY ON YOUR VIC

Your Vic-20 has two very useful commands – READ and DATA. Using these commands we can program your Vic to play a very educational game.

The game we are going to write is called CAPITALS OF THE WORLD. The player will be given the name of ten countries, with which he/she must find the capitals of. This type of program is very simple to write, and can be ammended to write other types of educational programs, such as quizzes.

Let's start programming!

```
10 PRINT "[CLR]";
```

First line clears the screen.

```
20 FOR I = 1 TO 10
```

Line 20 starts a counter loop, when the program reaches a NEXT I statement, the program will return to this line. It will do this ten times (count FOR I from 1 to 10).

```
30 READ A$
```

Line 30 reads a peice of data from lines 130 to 220.

If you run the program now, you'll get an OUT OF DATA error, because we have not yet added the data lines. (ie. the program is trying to read data from lines that do not exist!)

```
40 PRINT "WHAT IS THE CAPITAL OF ";A$
```

Line 40 asks the player a question. The program would have read the name of the country in line 30, and line 40 would print the question, along with the county. Confused? Line 30 read a country from the data lines, and line 40 printed the country on the screen. Simple!

```
50 INPUT G$
```

Line 50 waits for the player to enter the CAPITAL and then press return.

```
60 READ B$
70 IF G$ = B$ THEN PRINT "CORRECT" : T = T + 1
80 IF G$ <> B$ THEN PRINT "WRONG, IT WAS ";B$
```

Now we're getting into the nitty gritty part.

Line 60 reads the answer from the data lines, and matches it with the answer given by the player. If the answer given by the player (G$) is the same is the correct answer(B$) then the computer will print 'CORRECT'. If the answer given by the player is not the same as the correct answer, then the computer will print 'WRONG' and give the correct solution.

You will aslo notice that on line 70, a new value appears. This is (T), the score counter. Every time the answer is right, (T) will be the same PLUS one. Therefore, T will equal the number of questions the player has got right.

```
90 NEXT I
```

This line tells the program to keep going back to the FOR commands until I = 10.

```
100 PRINT "[CLR]";
```

Line 100 clears the screen again.

```
110 PRINT "YOU SCORED ";T;" OUT OF 10"
```

Line 110 prints (T), the player's score.

```
120 END
```

Line 120 ends the program. Although this is where the actual program stops running, we still have to put the DATA statements. DATA statements are like REMS, they can be put anywhere in a program, and will not effect the running. We could put a DATA statement at line 15, or line 60.....it would not matter.

It makes the program easier to understand and follow if all of the DATA lines are at the end of the program.

```
130 DATA "AUSTRIA","VIENNA"
```

country solution

Line 30 would have read the name of the country, and line 60 would have read the solution, then it would go onto the next line of data.

```
140 DATA "BELGIUM","BRUSSELS"
150 DATA "BRAZIL","BRASILIA"
160 DATA "CANADA","OTTAWA"
170 DATA "GREECE","ATHENS"
180 DATA "ITALY","ROME"
190 DATA "SPAIN","MADRID"
200 DATA "U.S.A","WASHINGTON"
210 DATA "JAPAN","TOKYO"
220 DATA "IRELAND","DUBLIN"
```

Now our program is complete. Or is it? It looks very dull. Here are ways of enhancing it:

a) Add sound to it. This line makes a little beep:

```
POKE36878,10 : POKE 36876,249 : FOR S = 1 TO 2000 : NEXT S:
  POKE 36876,0
```

b) Add more capitals! Change line 20 and 110 to the suitable number of capitals. For example, if you added ten more countries, line 20 would read:

```
20 FOR I = 1 TO 20
```

Don't forget to add more data lines!

c) How about messages on the screen, more colours, etc.

There are many ways of enhancing such a simple program – why don't you try it!

That's it for this issue, happy programming!

PRINTER CHECKER

By Bryan Whelan

A recent edition of the Commodore Magazine gave a nice little routine to check to see if the printer is turned on. Here is a slightly improved version which should work for both 1515 and 802 printers. Put it at the end of your program and simply GOSUB 10000 to it:

```
10000 REM PRINTER ON CHECK'BOXU
10005 OPEN 4,4: PRINT#4'CFGX
10010 PRINT#4: IF ST=-128 THEN PRINT "TURN ON PRINTER":
      GOTO 10015'HNDD
10012 CLOSE 4: RETURN 'CCFU
10015 PRINT "PRESS <RETURN> WHEN PRINTER IS ON"'BACA
10017 GET A$: IF A$="" THEN 10017'EKED
10018 PRINT#4: IF ST=-128 THEN PRINT "IT'S STILL NOT ON!":
      GOTO 10015'HNEF
10020 PRINT#4: CLOSE 4'CDRT
10025 RETURN 'BAQX
10030 RETURN 'BAQT
```

Adventure Help

Michael Spiteri

Welcome once again to the Adventure Help page. I'll try to help anyone stuck in an adventure game, so write in if you have problems. Also write in if you have tips. The address is

Adventure Help
Commodore Magazine
82 Alexander St Crows Nest NSW 2065

I seem to get em all the time! Letters from troubles ZORKer's! I should have a ZORKer of the Month section. This months ZORKer is Narain, from parts unknown. This ZORKer has scored 300 out of 350, yet asks for help for the following questions:

a) How do you get the platinum bar? (A.Lister had the same problems a few weeks back. Does anyone know the solution?)

b) What is the significance of the chirping of a songbird?

c) What are the brass bell and the broken timber used for?

If you can help Narain, write in soon!

Courtney Babb is having problems with closing compound doors in Wargames. Here we have a clever red herring! Nobody can get through the closing doors! There is another entry via an air vent! Remove the grill, tie the cable to a tree, get the bar, break a lock on a machinery room door – and go on from there!

I'll also reprint a valuable clue for Courtney, who is stuck in a certain goblin dungeon in a certain game called 'The Hobbit':

After you have got one of the characters to CARRY you through the window, go the following directions: sw, d, n, se, e.

Kevin Ferguson sent in some valuable tips last month, here are the rest of them:

BASTOW MANOR: Once you are over the pit, open the toolbox and collect the crowbar. Go back to the room with the small box and remove the beam from the door. Before going through that door, make sure the ladder has been placed outside the window. You must also have the apple, the small box and the letter. Next issue I'll print the combination to the chest!

WARGAMES(C64): Once inside the machinery room, look at the machinery TWICE. Turn the wheel and UNDO the nut on top of the bin which holds a torch. The rest is up to you!

AZTEC TOMB: After scaring the elephant (using the mouse), make your way to the harbour. Take the boat to a small island, where you'll find a life jacket.

Clues for cool games:

WITNESS
Want some clues? Ask DUFFY for help whenever in trouble!

HITCH HIKERS GUIDE
Having trouble with a screen door? I'm not going to give this clue away to easily. Think of your inventory! NO TEA! Try and get yourself some!

ADVENTURELAND
Build a DAM at a hot lava stream. Don't try and get the treasure before you soak it from cold water!

VOODOO CASTLE
A small shovel, a grave and a jail cell – all red herrings!

TAREK
A lot happens on level three but all in not as it seems!

That's it for this issue, don't forget to write when in trouble!

ED – Hot tip Michael is about to publish his second book. This time on adventure gamming (I didn't say a word! did I?)

SNIPPETS

Paul Blair

My mail is an odd collection of household and computing items, all faithfully delivered by a big helmet on a red bike, with a cheery postie somewhere between the two. The bills I try to pay, the letters get answers, and by and large we get along.

Paul's Help Billy Campaign

Some letters are pleasant, some abusive (they go straight into the waste paper basket), some beggar description because I can't figure out the name, address, topic or all three. Some strike a very responsive chord, and a recent epistle from a lad named Billy Marano did just that.

Billy's letter went half way 'round Australia before ending up with me. He had latched onto a non-existent address, but Australia Post came through again!!

Billy is 14 years old, and lives at 56 Delman Avenue, Glen Rock, New Jersey, 07952, in the USA. He is looking for a soul mate with whom to swap letters and (need I say it?) software. He seems to have a goodly pile of various swappable programs.

There is one hitch. He has not been getting good Biology grades lately, so I have written telling him that I would put out a call for help from our readers. But that will come to a halt unless.....

Billy also wrote on the bottom of his letter "Please send a picture of what it's like down there in Australia".

Over to you. How about a couple of you writing to Billy, with a photo or two of where you live or something else that would be interesting to him. He certainly would appreciate it. I would. Wouldn't you?

MPS803 PRINTER

If the demand for replacement printer chips is any indication, there are a lot of CBM printers in service out there, and a big heap of the owners want a better character font than the one that comes built in.

The most recent example is the MPS803, a handy, robust and fairly useful plug in and use printer that (sort of) replaces the MPS801. But, once again, we have the sad situation of some lower case letters (q, y, p, g, j) that sit above the line. The result is that any document using lower case characters that is printed on the MPS803 looks like a dog's breakfast.

Why not redo the chip, as we have done before? Well, thanks to Steve's here in Canberra, I had a look around inside an 803 – only to find that the chip is a 64 legged monster, firmly soldered in, and not a hope in hell of reading it or replacing it. So that's that.

Or is it? This sort of thing makes me cranky, so here is an offer/challenge to Commodore ...are you there, Nigel? I will redesign the character set for you, so you can send the information across to the manufacturer of the original chip, and we can all enjoy your printer. How about it? If you want to support me, write to Commodore (Private Bag 7, Lane Cove NSW 2066) and mark your envelope "MPS803".

VIATEL

Greg Perry, Cultural Attache from the Banana Republic, has been helping me (and you) with nice stories about telecomputing. I have on loan a modem from MICROTEX in Melbourne, who are running Club 666, as a service provider for us computerists. Thanks to them, I'm now enjoying electronic mail and an increased phone bill. I plan to tell you of my experiences, which vary from satisfaction to mistrust. However, as long as MICROTEX trusts me with this doover, I'm on air. You can send me a note on 628835840 for only 5 cents (plus a phone call, plus a service fee, plus....).

While on the subject, spare a moment's sympathy for Mr Brown, who works for Telecom. Like all new enterprises, Telecom is having one or two start-up problems, not the least of which is in the accounts department. Sadly for Mr B, his phone number in Sydney is given as the contact point for enquirers. I hope for the sake of his health, his company stops sending out accounts the day AFTER they are due, and quits sending reminders of non-payment to payees. In the meantime, resist the urge to blast Mr B out of his socks. It ain't his fault.

SUPERBASE NOTES

Paul Blair

This is the second column for Superbase users. I can't say that I have been overwhelmed with brilliant routines...come to that, no one has done anything. Come on you lot, get cracking. Without you there will be no column, the Editor will have hysterics, and I'll have to find something else to write about. My creditors depend on you!!!

In the meantime, as they say, I have been having a problem or two of my own with SB. So sit back....

EXPORT

When EXPORT is used to throw a sequential file to disk, you may strike some problems reading the file back in a sensible manner.

Recently, I dumped a file with EXPORT. Each record had 10 fields, and fields 8 and 9 were date fields. In many of my records, field 8 contained nothing – it was a blank.

After EXPORT, I wrote a short program to read back all 10 fields per record, planning to format them up in a special way for the printer. But I found that reading fields in batches of 10 went awry. Some records had less than 10 fields, or so it seemed.

Checking the actual file as it was written on my disk, I saw the problem. SB, when writing each field, sends a carriage retuen (CR) after each one. But if the field is empty, it just sends a CR. So, on the disk I had:

Field 7: GARRAN ACT(CR)
Field 8: (CR)
Field 9: 30788(CR)

as part of one record. I had been using the INPUT# statement to dig the fields from disk. When it got to Field 7, it worked it out OK. But because CR is used to signify the end of INPUT#, Basic thinks there is NO Field 8, and trots on to read Field 9, leaving you with a bit of a tangle.

Rather irritated by this, I decided to read the Manual (the last resort, of course!). I could have altered my EXPORT statement to try and cope with blank fields, but a short trial run was not satisfactory. Although I fixed the blank field problem, I created another with the non-blank fields. Good try, Paul.

So I figured on a change of attack. I would use GET# and test each incoming character. If it was acceptable, use it to build up a string for each field. If I got a CR and the string had no characters at all, then I had found my blank fields. Pop in a character (a space, for example), and all would be well.

Here's how I did it.

```
100 REM: SUPERBASE EXPORT FILES
110 REM: PROGRAM TO FILL BLANK
    FIELDS
120 REM: PAUL BLAIR AUG85
130 REM:
140 OPEN2,8,2,"FILENAME,S,R"
150 OPEN3,8,3,"0:NEWNAME,S,W"
160 CR$=CHR$(13):REM CR
170 ZZ$="":REM SET NULL STRING
180 GET#2,A$:M=ST
190 IFA$=CR$ANDLEN(ZZ$)=0THEN
    ZZ$="#":GOTO220
200 IFA$=CR$THEN220:REM END OF LINE
210 ZZ$=ZZ$+A$:IFM=0THEN180
220 PRINTZZ$:PRINT#3,ZZ$CR$;
230 IFM=0THEN170:REM MORE TO DO
240 CLOSE2:CLOSE3
```

Line 190 finds CR's for me. If no string, make one (the example uses "#") and go on. If there is a string already (LEN>0), then compound the new string (ZZ$ in Line 210) and continue.

In the example, I have opened files to read (Line 140) the old file and write (Line 150) a new file to grab the results. Line 220 shows you what is happening, and also writes out the new field.

If your file is large, expect some delays from garbage collections, because the program uses a lot of strings.

Now, where's them letters???

SWEET SIXTEEN

Michael Spiteri

Welcome to another column dedicated to all those lonely Commodore 16/+4 owners out their. Another old Vic program is revamped for you to type out. This program displays on the screens (a) a chart and (b) a colour graph. You can use the program to graph anything, whether it be sales figures, golf handicaps, etc. It is very simple to use. First you have to tell the program whether the figures you will enter are in UNITS, TENS, HUNDREDS or THOUSANDS. Then you enter the name of each item and then the matching figures. When you press a key a chart will appear on the screen, and then the colour graph. Simple!!

```
5 REM ###PRODUCT GRAPH###
10 FA$="[CLR,BLU]PRODUCT GRAPH.": COLOR 0,9: PRINT F$
15 PRINT FA$
20 PRINT "[DOWN2]ENTER UNIT OF SALES:"
25 PRINT "[DOWN,RED]UNITS[SPACE4]HUNDREDS":
   PRINT "[DOWN]THOUSANDS[SPACE4]MILLIONS"
30 INPUT U$
35 PRINT FA$: PRINT "[DOWN]ENTER EACH PRODUCT(10)"
40 INPUT "1)";A$: INPUT "2)";B$
45 INPUT "3)";C$: INPUT "4)";D$: INPUT "5)";E$
50 INPUT "6)";F$: INPUT "7)";G$: INPUT "8)";H$
55 INPUT "9)";I$: INPUT "10)";J$
60 PRINT FA$: PRINT "[DOWN2]ENTER SALES FIGURES OF":
   PRINT "EACH PRODUCT:"
65 PRINT "[DOWN2]NO. OF ";U$
70 PRINT "1)";A$;: INPUT A
75 PRINT "2)";B$;: INPUT B
80 PRINT "3)";C$;: INPUT C
85 PRINT "4)";D$;: INPUT D
90 PRINT "5)";E$;: INPUT E
95 PRINT "6)";F$;: INPUT F
100 PRINT "7)";G$;: INPUT G
105 PRINT "8)";H$;: INPUT H
110 PRINT "9)";I$;: INPUT I
115 PRINT "10)";J$;: INPUT J
120 PRINT FA$: PRINT "[DOWN]ITEM[SPACE2]SALES("U$")"
125 PRINT "[DOWN]";A$,A: PRINT B$,B: PRINT C$,C: PRINT D$,D:
   PRINT E$,E
130 PRINT F$,F: PRINT G$,G: PRINT H$,H: PRINT I$,I: PRINT J$,J
135 PRINT "[DOWN]HIT A KEY FOR GRAPH!"
140 GET Z$: IF Z$="" THEN 140
145 PRINT FA$
150 PRINT "[HOME,DOWN2]ITEM"
155 PRINT "[HOME,OFF,DOWN4,RIGHT,BLU]1)[SPACE,<W>]";:
   FOR I=1 TO A: PRINT "[RVS,RED,SPACE]";: NEXT
160 PRINT "[HOME,OFF,DOWN5,RIGHT,BLU]2)[SPACE,<W>]";:
   FOR I=1 TO B: PRINT "[RVS,BLU,SPACE]";: NEXT
165 PRINT "[HOME,OFF,DOWN6,RIGHT,BLU]3)[SPACE,<W>]";:
   FOR I=1 TO C: PRINT "[RVS,GRN,SPACE]";: NEXT
170 PRINT "[HOME,OFF,DOWN7,RIGHT,BLU]4)[SPACE,<W>]";:
   FOR I=1 TO D: PRINT "[RVS,PUR,SPACE]";: NEXT
175 PRINT "[HOME,OFF,DOWN8,RIGHT,BLU]5)[SPACE,<W>]";:
   FOR I=1 TO E: PRINT "[RVS,YEL,SPACE]";: NEXT
180 PRINT "[HOME,OFF,DOWN9,RIGHT,BLU]6)[SPACE,<W>]";:
   FOR I=1 TO F: PRINT "[RVS,CYN,SPACE]";: NEXT
185 PRINT "[HOME,OFF,DOWN10,RIGHT,BLU]7)[SPACE,<W>]";:
   FOR I=1 TO G: PRINT "[RVSBLK,SPACE]";: NEXT
190 PRINT "[HOME,OFF,DOWN11,RIGHT,BLU]8)[SPACE,<W>]";:
   FOR I=1 TO H: PRINT "[RVS,GRN,SPACE]";: NEXT
195 PRINT "[HOME,OFF,DOWN12,RIGHT,BLU]9)[SPACE,<W>]";:
   FOR I=1 TO I: PRINT "[RVS,BLU,SPACE]";: NEXT
200 PRINT "[HOME,OFF,DOWN13,RIGHT,BLU]10[SPACE,<W>]";:
   FOR I=1 TO J: PRINT "[RVS,RED,SPACE]";: NEXT
205 PRINT "[HOME,OFF,DOWN14,RIGHT4,BLU,PPPPPPPPPPPPPP
   PPPP]"
210 PRINT "[RIGHT4]0 1 2 3 4 5 6 7 8 "
215 PRINT "[DOWN,RIGHT9]";U$
220 PRINT "[DOWN]HIT A KEY TO END"
225 GET Z$: IF Z$="" THEN 225
230 PRINT "[DOWN]BYE!": END
```

1541 DISK DRIVE MANUAL

Paul Blair

The manual that came with my 1541 disk drive was no different from anyonelse's – and it took me only a few moments to realise that the book had been prepared by Commodore's famous Obscure Writing Department. I have become used to atrocious manuals, and had enough experience with disk drives to work it out for myself, but I did pause to consider how people starting out for the first time with a disk drive would manage.

So, it seemed, did others. Commodore, to their eternal credit, heeded the mutterings and approached Jim and Ellen Strasma to rewrite the manual. Now, if you don't know, the Strasmas are a remarkable couple, highly skilled in Commodore computers, and (bless them) literate. As of about now, all new drives delivered in Australia should contain the revised manual.

What about those of us having the old manual? Can we get a copy of the new one? I don't know, and I could imagine that Commodore Australia are probably uncertain about what to do. On one hand, everyone might want one. On t'other, no one might. So, how about it. If you do want the revised manual (and it's worth having), write to Commodore at 67 Mars Rd, Lane Cove 2066 and tell them. That way, they will at least have an idea of what you, the consumer, wants. The cost to Commodore would be very small, but the good will would be enormous.

'PRINT@' FOR C64 – continued from page 32

```
40 FOR Y=8 TO 18'DEIC
50 PRINT @10,Y"[<L>]""BFRD
60 PRINT @30,Y"[<J>]": NEXT 'CGAF
70 PRINT @16,6"NEW MEMBER""BFIH
80 PRINT @12,10"SURNAME""BGJH
90 PRINT @12,12"INITIALS""BGWJ
100 PRINT @12,14"STREET""BGTX
110 PRINT @12,16"SUBURB""BGRY
120 INPUT @19,10A$'BIHY
130 INPUT @20,12B$'BICA
140 INPUT @18,14C$'BIMB
150 INPUT @18,16D$'BIPC
160 GOTO 160'BDGC
165 :'ABHG
50000 N=828'BELV
0010 READ D: IF D=-1 THEN 50040'FJCB
0020 POKE N,D:N=N+1: GOTO 50010'ENMC
0030 DATA 169,76,133,115,169,73,133,116'BERE
0031 DATA 169,3,133,117,96,32,90,3,160'BDLE
0032 DATA 0,177,122,201,64,208,3,76,97'BDMF
0033 DATA 3,76,121,0,230,122,208,2,230'BDJA
0034 DATA 123,96,32,155,183,134,251,32'BDLB
0035 DATA 155,183,134,252,166,252,224'BCRC
0036 DATA 25,176,9,164,251,24,32,240'BBLD
0037 DATA 255,76,121,0,32,72,178,-1'BAEE
0040 SYS 828: RETURN 'CEIB
```

LISTING 2

```
50000 N=828'BELV
0010 READ D: IF D=-1 THEN END 'GELA
0020 POKE N,D:N=N+1: GOTO 50010'ENMC
0030 DATA 169,76,133,115,169,73,133,116'BERE
0031 DATA 169,3,133,117,96,32,90,3,160'BDLE
0032 DATA 0,177,122,201,64,208,3,76,97'BDMF
0033 DATA 3,76,121,0,230,122,208,2,230'BDJA
0034 DATA 123,96,32,155,183,134,251,32'BDLB
0035 DATA 155,183,134,252,166,252,224'BCRC
0036 DATA 25,176,9,164,251,24,32,240'BBLD
0037 DATA 255,76,121,0,32,72,178'BWWD
0038 DATA 169,230,133,115,169,122,133'BCKF
0039 DATA 116,169,208,133,117,96,-1'BAOG
```

Commodore Telecomputing

Continued from page 27

is switched to ORIGINATE while the receiving modem is set to ANSWER. The actual settings are irrelevant providing that both modems are switched to complementary settings. If both are set to ANSWER, for example, communication is not possible.

The cheaper modems transmit data at a single speed. This is normally expressed as the BAUD rate, or number of bits per second. The most common speed is 300 baud roughly 30 characters per second which equates to approximately 200 words per minute. Most BBSs operate at this speed. (But a character or byte is only 8-bits long, why are 10-bits used per character? We'll explain later.)

Higher speed modems using 600, 1200 or 2400 baud are slowly coming down in price and therefore increasing in popularity for user to user links. (Since the transmission time is inversly proportional to the baud rate, 1200 baud being four times as fast as 300 baud, the cost of STD is reduced accordingly.) Commercially, 2400-9600 baud rates are used but these generally require a special data lines. Because of its limited bandwidth, the normal telephone lines can only be used for speeds up to 600 baud full-duplex or 1200 baud half-duplex. (Advances in technology do allow higher speeds on phone lines but the costs are out of the reach of all but commercial users. 1200 full duplex modems are still above $1300.00)

The limitation on telephone bandwidth combined with the desire for higher speed communication has led to the development of a slightly different protocol where the main signal is transferred in one direction at 1200 baud and a return signal is transmitted a the slower speed of 75 baud. (However, even 75 baud translates to roughly 50 words a minute which is faster than most people can type!) This is known as 1200 baud half-duplex with a 75 baud 'back channel' or simply 1200/75. It finds its greatest use with information services such as Viatel where the user is predominantly receiving large amounts of data (including screens full of graphics) and sending back only limited control messages.

Types of Modems.

Modems may be connected to the telephone is one of two ways – acoustic coupled or direct-connect.

ACOUSTIC modems have two rubber cups which fit over the telephone handset. Since this type of connection provides electrical isolation from the line, no special permit is required. Acoustic modems are particularly useful when the computer is being continuously moved but are designed for the standard telephone handset and many of the newer handsets will not fit correctly. Since they also suffer from background noise to some extent, they are becomming less popular.

DIRECT-CONNECT modem plugs directly into the wall socket in place of the telephone. Such modems are generally fitted with their own handset allowing the user to dial the number then switch to modem operation. Direct connection is a more reliable method but requires a semi-permanent connection and, legally, both the connection and the modem itself should be approved by Telecom before the connection to the line. (When buying a modem check that it has Telecom approval. It assures that it conforms to Australian conditions.)

The more expensive modems offer extra facilities such as switchable baud rates, auto answer and auto dial and others. Auto answer modems will automatically answer the phone and connect to the computer (provided it is turned on of course!) allowing unattended operation for things such as receiving electronic mail or running a local BBS. Auto dial is the facility where by the modem, combined with the appropriate terminal software, can automatically dial the phone number for you. This can be extremely useful when trying to access a popular BBS or data base. Simply set the program/modem to continuously dial the number until it answers while you put the kettle on or watch TV!

The average price for a no-frills 300 baud modem is of the order of $150-$300, still quite expensive compared to similar U.S. models. Members of some user groups (e.g. CCUGQ) have designed and built 300 baud and 1200/75 – 300 baud direct-connect modems which meets all Telecom standards at a considerably lower price. Unfortunately, only limited quantities are usually available for their own members.

Modem Standards and Protocols.

As with most facits of computing, there are a number of different standards used world-wide for data communications over telephone newtorks. These standards define the electrical characteristics, baud rate(s), and other parameters such as Answer/Originate tonal frequencies. Since the Bell laboratories in the US developed the original systems for data transfer, the most common US standard for low speed modems is known as a Bell 103 or Bell 202 standard. In Australia and Europe, the connections between a terminal and modem are specified in standards from the International Telephone and Telegraph Consultative Committee (CCITT). For example, the commonly used CCITT V.21 standard specifies 300 baud full duplex using two tone pairs of 980/1180 Hz (Originate) and 1650/1850 Hz (Answer). Bell and CCITT modems are not compatible so therefore, unfortunately, the Commodore 1600 and 1650 modems, available cheaply in the U.S., are not suitable for Australian conditions. Other parameters for the terminal program will be delt with later.

Modems are usually designed to be connected to the computer by a 'standard' RS 232 C connection. (In practice, there is no such entity.) Herein lies a problem. Although the C64/VIC advertise an RS 232 as available on the user port, in fact it does not conform to the voltage levels required for the normal RS 232. This specifies signals of +/- 12 Volts whereas the C64/VIC produces only 0-5 Volts (known as TTL levels) on the user port. This problem can be overcome with the purchase of a VIC 1011 RS 232 C interface, but this adds around $50 to the price of the modem. Many modems manufacturers have elimated this problem and direct connection to the user port of the C64 or VIC without the extra interface is now possible. (It is actually cheaper to do it this way!)

A second problem is in the Commodore 64 power supply. Some modems which take thier power from the user port may draw too much power and lead to problems with the C64's power pack at a later date.

Part II of this article will appear next month.

ERRATUM 1

An apology. Due to a Typesetting error, **(i.e. the editor blew it!)** the control sequence for UNDERLINE ON and UNDERLINE OFF on page 35 of Issue 30 was shown incorrectly. The correct sequences are:

UNDERLINE ON F1//+

UNDERLINE OFF F1//I

that is, the Function 1 key with either the left or right hand square bracket (the shifted colon and semi-colon keys). OK make a note of that.

– Paul Blair

ERRATUM 2

In his review of "PRINT SHOP" page 15 Issue 30, Michael Spiteri stated that the program would run on 801/1526 printers. This should have read 801/1525. Unfortunately this caused a little embarrassment to one reader and I apologize.

– Mervyn Beamish

COMMODORE BBSs IN AUSTRALIA

Commodore BBSs in Australia

Set your modem on and software for

300 Baud Originate
Full Duplex
8 data bits or 7 data bits
no parity plus space parity
1 stop bit 1 stop bit

Best Programs to use in order of preference

General access VIP Terminal XL, Term64, Modem64, Xmodem.C
Download/upload (XMODEM protocol recommended)
VIP XL Terminal, Xmodem.c

(Apologies: Contrary to what I have said, MODEM64 WILL NOT DOWNLOAD programs successfully from many BBSs. It adds two extra bytto start of program.It is ok for text files however.)

BOARD	PHONE	HOURS	SYSOP
COMboard	02.664 2334	24Hrs	Graham Lee
RCOM	02.667 1930	24Hrs	Simon Finch
	(Note: requires special terminal prog.)		
Palantir	02.451 6576	24Hrs	Steve Sharp
Sentry	02.428-4687	(2100-0700)	Trev Roydhouse
	02.621.7487	(2100-0700)	Russ Morrison
Scorpio			
Kneeboard	02.629.2230	24Hrs	Phillip Keegan
CCUGQ BBS	07.808 2125	24Hrs	Ray King
Illawarra C64	042.84 5224	24Hrs	?????

Education

The Goulburn Education Centre runs a COMboard BBS system with restricted access available for approved educational institutons. Schools and educationalists should contact Dr Geoff Bird on 048.212704 (voice only, office hours).

The Rest

Victoria

MICOM	03.762 5088
IBM BBS	03.528 3750
TARDIS	03.677 760
SORCERER UGBBS	03.836 4616
SORCERER CBBS	03.434 3529
MELBOURNE PC CONNECTION	03.528 3750
OMEN IV	03.846 4034
HI SOFT	03.799 2001
COMPUTERS GALORE	03.561 8497
EAST RINGWOOD RCPM	03.870 4623
HIGH TECHNOLOGY	03.596 2340
GIPPSLAND RCPM	051.34 1563
MAILBUS	051.27 7245

New South Wales

MICRO DESIGN	02.663 0150
MI COMPUTER CLUB	02.662 1686
SYDNEY PUBLIC ACCESS	02.808 3536
PROPHET	02.628 7030
AUGABBS	02.955 377
CLUB 80	02.332 2494
OMEN I	02.498 2495
ORACLE	02.960 3641
PARIS RADIO	02.344 9511
DICK SMITH	02.887 2276
SORCERER USERS GROUP	02.387 4439
AUSBORNE USERS GROUP	02.568 2791
TEXPAC	02.560 0926
DATE	02.550 1004
NEWCASTLE MICRO CLUB	049.68 3585

ACT

RBBS-RCPM	062.888 318
MICSIC	062.866 334

BRISBANE/DARWIN/ADELAIDE/PERTH

TIBUG	07.263 6161
SOFTWARE TOOLS	07.378 9530 (1200 v22 only)
MUG BBS	08.271 2043
COMPUTER VENTURES	08.255 1946
RCPM	089.277 111
OMEN II	089.274 454
RCPM	09.367 6068
RMPM	09.381 6070
OMEN III	09.279 8555

Videotex

Telecom's Viatel 01955

Commercial Data Bases

Teledata (TAB)
Direct 03.8133522 (300 baud)
03.8133733 (videotex 1200/75)
Via AUSTPAC 01921 (300 baud)
01922 (1200 v22)
01923 (videotex 1200/75)

Teledata access via AUSTPAC
Dial 01921 (or other) on message enter
?23822100 <return>
Visitor Access mode user name VISITOR
password VISITOR

COSTS

Commercial membership	$150.00 + $5.00/month
Home/Student membership	$50.00 + $2.00/month
Online Charges	$5.00-$13.00 depending on t.o.d.
Austpac Charges	$4.95-$5.95 depending on t.o.d.

For information Contact:
Teledata Pty Ltd
24 Camberwell Rd
Hawthorne East VIC 3123
Phone voice only 03 8131133

STARS (Scholastic Text And Retrieval System)
Costs Registration $49.95
Online $14.00/hr

For information contact:
Computing 2000 Corporation Pty Ltd
44 Hunter Street, Sydney
Phone voice only 235 3859

If anyone has any specific information on these systems or if you know of any other BBS or commercial services which may be of interest to our readers, please drop me a line on Viatel 738329500

Greg Perry/Mike Spiteri 10th August 1985

"Honey, were you saving this for anything special?"

COMMODORE DOCTOR

by Dr. Greg Perry

The aim of this column is to help readers with any problems they have with CBM/PETs, VICs, C64s, Plus 4/C16 and associated Commodore equipment. Send us your queries and we will do our best to provide an intelligent answer.

Alternatively, if you don't have any immediate problems but have discovered some smart tricks in BASIC or machine code, or better ways to program some of our answers/ articles we would be interested to hear from you.

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

OR MAIL them to me on VIATEL to my user number 738329500

Please ensure that any program listings are in NICE LISTER format and include a REM statement with your name and address. (By the time it passes through several hands and reaches me sometimes bits of the letter can have been mislayed. If not, I'm also likely to lose it!) Machine code programs should be in assembler format and not directly in hex.

I apologise for the fact that, in general, letters can not be answered personally. Also, because of printing schedules and other factors, some questions may not appear until two months after they are received.

Comments

Over the last month someone told me of a wonderful patch for the JUMPMAN game. This is still one of my favourite games although I get annoyed at not being able to practice on the higher levels since if you loose seven men the game starts again. The trick is: load the program, type run and check the time, press return and exactly 90 seconds after press the run/stop and restore keys simultaneously. The computer will come up with the usual blue screen. Then enter the following to restart the game.

```
POKE 24015,173: POKE 54296,15: SYS 9*4096
```

What's it do you ask? One very simple thing – the player never looses a man! You always have seven men left even after some of them get killed! A wonderful trick. Like me, you will now be able to play all those more difficult higher levels which used to defeat us.

Question and Answer

Q. My C64 started doing strange things about a month ago. About thirty seconds after I turn on my C64 the cursor starts changing colour. It will go to black, cyan, red and then back to normal and then does it again! Also, if I am working on a program some of the letters that I have typed change colour. It seems like a 'wave' starts from the top of the screen and rolls to the bottom changing the colour of the letters on the screen. The problem is also apparent on commercial software like International Soccer. When the game is first played, three solid white bars appear and scroll along with the graphics, but the second game is ok.

The computer seems to return to normal after about half-an-hour to an hour.

Could it be the 6566 VIC chip playing up?

If so, does Commodore sell it through their sales department. I'm sure I could replace it. By the way the C64 is seven months old.

R. Porrino WESTMEAD

A. Nice one! I'm not quite sure what the problem is. I phoned Commodore's service department in Brisbane for advice and was told they were too busy to talk to me! Admittedly it was Friday afternoon but I am not impressed to say the least. Talking to others, it has been suggested that the problem may be in the VIC chip but could equally be a problem with RAM, the Programmed Logic Array, or even the power supply. (I assume it is not due to your TV.) It would be best to put the C64 into an authorised repair centre for a quote.

With regards to the VIC chip, it used to be possible to buy both the VIC and SID chips from Commodore (about $70 though!). However, a number of people have told me recently that Commodore will now not sell these chips to the public. Other authorised service centres not run by Commodore appear happy to sell these over the counter. (Hills for example.)

Q. My C64 has an annoying fault. After it has been on for about an hour or more and if a cassette deck, CP/M cartridge, or Sendata Modem were plugged in, on turning the computer off and on again it would not reset. I am simply left with a black screen? If I leave the computer off for half-an-hour, all works happily again. The only thing I have noticed is that the power supply gets very hot. The power supply is the black plastic type with a sloping top. Can you shed any light on this problem?

Lester Bennett GREENBANK 4124

A. This sounds like a power supply problem. A number of the earlier black power supplies did have some problems. Commodore have announced a recall of all these power supplies which do NOT bear the G2 label. More specifically, power supplies with serial numbers ending with the digits 53-08 and possibly 53-07 have been recalled because of their high failure rate. These were apparently sold between July and September 1984. If you have one of these and are having problems, contact your local dealer and request a replacement, especially if you are planning to use one of the new modems which draw their power from the C64.

Q. I am enrolled in an computer education course and have been given a Commodore CP/M cartridge so that I may learn CP/M and run different languages on my C64. The cartridge works well on one of my C64s but refuses to work on my new C64 or my friend's new SX64. Can you explain why? Also is there any CP/M software available for the C64 on 1541 disks?

Mary Peters GRAFTON NSW

A. You are not alone in your problem with the Commodore CP/M cartridge. A number of people have found the same problem. At first we thought that the cartridge would not work on revision -03 of the Kernal ROMs in the latest C64s. (A PEEK(65408) will return the value '3' for revision 03 ROMs. Earlier versions return either '0' or '170') After changing ROMs we found that this was not the problem after all. Jim Strasma in the US has suggested that the problem lies in the VIC chip.

Apparently, because of timing changes and improvements in the later revision 08 versions of the VIC chip, CP/M will now not work correctly. The earlier revision 02 or 05 versions work ok. Unfortunately, to find out which VIC chip is used in a C64, one has to open the case and try to read the numbers on the VIC chip itself. If this is a real problem to you, Commodore may be able to replace the revision 08 VIC chip with one of the earlier versions. (However, I am not sure if these are available.)

I am afraid I do not know of any good source of CP/M programs for the C64 in Australia. CCUGQ has a couple of programs and a modem program which allows downloading from many of the RCPM BBSs. Someone in Sydney has a few more but I cannot find out who at the moment.

Competitions

Interesting One Liners. If you have found any interesting one line routines we would like to hear about them. The best routines every month will receive a NSW lottery ticket or equivalent prize.

For example:

```
1 FOR I=0 TO 1 STEP 0: POKE 53280,3:
  POKE 53280,6: NEXT
```

Competition 2

None of the entries for this competition have been successful. As we announced last month, our editor has aggreed that the prize for this competition will jackpot each issue until we receive a correct solution and program. Most entries still are missing the point – find the 'unique' rectangle which satisfies the requirements. By 'unique' I mean one which can be readily distinguished from all others by some critera.

The Problem: Two computer experts, who live on country properties, are having a quiet drink in a country pub. Expert 'A' owns a rectangular 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),

Continued overleaf

Continued from previous page

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 privilege 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 the area and dimensions of the property. (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 one: work out the dimensions and areas of all the rectangles (including squares) with integer sides within a 23 by 23 square, then find which one is uniquely related to the length verses breadth question L>2*B). If two rectangles have the same area, and both have L>2*B then obviously neither can be the unique solution.

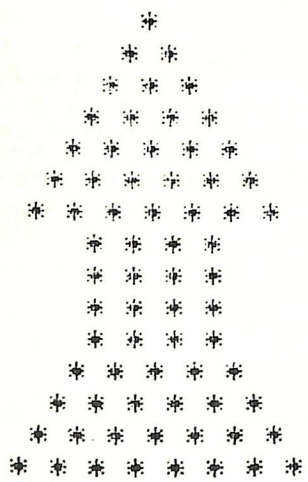
Hint two: For a correct solution to emerge the fact that there may be one or more rectangles which lie along the diagonal and therefore have lengths which are greater than 23.

At present, the winners jackpot has not been claimed for six issues and currently stands at six disks or six C10 cassettes. I will also throw into the pot a copy of my recently published book on Sound and Graphics for the C64.

Good luck!

COMPETITION 3/2

Using PRINT statements containing only one '*', write a program to draw the following pattern on the screen.



The competition will run for the next two issues. The best entry will be judged on skill, brievity, and elegance of the program. It can even be done with a one line program if you are devious.

Competition 4/1. Machine Code.

One small problem I had recently was to calculate a checksum for a program block recieved over an RS232 line and compare it with the received value. The problem stems from this.

Write a program to convert a three digit ASCII number to a single byte hex number. Assume that decimal 159 as its ASCII equivalent is stored in memory starting at location $1000. That is

Loc	Hex	ASCII
$1000 =	$31	= 1
$1001 =	$35	= 5
$1002 =	$39	= 9

The program must convert these values to a single byte hexadecimal value ($9F) which must appear in location 1004. (It must also work for any decimal number 0-255!)

The competition will run for a minimum of two months and the winning entry will be judged purely and simply by cleverness! Specifically, the winning program will be judged on speed of operation. The program should be placed in memory starting at memory location $1005. All entries MUST be as an assembler listing or handwritten. I do not want to sort through a hex dump!

Regards Greg Perry.

HIGH SCORE

HIGH SCORE is for serious games players who thrive on competition. We are publishing the highest known scores of readers for any game on disk, cassette or cartridge on any Commodore machine.

If you have a score that beats the existing record, photograph your screen or get a second person to initial your highscore and send it in. If a game is not listed send in your highest score-you might be the champion.

GALACTIC CROSSFIRE
27,010 Michael Bakes, Tas.
MENAGERIE
6,100 J.H.Fry ACT
MONEY WARS
104,240 D.G.Fry ACT
RADAR RAT RACE
137,540 Tom Spencer, Qld
RAID ON FORT KNOX
13,783 D.G.Fry ACT
SPRITEMAN 64
92,290 Brendon Madden VIC
TRASHMAN
265,765 Mazine Brown,?Aust
VIC FROGGER
225,000 J.H.Fry ACT
FALCON PATROL
95,000 Jeremy Bone, S.A.
SAMMY LIGHTFOOT
54,376 Greg Taylor, Qld
ATTACK OF THE MUTANT CAMELS
52,280 Brendon Madden Vic.
LOCO
100,400 Brendon Madden Vic.

DEFINITIONS

MEMORY
- I've forgotten, **again**

CEREAL BUS
- Double decker corn flake

I/O PORT
- Nice new name for a retirement village

KEYBOARD
Retirement home for keys

BYTES
- The number of things that can and will go wrong with my VIC. (Murphy's Law).

Definitions by Rowan Dean Avalon N.S.W.

Commodore Makes Software For Every Member Of The Family.

Almost.

Commodore make software for people. All kinds of people. Software for fathers, mothers, brothers, sisters, uncles, aunts, nieces, nephews, grandparents and even brothers-in-law who fix cars. Everybody. Software for fun, profit, homework, housework and officework. We do not however, make software for dogs. Yes, we are working on it, but as research in this area is fairly limited, we're calling for all the help we can get. If you have any suggestions please contact your nearest Commodore dealer.

commodore COMPUTER

Keeping up with you.

Contact your nearest Commodore dealer or Commodore Business Machines:
Sydney: (02) 427 4888 Melbourne: (03) 429 9855 Brisbane: (07) 393 0300 Perth: (09) 389 1266

BMS/cc.263

The Commodore 64 Music Maker.

The Keyboard For The Keyboard

Well, it's not exactly 'clip on Chopin', but the Commodore 64 Music Maker certainly adds a new dimension to home computers. It's the 'keyboard' for the 'keyboard'. Just clip on and play.
Music Maker comes with instructions and easy-step melody book to enable you to explore the wonderful world of music at your own pace and in your own time. In fact, it's so much fun that music lessons may never be the same again. Music Maker encourages musical adventure and experiment,and that, in our opinion, is a good place to start experiencing the magic of making your own music.
Talk to your nearest Commodore dealer today about the simple, easy way to turn your Commodore 64 computer into a Music Maker.

commodore
COMPUTER

Keeping up with you.

Contact your nearest Commodore Dealer or Commodore Business Machines:
Sydney: (02) 427 4888. Melbourne: (03) 429 9855. Brisbane: (07) 393 0300. Perth: (09) 389 1266.

BMS/CC373