

TPUG Magazine

Commodore 64
VIC20
PET/CBM
SuperPET

January 1985

Butterfield:
SECRETS IN
SOFTWARE

CREATING
COMPUTER
MUSIC

Articles by:
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Brad Bjorndahl
Borge Christensen
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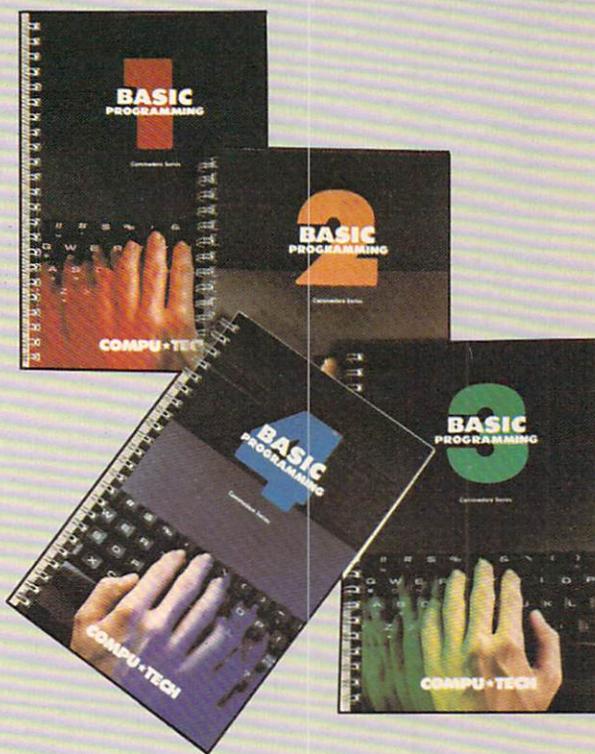
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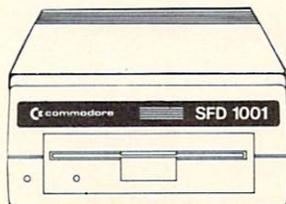
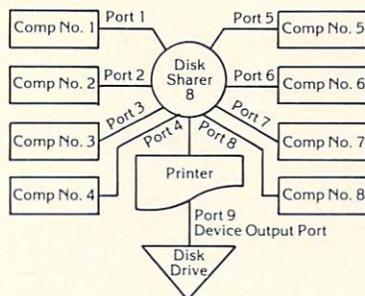
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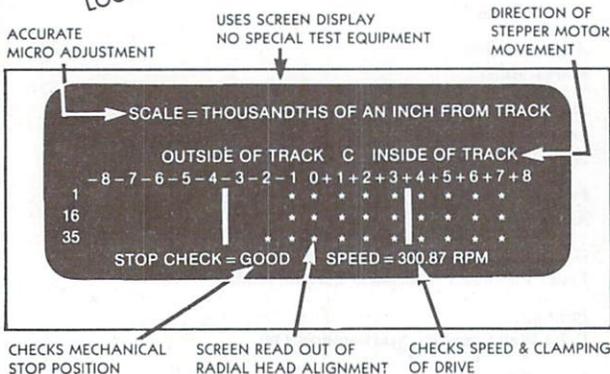
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President's Letter

With this issue we are pleased to announce the arrival of our new editor, Nick Sullivan. Nick is an editor and writer of wide-ranging experience and an avid user of Commodore computers, especially the C-64. Nick has been asked to take *TPUG Magazine* forward and produce a professional magazine of wide interest to all our readers.

We would like to take this opportunity to thank David Williams and Sandi Waugh for their contribution in bringing the magazine forward this far. It has become apparent, however, that a full-time editor is required. We have passed this challenge on to Nick and together with our best wishes we offer our support in the form of all the help we can provide. Are there articles you'd like to see, articles you'd like to write? Are you an artist, or a photographer? There's no better time than now to get involved with the magazine — let's see just how good we can make it.

You'll see some changes in the coming

year. We'll be working to make the magazine more professional in both appearance and content. The changes won't happen overnight but they *will* happen, and they'll be more than just cosmetic. We'll be asking writers to work harder than ever to produce useful, informative articles on topics that interest all of us as Commodore users. And we'll be working with them to make sure that those articles will be as clear, readable and entertaining as we can make them. But let me reiterate — we're counting heavily on your help and your involvement to make it all possible.

Concerning other aspects of the club, there will be some changes too. It became fairly clear from the annual meeting in October that while most of the members felt the current directors were doing the best they could, we have some very specific areas for improvement. Our costs are higher than

they should be. In short, the club broke even in a year in which our membership rose to almost 16,000 (from 9,600 the year before) and our gross income for the year reached three-quarters of a million dollars. Our major costs were those of producing and shipping disks (30,000 were distributed last year) and producing the magazine. A complete financial statement was sent to all full members. If you are interested, write and we'll send you one.

I want to close by thanking all the directors last year for their help and by welcoming the new directors to the board. I would also like to thank all the staff for their tireless help and dedication. I know the coming year will be an exciting one for all those involved in the club.

Happy New Year!

*Michael Bonnycastle
on behalf of the Board of Directors.*

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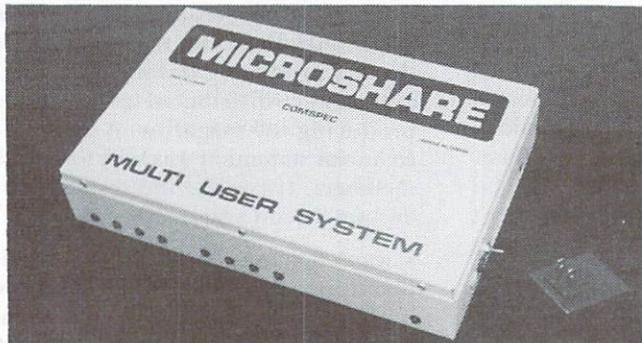
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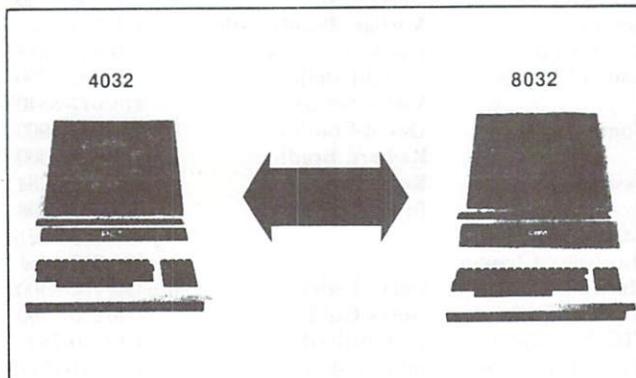
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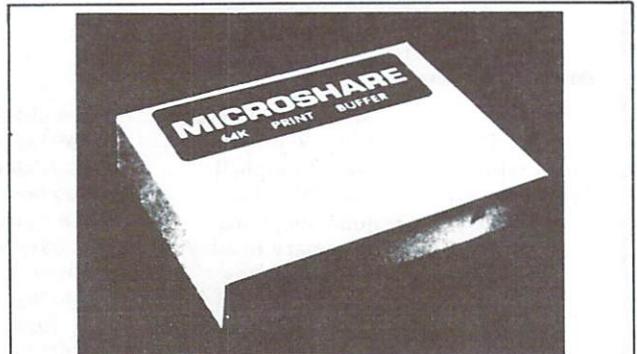
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This And That

by Doris Bradley

Do You Remember When. . .

. . . a *commodore* was a nice man who ran a ship. . . an *error* was something the Detroit Tigers made a lot of (but not in 1984!), etc. When this was published in the November magazine we didn't know who the author was, but now we do. This piece originally appeared in the *Educational Computing Organization of Ontario Newsletter*. The author was John Caspic McManus.

B-128 Users

If you own a B-128 and did *not* get a letter from TPUG regarding it, please let the office know and we'll add you to our growing list of members who are interested in the B-128.

Associate Club Chapters

Time to catch up again on the list of Commodore computer clubs that have taken advantage of the offer to have 15 or more of their members join TPUG at a saving of \$5.00 per member. The newest additions are: South Kent TPUG of Grand Rapids, Michigan, Frontenac Commodore Users Group of Kingston, Ontario, Commodore Connection Computer Club of West Palm Beach, Florida, Commodore 64 Owners of Petaluma, California, Niagara Commodore Users of St. Catharines, Ontario and Commodore Users Group of Pensacola, Florida. That brings the total of associated clubs to 57!

Jim Butterfield's Mail

One of the heaviest post cards that Jim Butterfield has ever received arrived recently from Taiwan. It had been posted by Lyman Duggan (TPUG's founder). It is actually a Chinese translation of a book by Ken Skier. What will he think of next?

Other Computer Clubs

I try to include information submitted by other computer clubs. These groups may or may not have an associate membership in TPUG.

Users Group of Mount Forest (UGMF) meets at the Mount Forest District High School, Durham Street in Mount Forest, on the 3rd Wednesday of the month at 7:30 p.m. Contact Bob Tokarsky, President, 519-323-1922.

Commodore Corps of the Coeur D'Alene Computer Club meets on the first Saturday of each month at a place to be designated. Write for additional information. Contact Tom Nelson, PO Box 007, Harrison ID 83833 -208-689-3919 - WA7VWI.

Canadian Air Rescue Association (CARA)

This is a national non-profit volunteer service organization dedicated to humanitarian needs in Canada. The three Services provided are Air Services, Mobile Support Services and Telecommunications. The latter may be of interest to TPUG members. Since CARA is a new organization they are looking for interested individuals in all Services. They are also looking for Telecommunications, and other types of equipment. This includes computers and Amateur as well as General Service Radio. Anything they get will be greatly appreciated, no matter the condition, as long as it is repairable. If you want to learn more send \$2.00 for an information package to: CARA, c/o Robert A. Vinet, PO Box 684, Grand Falls, NB, E0J 1M0.

Fourth Annual TPUG Conference

You will see another notice elsewhere in this issue, but let me repeat the bare facts here. The next conference will be held May 25 and 26 at the Ontario Institute of Studies in Education, Bloor St. near St. George, in the heart of Toronto!

We win some and we lose some in our move to downtown Toronto. Those from out-of-town will probably have the choice of cheap or not-so-cheap accommodation, as well as much easier access to the sights of Toronto. On the other hand the conference will not be in as luxurious surroundings, and those who are driving would be well advised to park near a subway station and ride the TTC.

(C)TB - September 1984

Please note that the last program on this disk is entitled MUSIC SYS49152. A little gremlin caused an error in the SYS# on page 59 of the November issue of *TPUG Magazine*.

COMAL Reference Guide

Our apologies for the delay in shipping the *COMAL Reference Guide* by Borge Christensen. Our letter-quality printer decided to develop 'automatic self-motivated page feeding' at the most awkward time. We were the victim of Murphy's Law - "Nothing is as easy as it looks. Everything takes longer than you expect. And, if anything can go wrong - it will, at the worst possible moment!" I trust everyone who ordered one has now received it, and that you are finding it a welcome addition to your library on COMAL.

VIC 20 Library

The VIC librarians, Chris Covell and Daryl King, are beginning to have difficulty putting together a release each month. Please take the time to look around your collection of public domain VIC 20 programs which you have written or acquired, and send along any that you think we don't have. Commodore may not be making VIC 20s any more, but there are still millions of them out there, and millions of owners who are still enjoying their VIC 20, and looking for support for their machines. Also, don't forget the magazine is always looking for interesting and informative articles concerning the VIC 20. If you're interested in writing, drop the magazine staff a line and ask for the *Authors' Guidelines*.

Membership Fees

It is now 1985, and so the new rates are in force. An Associate or Student membership is now \$25.00 and a Regular membership \$35.00. Please see the masthead of this magazine for full details.

FIG Southern Ontario (FORTH Interest Group)

The next meeting of this group is Saturday, March 2nd, 2:30 p.m. to 5:30 p.m., at the General Science Building, Room 312, McMaster University, Hamilton, Ontario.

Trinidad Trip!

By the time you read this, we'll know if the trip to Trinidad in February is on or off. If it's on, we're going Carnival Week: i.e. mid-February. More news next time.

A short time ago you published some code to provide dollars and cents from a floating point variable. Here is a more concise version. Note the use of abbreviated keywords in line 20: 'tH' for THEN, and 'reT' for RETURN.

```
20 ifn<0tHn=(int(n*-100+.5)/100+.001)*-1:n$=str$(n):n$=left$(n$,len(n$)-1):reT
25 n=int(n*100+.5)/100+.001:n$=str$(n):n$=left$(n$,len(n$)-1):return
```

Robert Squirrell
Oshawa

1541 PROBLEMS And How To Solve Them

Ian A. Wright
Toronto, ON

It has been estimated that over 90% of the buyers of new Commodore systems acquire a disk drive and most of these drives are 1541's. The 1541 is the cheapest disk drive available from an original manufacturer, but unfortunately, while the price is right, the quality has been erratic.

We have all heard the horror stories of 1541 owners who are on their third 1541 drive — they really do exist. However, there are many more 1541 owners who have had trouble with their drive overheating and becoming misaligned or gradually drifting out of alignment; this in turn has caused read errors and scrambled directories. Let's look at this matter using information gathered from various BBS's, club discussions, newsletters and many other sources.

During any question period at club meetings the same set of questions seem to re-occur so let's first clear the stage by covering some basic information again.

1. (Q) *Can I double-side my disks?*

(A) Yes, as long as you do not care if the data is lost from that disk because you have a backup. Your chances of losing the material stored on a two-sided disk seem to increase geometrically with time and use.

2. (Q) *Can I write on my TPUG disks?*

(A) No. TPUG'S disks are 4040 format which are NOT write-compatible with 1541 disk drives (although they are read-compatible). Don't write on any one else's disk — instead, you should copy the material onto one of your own disks, on your own drive unit.

3. (Q) *Why does the drive sometimes refuse to read my own disks?*

(A) Try to centre the disk in the drive by starting the load and then, as the motor spins, gently close the drive door. If this is not the answer you may have a bad disk or an alignment problem — read on.

4. (Q) *What does a file with a "*" mean?*

(A) This is an improperly closed file and a short-fused disaster. You must "COLLECT" or "VALIDATE" the disk before you write on it again — i.e. immediately! See the User's Guide for instructions on how to do this. If collecting doesn't work you must use a copy program to transfer the material to a fresh disk and re-format the original as a new disk to wipe it clean.

5. (Q) *Write-protect tabs are provided with disks — why do so few people use them?*

(A) The answer lies in an oversight by the original engineers who didn't put into ROM an instruction to re-set on a write protect error. If you try to write to a disk with a tab and get an error message, re-set the drive by switching it off and on again or by typing in immediate mode: OPEN 15,8,15,"U:":CLOSE 1, both of which will re-set the drive. Most disks do not need the write protect tab on (unless you have small children!).

6. (Q) *What disks should I buy?*

(A) The best answer is to buy the best ones that you can afford because it is generally true in disks, as with other merchandise, that you get what you pay for. I suggest you buy some high quality (expensive) disks that are "verified" to backup your favourite (expensive) programs.

7. (Q) *What is the disk ID?*

(A) This is a two-character code that tells the drive what disk it is working on. Each disk should have its own ID so that the drive cannot get confused and continue to write on another disk by mistake.

Many of these questions are not covered in the 1541 User's Guide or in any recent reference. It is important that you are aware of 1541 disk drive issues, because this machine is your link to large-scale data storage.

If your 1541 is an early model it may be subject to overheating because of the design of the early circuit boards. The internal heat was not sufficiently dissipated and it was possible for some of the chips on the board to break down. The only sure cure seems to be the addition of a tiny low speed fan and I have seen these advertised in U.S. magazines for about \$30.00. To make a good job of it, the fan should blow only filtered air gently into the drive unit.

A number of 1541 problems have been associated with the drive going out of alignment. I have read some detailed explanations of how to re-align your drive head, but I still believe this is a job for a professional. Just opening the case of your 1541, for example, will void the warranty — not to mention that you may do other damage at the same time. Speaking of professional alignment, I came across some useful information presented by Ray Cadorn in the Vancouver Commodore Computer Club NEWS. According to Cadorn, "... industry-standard

alignment disks are available for the 1541 drive. These disks have a pattern on them called a "cats-eye", which is used to perfectly align a disk, and is the only accurate way of aligning a disk drive."

The major reason that a 1541 drive goes out of alignment is that the mechanics involved in the positioning of the read/write head are cheap. The stepper motor (which moves in precise steps — thus the name) is attached to the head by a steel band passing over a pulley. These parts are designed to be attached "flexibly". Each time the head re-sets itself it bangs against a bumper or stop and it is the constant knocking of the

...each time a copy-protection error is read, the drive head is thumped repeatedly...

head against the stop that deteriorates the drive-head alignment. Each time you header a disk, the head smacks against the stop many times. Similarly, each time a copy-protection error is read, the head is thumped against the stops repeatedly and the read/write head drifts out of alignment after a time. The more you use heavily protected software, the greater the problem.

Your next problem is to know when your drive needs alignment. The obvious way is to wait until the drive will not read/write to your disks, but by this time you will have accumulated a number of disks that you may never be able to read again!

The fact that the head drifts at different rates on different machines can produce some interesting errors when you try to trade TPUG programs with your friends.

The program you saved on their disk from your 1541 will not load from their drive unit and subsequently all of the other programs on their disk become a jumbled mess. You are in big trouble. You can try shrugging it off by explaining that track separation is 1/100 of an inch, so your alignment must be very accurate to be sure of compatibility. You might wish to enlist in the armed services.

To determine your drive's performance you need one standard disk and program. One obvious answer is to use the 1541 TEST/DEMO disk that was included with your drive. The program called **Performance Test** on that disk is a good start, but it writes as well as reads the disk. You can add this read-only routine to your disk to check the alignment of each track:

```

100 OPEN15,8,15:OPEN8,8,8,"#" :open the error and a random file channel
110 FT=1:FT#=STR$(1):LT=35 :set the first and last tracks to #1 and #35
120 LT#=STR$(LT) :set string value
130 PRINT#15,"U1:";8;0;LT;0 :block-read a 256 byte block
140 T#=LT#:GOSUB500 :check status
150 PRINT#15,"U1:";8;0;FT;0 :block-read track 1
160 T#=FT#:GOSUB500 :check status
170 LT=LT-1:IFLT>1THEN120 :decrement the last track
180 CLOSE8:CLOSE15:END :shut down all files and quit
500 PRINT"READING TRACK: ";T# :screen prompt of track being read
510 INPUT#15,NU,ME$,TR,SE :get the error messages
520 PRINTTAB(12)NU;ME$;TR;SE :print errors to screen
530 IF NUK2 THEN RETURN :status OK? - yes - go on
540 PRINT:PRINT"DRIVE FAILURE!!" : oops ... that's a Boo Boo
550 GOTO 180

```

Steven Niers of the Windsor PET Users Group originally wrote this program and I have modified and added notations to it.

The "U1" command is similar to the "B-R" or BLOCK-READ command except that it reads an entire 256 byte block of information into the buffer by forcing the buffer-pointer to 255. This is an example of a

"user" disk command, and is used here to check the contents of each track.

The purpose of this exercise is to have a standard against which you can measure any deterioration of your drive. Most people will find that their drive will last for years without error—some heavy users should include a monthly check as part of their maintenance program. If you find

that the head "chatters" more than it used to, or the error light flashes frequently when loading programs, you can run this disk through the drive and determine if it is time to have the heads re-aligned by a professional. One software developer has his drives checked each year whether they need it or not. He says it's cheap insurance and I agree with him. TPUG

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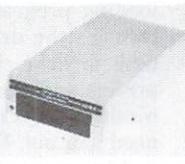
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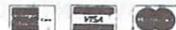
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CREATING COMPUTER MUSIC

Michael Quigley
Vancouver, BC

Some time ago, I wrote to a friend of mine who has a small business selling records. I suggested to him that he could make good use of a word processing system like mine to keep up-to-date lists of all his albums. He wrote back, saying "Thanks for the suggestion, but I already have a 'word processor'. It's called a 'typewriter' and it cost me \$150."

My friend's response is not unlike my own attitude to creating music with your computer, which is: "Why bother?" Most people who can afford a computer with all the attendant peripheral hardware probably already have a musical instrument of some kind, like a piano or guitar.

Although the Commodore 64 is highly touted as a musical instrument, especially in its TV commercials, creating music with it is not an easy task. One of the main impediments is the fact that the Music Note Value tables in the *64 User's Guide* (Appendix M, pp. 152-4) and *Programmer's Reference Guide* (Appendix E, pp. 384-387) are completely different! No one has yet been able to explain to me why this is so. (The *User's Guide* values seem to work better, by the way.)

There are basically three kinds of music which can be created on your computer: pieces by other composers which you arrange, pieces of your own and music which the computer makes up.

The first variety, arrangements of other composers' music, is a novelty which wears out very fast. When I bought a VIC 20 a couple of years back, one of the first things I got for it was a music composing program. I used it to arrange a few pieces until I realized that there was little point to what I was doing, other than demonstrating my computer's "amazing" abilities. The fact that only three voices were available imposed severe limits, though I did make a transcription of the first twenty bars or so of Stravinsky's *Rite of Spring*, just to prove it was possible.

As far as the C-64 goes, there are some impressive public domain programs, such as Pachelbel's Canon and Bach's "Little" Fugue, showing what the C-64 is capable of doing musically — each of which are over 25,000 bytes long! Such creation is a job for the truly dedicated — or the truly masochistic. There are also a wide variety of commercial C-64 programs designed to make music entry an easy task, which show that some people have a peculiar idea of what "easy" means.

The ideal facility to help in this regard would be some kind of keyboard on which you could play or compose music and have it immediately stored in the computer. This is similar to a device used around the turn of the century, a sort of Player piano in reverse. Famous composers played their pieces on this gizmo, which punched out not only the notes but dynamics onto a paper roll that could then be played back, reproducing the composer's intentions exactly. Unfortunately, the computer equivalent of this and the necessary interfaces would probably be so expensive that it would be cheaper to buy something like a Moog synthesizer intended specifically for this purpose.

Creating your own music on the computer, my second variety, has a pretty limited audience, though it should be pointed out in this diatribe that the *educational*, as opposed to artistic, field of computer music creation is one area where a great deal of potential does exist.

My third category, where the computer makes its own music, you might say is an anomaly, since the computer can't create music any more than it can serve you breakfast in bed. It has to be *programmed* to do something. Most attempts in this area fall into the category of random music. This usually sounds like "stereotyped 20th century electronic music", a fancy way of saying "garbage".

There is one area here I'm surprised no one I know of has investigated. This is twelve-tone music, first popularized by Arnold Schoenberg, who lived from 1874 to 1951. Schoenberg's system was based on the fact that in each musical octave (say, between one note A and the next A above) there are twelve unique tones. These notes can be arranged in any order, which then form a "row". This row is then inverted, so that if the distance between the first two notes is originally three notes up, in the inversion the second note will be three notes down from the first, and so forth. Both the basic row and inversion can be read forwards and backwards, making a total of four rows.

This would seem to be ideal "computer music", for the computer could not only choose the basic material for the piece, but choose all the other parameters like tempo, volume, duration of rests, and so forth. Unfortunately, one attempt I made in this direction sounded like the "typical 20th century music" mentioned above. (A copy of this VIC 20 program, called TWELVE-TONE MUSIC has been submitted to the TPUG library.)

In their time, Schoenberg's own creations earned a great deal of abuse for what people considered their ugly, mechanical sounds and are still unpopular today, some sixty years later. Only certain of his contemporaries were able to organize their twelve-tone material so that it sounded more like music.

In other words, the human touch is something which music can't do without. TPUG



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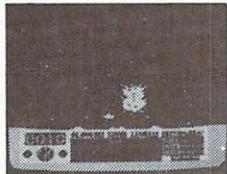
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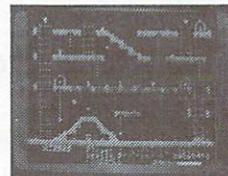


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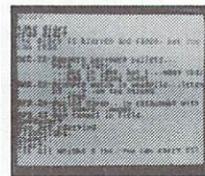
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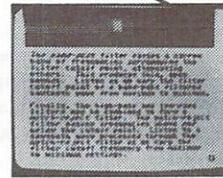
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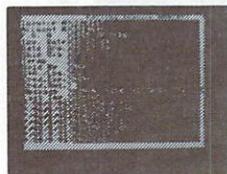
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TPUG COMAL Course: Part Seven

Borge Christensen
Tonder, Denmark

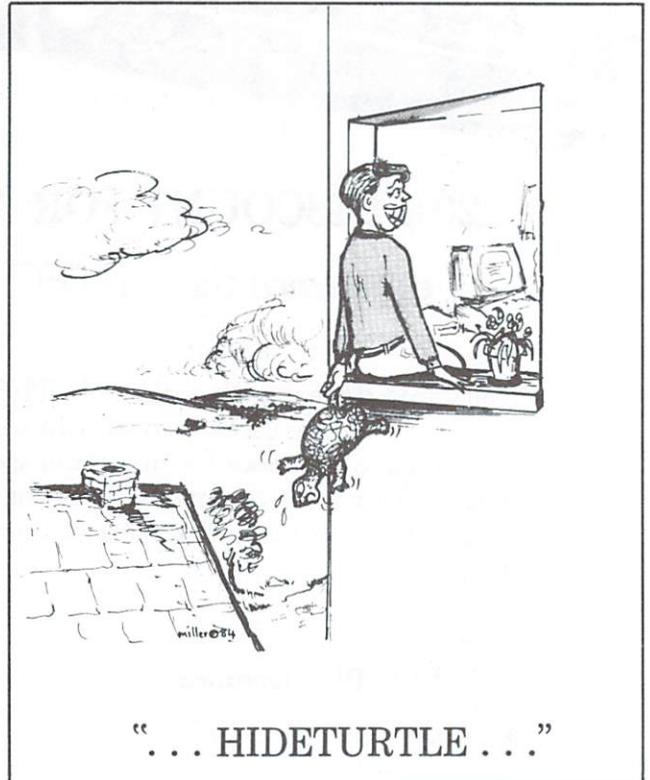
This is the seventh and last instalment of our series introducing the COMAL language. This month Borge Christensen presents a method for controlling the movement of the sprites created in earlier instalments, a discussion of the CASE statement, and an intriguing method for 'hiding' COMAL routines while keeping them active in memory.

7. CALLING DELTA CONTROL

If you have been following this series you now have four different sprite definitions stored on disk or tape: 'UP DELTA', 'RT DELTA', 'DN DELTA' and 'LT DELTA'. Let's start by checking them out.

Clear the workspace and the screen and type in the following:

```
SETGRAPHIC 0
HIDETURTLE
//
DIM NAME$(0:3) OF 10
DIM THISSPRITE$ OF 64
//
NAME$(0) := "UP DELTA"
NAME$(1) := "RT DELTA"
NAME$(2) := "DN DELTA"
NAME$(3) := "LT DELTA"
//
PROC LOADSPRITE(NO)
  OPEN FILE 3, NAME$(NO), READ
  READ FILE 3: THISSPRITE$
  CLOSE
  DEFINE NO, THISSPRITE$
ENDPROC LOADSPRITE
//
PROC SHOWSPRITE(NO)
  ACTING:=0
  IDENTIFY ACTING, NO
  SPRITEPOS ACTING, 100, 100
ENDPROC SHOWSPRITE
//
```



Note: If you are using a tape recorder, lines 130-140 must be changed into:

```
130 OPEN FILE 3, NAME$(NO), UNIT 1, READ
140 INPUT FILE 3: THISSPRITE$
```

The four files with delta wing definitions should be stored as a queue at the beginning of the tape in the order they were listed above.

Type RUN and watch the computer switch to graphics mode with the cursor sitting at the top left corner of the screen. Enter the command:

```
LOADSPRITE(0)
```

The cursor returns when the sprite has finished loading. Now type:

```
SHOWSPRITE(0)
```

A delta wing headed upward is displayed at position (100,100).

To see the other three delta wings, type:

```
FOR NO=1 TO 3 DO LOADSPRITE(NO); SHOWSPRITE(NO)
```

Let us take a closer look at some of the statements in the program:

HIDETURTLE

The turtle is not shown.

DIM NAME\$(0:3) OF 10

NAME\$ is an array of strings.
It may hold four strings,
—indexed 0-3, each of length 10.

OPEN FILE 3,NAME\$(NO),READ

A sequential file is opened, its
name is given by a component of
NAME\$, its channel no. is 3.

READ FILE 3: THISSPRITE\$

A sprite's definition is loaded
into THISSPRITE\$ from the file
just opened.

CLOSE

The file is closed.

Remove SHOWSPRITE from your workspace by typing DEL 190-240.
Then type AUTO 190 and enter the following lines:

```
PROC GETWINGS
  FOR I:=0 TO 3 DO LOADSPRITE(I)
ENDPROC GETWINGS
//
PROC START
  X:=100; Y:=100; NO:=0
  ACTING:=0
  IDENTIFY ACTING,NO
  SPRITECOLOR ACTING,7
  SPRITEPOS ACTING,X,Y
ENDPROC START
//
PROC FD
  CASE NO OF
    WHEN 0
      Y:=+10
    WHEN 1
      X:=+10
    WHEN 2
      Y:=-10
    WHEN 3
      X:=-10
  ENDCASE
  SPRITEPOS ACTING,X,Y
ENDPROC FD
//
PROC LT
  NO:=(NO+3) MOD 4
  IDENTIFY ACTING,NO
  SPRITECOLOR ACTING,7
ENDPROC LT
//
PROC RT
  NO:=(NO+1) MOD 4
  IDENTIFY ACTING,NO
  SPRITECOLOR ACTING,7
ENDPROC RT
//
```

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Type RUN. Then use GETWINGS to load the four sprites, and START to initialize the delta wing command system. Play around with the delta wings by using commands like the following:

```
FD;FD;FD
RT
FD;FD;FD
RT;FD;FD
LT
FOR I=1 TO 10 DO FD
START
FOR I=1 TO 10 DO FD;FD;FD;RT
```

IMPORTANT NOTE: If you happen to introduce an error during the session, you will have to restore the delta wing command system by typing RUN and START.

By the way, are you aware that you have just written your own interpreter! Better save it by using:

```
SAVE 'DELTA CONTROL'          on tape: SAVE 'DELTA CONTROL',1
```

In procedure FD we have introduced the CASE structure. This is what it looks like in general:

```
CASE <case selector> OF
WHEN <list of expressions>
  <list of statements>
WHEN <list of expressions>
  <list of statements>
...
OTHERWISE
  <list of statements>
ENDCASE
```

The <case selector> is an expression of either numeric or string type. Each expression on the list following a WHEN must be of the same type as the case selector. You can have as many WHEN statements as you wish in a CASE structure. If an expression on a WHEN list has the same value as the case selector, its <list of statements> is executed, and the interpreter then goes on with the first statement following ENDCASE. If more than one list contains an expression whose value matches that of the case selector, only the statements affiliated with the first of these lists are executed.

By using the OTHERWISE statement, a default case may be introduced, to be executed if no matching expression is found on the WHEN lists. It is important to note that if no matching expression is found and no default case is provided, the program is stopped with an error message.

The multiway branching CASE structure can be replaced by an extended IF-ENDIF branching. Thus the body of FD may also be programmed like this:

```
0320 //
0330 IF NO=0 THEN
0340   Y:+10
0350 ELIF NO=1 THEN
0360   X:+10
0370 ELIF NO=2 THEN
0380   Y:-10
0390 ELIF NO=3 THEN
0400   Y:-10
0410 ENDIF
0420 SPRITEPOS ACTING, X, Y
```

The keyword ELIF is a contraction of ELSE IF. If this structure is used, the ELSE clause would take over the part of the default case. Normally you would use the CASE structure if you have arithmetic or string expressions controlling the structure, and the IF-ELIF-ELSE-ENDIF structure if Boolean expressions are used, but sometimes the choice is merely a mere matter of taste.

Suggested extensions to DELTA CONTROL: Design and enter procedures HUP, HRT, HDN, and HLT to set the delta wing heading upwards, to the right, downward and to the left, respectively. You could also introduce a kind of 'chess board' for the wings to move on. One move forward in any direction should correspond to a 'draw' on the board. As it is, each move of a wing is set to 10 pixels. You may have to change that in procedure FD in order to make it compatible with your board.

To prevent the wings from flying off the board, use statements like:

```
IF X<X'MAX THEN X:+10
```

After having finished your 'delta wing universe', you can 'hide' it by using the following trick. Insert this statement:

```
5 //
```

Then use the commands RENUM 9999 and DEL 9999. Now try to LIST — and your program appears to have vanished! However, by using RUN and START and then some of the delta wing commands, you will discover that it is still acting backstage.

You can save your 'invisible program' by using the SAVE command, and reload it any time with the LOAD or CHAIN command — and it remains invisible!

You can now write programs that use the delta wing procedures, and still use the commands LIST, EDIT, DEL, RUN and ENTER, though not RENUM or NEW. If you want to erase all lines in the visible part of the workspace, simply use DEL-. The SAVE command can still be used, but it will save both the visible and the invisible part of the workspace. Since LOAD automatically evokes a NEW, it cannot be used to load subprograms.

You might get some more ideas about extending and using DELTA CONTROL by looking in the book *Karel The Robot* by Richard E. Pattis (Wiley 1981). TPUG

A Plug For WHOZITs

Brad Bjorndahl

Bramalea

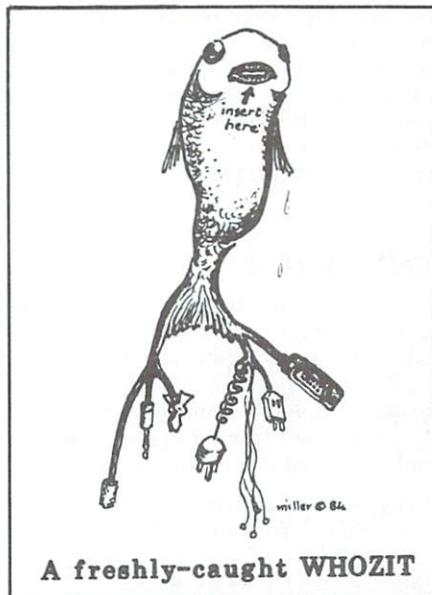
There are those who can never get enough jargon. For such people I will define here a new computing concept, for which we will, of course, need a new word. This concept will, I believe, be extremely useful in the near future.

Let me present some background before defining my new term. Imagine, if you can, being thoroughly bored with drawing multi-colored, multi-dimensional spheres with incredibly powerful graphics commands, or perhaps being tired of designing and simulating yet another set of micro-instructions for the latest generation of microprocessors. Instead, in desperation, you develop a yearning to put your hands on some real hardware; to get some silicone grease under your fingernails; to jam little chip leads into little chip sockets; to solder and wire-wrap until your eyes feel like boiled onions.

So off you grope through your junk box and what should you find but a speech synthesizer! It is, of course, the latest model. It is, in fact, a WHOZIT. A WHOZIT is a device that is plug-compatible with everything. You take this speech-synthesizer and plug it into the nearest available board, placing it close to its controller because old habits die hard; and after wiring it up and programming the controller, it talks to you. Well, of course it works—it's a WHOZIT.

The name WHOZIT I take from the British television series *Doctor Who*. Those who have seen the show know what I mean.

The main character, Doctor Who, can take any device from his time travel vehicle and insert it or fasten it to any other device or machine and it immediately functions as it should. He can do this with any machine built by anyone in this galaxy (or perhaps our local group of galaxies, I'm not sure).



The term WHOZIT is in the same category as, but must not be confused with, the terms WHATZIT and HOWZAT?. Now, like GIZMO, WHATZIT means 'thing'. But let's be very careful here. A GIZMO is a 'thing that has a function', even if the function is not known or is inexpressible. Everything is a WHATZIT but is also what

it is; that is, it has another description (but perhaps not a function).

So a WHATZIT exists, but no one can say exactly what it is (since it is any and every thing). By contrast, a (true) WHOZIT does not exist, but it is clear what it is and it will work with anything. I will not discuss the HOWZAT? except to say that it is currently implemented locally by the ASCII 'NAK'.

...a fish which, when stuffed into the ear, will translate the speech of any other being in the universe...

Very simply, a WHOZIT is a GIZMO that will operate with any WHATZIT.

The best example of a WHOZIT is given in another British radio/television series, *The Hitchhiker's Guide to the Galaxy*. This show introduced a fish which, when stuffed into the ear, will translate the speech from any other being in the universe so that the user can understand. This is truly wonderful, but I think that the sweetest aspect of this for us is that — since we have two ears and only one fish is necessary — we have a complete ear available for any other function that we desire. Think of those poor beings with one ear, or even those with *no* ears! Where do they stuff their fish? The fish (being a WHOZIT) can be stuffed anywhere, and will work.

Now you have it: the WHOZIT, a Universal Plug-compatible GIZMO! TPUG

Switching 1541 Device Numbers

Elizabeth Deal
Malvern, PA

A SEMI-PERMANENT 1541 DEVICE NUMBER CHANGE

When you decide to change a 1541 device number via hardware, you may want to consider as an alternative a not-so-permanent change. The problem with a true device number change is that when drive #8 decides to go out of whack you may not be able to use the programs that LOAD from device #8 until the fix. Very few commercial programs actually check what device you're using — most assume #8. This can mean BIG trouble.

This article shouldn't be (but may be) system specific. The tail end discusses KERNAL 2 and 3. Currently I use KERNAL 3 ROMs in the C-64, one white 1541, short board, ROM set #5, one brown 1541CR (cost-reduction), short board, ROM set #5. Incidentally, I switched to supposedly 4040-compatible #5 ROMs just recently and unfortunately have no idea how all this behaves in ROM #3 or ROM #4 (if #4 existed). This article also applies to the Commodore 264, an early version of PLUS 4, not a production model. Things may change.

BACKGROUND

The March 1984 issue of *TPUG Magazine* had a wonderful set of super-clear instructions for changing device numbers of the disk drive, written by Dave Powell. With this calibre of instructions, the project was a snap! I desperately wanted a hardware device change. I couldn't make any sense out of the CBM instructions. No wonder — I've got the short board!

To make device #9, the circle closest to the front of the drive needs to be cut, just as Mr. Powell suggested. Use a damp Q-Tip to remove all the solder. Don't blow it around.

A SWITCHING DEVICE NUMBER

I was a bit reluctant to make the change permanent, so we attached two wires and a

switch which now comes out of the box. Flip a switch one way, it's device #8; the other way, it's device #9. Now reset the drive and you're all set. It's handy and it's flexible. When the #8 decides to bite the dust, I won't be stuck with #9 forever. A big thank-you to Mr. Powell for his superb instructions.

By the way, attaching a switch is tricky. The wires go onto two tiny flat surfaces. There are no hooks. You risk connecting the gap you just cut, and you risk a cold solder connection. It's like brain microsurgery: it has got to be right the first time!

So practise, and practise again, and then (as the photographers do) hold your breath and do it. Good luck: and don't blame me for the idea, if you damage the drive. Considering that the switch costs 69 cents, it's surprising that Commodore did not build one in.

Carrying the switch outside the drive box is simple in theory: make a hole and fit it through. The plastic box is fairly soft — an Exacto-knife will do the job. If you scrape, saw or drill the box, be especially careful: using a wet rag, keep removing the dust and pieces as soon as they form. If you don't, the grime will find its way to the disk area and cause problems later.

USING THE SETUP

Normally you decide on the drive number as you turn the computer on. The system takes care of itself quite nicely. But don't try to flip the device number and expect it to work without resetting. I have to admit I forgot this last link for a while, and was rather puzzled at the resulting confusion.

When you do things right, everything works like a charm. You can use device #8 or #9.

When either one is turned off, the other can be used. If you try to talk to a turned-off device, you get a DEVICE NOT PRESENT error. All as it should be.

ABUSING THE SYSTEM

The C-64 works well. Surprisingly, even if you have *two* devices numbered #8, it no longer crashes. It's mixed up, but it works,

with the drive closest to the computer taking priority. If that drive is empty, the other one takes over. Error messages are meaningless, of course, but it's nice to know that a mistake in switching will not wipe you out.

This is not the case with the PLUS 4/Commodore 16 computer. Here, the story is complicated. If the true device #8 is closest to the computer. If the true device #8 is closest to the computer the PLUS 4/Commodore 16 will crash about 90% of the time. On the other hand, if the "switchable" device #8 is closest to the computer, the PLUS 4/Commodore 16 does *not* crash, but there are no clear priorities: the programs might come from either drive.

HOW TO RESET THE DRIVE

The simplest (and the recommended) way is to power it up with the switch in a position you want. There is little reason to switch devices on the fly. Hence the end of that story. *TPUG*

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Menu-Handling Subroutines

John Easton
Toronto, ON

The last part of this article (*TPUG Magazine*, December 1984 issue) did not include the following listing, which makes up an integral part of the DIRECTORY program. These are subroutines called by that program from lines 1010 and 1070, which place your DIRECTORY, HELP SCREEN and INFORMATION MENU on the screen. *TPUG*

```
10000 REM ***** MAIN MENU *****
10001 REM *****
10010 PRINT CL$
10020 PRINT LN$
10030 PRINT TAB(10)"INFORMATION DIRECTORY "
10040 PRINT " [RVS]" LN$
10050 PRINT " [RVS] 1.[RVS/OFF] Help"
10060 PRINT " [RVS] 2.[RVS/OFF] General Information"
10070 PRINT " [RVS] 3.[RVS/OFF] Games"
10080 :
10090 : "and so on - up to 12 - which is about maximum
10091 : "in this format
10100 :
10160 PRINT " [RVS]12.[RVS/OFF] Bibliographies "
10170 PRINT " [RVS] > Please select a topic 1 to 12 < "
10180 PRINT " [RVS]          or select 0 to Exit      "
10190 RETURN
10200 :
20000 REM ***** HELP MENU *****
20001 REM *****
20010 PRINT CL$
20020 PRINT LN$
20030 PRINT TAB(18)"HELP"
20040 PRINT " [RVS]" LN$
20050 PRINT " [RVS] 1.[RVS/OFF] Purpose of this Program"
20060 PRINT " [RVS] 2.[RVS/OFF] Rules of Operation"
20070 PRINT " [RVS] 3.[RVS/OFF] Input Values"
20080 :
20090 : "and so on - up to 12
20100 :
20160 PRINT " [RVS]12.[RVS/OFF] Data Format"
20170 PRINT " [RVS] > Please select a topic 1 to 12 < "
20180 PRINT " [RVS]          or select 0 to Exit      "
20190 RETURN
20200 :
30000 REM ***** INFORMATION MENU *****
30001 REM *****
30002 : "This menu is generally a repeat of the previous
30003 : "one. Retain a similar screen format, with prompts
30004 : "in similar spots. For this example, we'll presume
30005 : "that only 8 menu choices are required, so that our
30006 : "prompt lines will only go up to 8.
30007 :
30170 PRINT VT$(22) " [RVS] > Please select a topic 1 to 8 < "
30180 PRINT " [RVS]          or select 0 to Exit      "
30190 RETURN
```

BUYER BEWARE!

Mark Jacques

When I was manning our user group's booth at a computer fair last year, I was approached by an elderly gentleman. He said, "I just bought this Commodore 64 and printer. Now what do I do with it?"

This surprising question pointed out something that I've noticed for quite some time — that consumer awareness with regard to computers leaves a lot to be desired.

Everybody wants to be the first on their block with a new wonder toy. And who can blame them, considering the glamorous images of computers depicted in ads, especially on TV?

Computers in real life tend to be a somewhat different proposition. We've all suffered through wretchedly written, ungrammatical manuals full of facts and figures which make sense only to the person who wrote them. There are quite a few varieties of books available which supposedly explain how to run the doggone things, but at \$20-\$25 a crack, collecting these tomes becomes an expensive proposition.

One of the biggest areas of concern for computer owners is incompatibility. Products made by the computer company tend to work pretty well together . . . well, sort of. When you start buying second-party software, and hardware like printers, modems and other plug-ins, then the fun begins.

Unfortunately, finding sales people who are knowledgeable about what will work and what won't — especially in stores which sell things other than computers — can make your life even more miserable.

There are a couple of cardinal rules to follow when buying something for your computer. First, ask the salesperson to show you that it works, and with the same combination of equipment that you have. If they don't have the same equipment, then you might consider bringing your computer to the store and experimenting on your own. Or else try another store. Remember: one phrase non-existent in many computer salespeople's vocabulary is "I don't know."

Another thing to do is read the manual. This may sound rather obvious, but some

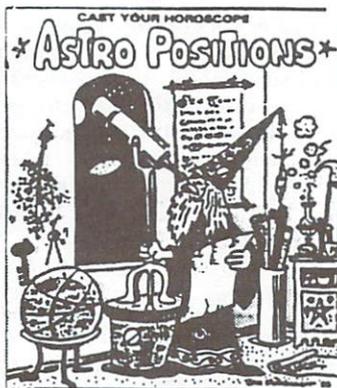
people (yes, even me, once in a while!) like to plunge right in and create music or design sprites or whatever else without knowing what the heck they are really doing.

Recently, I had a lot of problems with a music program even after following the manual. I phoned a friend who also had it and he said, "Oh yeah, you have to read in the 'Addendum' (a fancy word for a list of mistakes) . . . it tells you what to do." And after doing this, my problem was solved! In this case, it would pay off to read the errata list first.

It's quite surprising that there hasn't appeared anyone in the world of computers similar to Ralph Nader, who earned much of his reputation attacking the Detroit automaking giants. Like the auto industry, computers are a billion-dollar enterprise, full of user complaints, product failures, poor design, and so forth. Despite the fact that the world of computers is relatively fragmented compared to that of cars and trucks, there certainly is a need for such a person! *TPUG*

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The Oxford Pascal Compiler

Dave Powell
Mississauga, ON

Oxford Pascal by Oxford Computer Systems (Software) Ltd. Hensington Road, Woodstock, Oxford, OX7 1JR, England. Distributed in North America by Limbic Systems Inc. Disk

Oxford Pascal was not only the first Pascal compiler that I'd seen for the C-64, it was my first hands-on experience with Pascal. This, then, is a review by a Pascal neophyte. But that's probably what you are too, so we're even.

Oxford Pascal is said to be an implementation of standard Pascal, with many enhancements for the C-64. It can be broken down into standard Pascal, enhancements, an editor, direct commands (including compiling), and the manual.

Here's a breakdown of the enhancements:

HEX constants are allowed in the program, and can be read to and written from files. PEEK and POKE are implemented. ORIGIN allows definition of a variable in a particular memory location.

VDU puts a single character at row, col, on the screen (or, in Britain, Video Display Unit).

GETKEY is like BASIC's get.

ENVEL(voice,attack,decay,sustain,release) sets SID chip parameters.

VOICE(voice,frequency,wavetype,duration) sets more SID chip parameters.

VOLUME(level) sets one more SID parameter.

BORDER sets border colour

SCREEN sets background colour

PEN sets screen print colour

PAPER sets plot background colour

INK sets hi-res plot colour

EXAMINE determines whether a hi-res point is on or off.

PLOT is a multi-purpose command to clear the background, clear all points, plot or clear a straight line, fill or clear an area.

WINDOW creates a text area on a hi-res screen.

The EDITOR

Oxford Pascal has a line number based editor not unlike the Commodore BASIC editor. Having a familiar editor is helpful. LIST works normally, as do line insertions and deletions, NEW, and typing over an old line number to copy a line. Additions are: AUTO (line number prompts), NUMBER (why not RNumber?), FIND, CHANGE, DELETE (line range), HEX and DECIMAL (conversions), and DUMP (list

to the printer). The LIST command will pause when a key is hit, until the next keystroke. The editor is a distinct improvement over BASIC's, but I would prefer shorter commands (e.g. 'C' in place of 'CHANGE', as an option).

Direct Commands

These include the commands for saving and loading programs, and several compile options. Interestingly, one can also enter the following BASIC commands from the editor for direct execution: PRINT(#), OPEN, CLOSE, CMD, PEEK, POKE, SYS, FOR, LET and LOAD. Good use is obviously made of the existing code in ROM. Not only are the screen editor, those BASIC direct-mode commands, and some functions such as TI\$ and FRE() familiar, but some favourite POKES still work during execution, such as positioning the cursor before a WRITE (PRINT).

Debugging commands are conspicuously absent. I'd have liked to see at least some way of listing the values of program variables, and a way of setting breakpoints would have been great.

Compiling

This works in two modes: resident and disk-based. In resident mode, compiles can be done without disk access: the compiler, source code and object code are all stuffed into the 64K of memory. This is really convenient, as editing, compiling and testing can be done in relatively short order. I'm developing a program that so far has 213 lines, and it fits in this mode. Disk-based mode is for larger programs, or those needing the handful of esoteric functions only available in that mode. Changes take considerably longer in disk-based mode. As far as I can see, dual disks are supported, but two singles are not. So it's floppy-swoopy time. Load the source, edit it, save back to your disk, and load the compiler from the system disk. The compiler reads your source from disk, and writes the object back. From there it is finally read again to be executed. Then, if you didn't get it right (does that happen to you, too?) you start over. As with any new language, compiler messages take a bit of getting used to at first, but not for long.

The best strategy for huge programs is to test pieces of your code separately, in resident mode, before putting it all together. One advantage of Pascal is that once a program has compiled without error its chances

of working are quite good, because of the compile-time checks and rigid structure.

You'll also want to know that standalone Pascal programs can be created (i.e. programs that will run without the compiler present, such as on your friend's C-64). Also, object modules can be 'linked' together to form a larger program, with some restrictions. Alternatively, a compile can include extra source files from your disk; the whole program doesn't have to be created in one huge chunk. I haven't tried all of these features yet, but it's good to see them there.

The Manual

The manual is critical in products of this nature, and it looks as if Oxford's printer let them down. My interpretation is that a half-decent manual went to the printer, and a mess came out. The formatting is poor. In a list of functions, for example, a new function isn't offset from the text of the previous one, and bold type may be used for such things as notes as well as function names. Explanations are placed below examples rather than beside them. I'd have liked page numbers rather than section numbers (the same number on several pages). The first manual I saw had most of the 'up-arrow' characters missing completely. A replacement manual fixed them up in the file sections, but left them missing in discussions of pointer variables. It was an interesting puzzle to work out the syntax required. Finally, the manual is bound with a too-small plastic spine (like the *C-64 User's Guide* and *Reference Manual*). I'd like to see more examples in the manual, and more context. Partial examples are confusing. I'd recommend supplementing the manual with Jensen and Wirth's *PASCAL User Manual and Report* (Springer-Verlag).

Printer support

The 1525 was not the printer of choice when this product was being designed. All printing is done in upper-case/graphics mode, which means that only text in lower-case on the screen is readable on paper. This unfortunately means that compiler diagnostics aren't readable on a listing (and roll off the screen). Don't use the 'UPPER' (case) option if you want a print-out of your program, and don't expect things like square brackets to show properly. A fix to get a proper listing (but not the compile printing) is to enter the following as a direct command: OPEN 3,4,7:CMD 3:LIST. As usual, type PRINT#3:CLOSE3 after the print-out.

What is a compiler?

Dave Powell
Mississauga, ON

Your computer can only execute machine code. Does that come as a surprise? What about the built-in BASIC? Read on. . .

Giving the RUN command to execute your BASIC program invokes a special machine language (ML) program (usually in ROM) called an 'interpreter'. The interpreter treats *your* program as data, and creates an environment where your BASIC statements are used to determine which ML routines are executed, in which order, and with what data.

This interpretation overhead explains why BASIC is so much slower than ML. But what other choices are there?

Programming directly in machine code — a string of binary numbers — is not an enjoyable process for most humans. That is why when we write machine language programs we almost always use an 'assembler'. An assembler is a program that converts 'symbolic' machine code instructions like 'LDA #501' into pure ML like 'A901'. The symbolic instructions are called 'mnemonics' because they are easier for programmers to remember. However, each assembler instruction generally results in one and only one machine code instruction. Assembly language programming is therefore slow to write, since usually many instructions are required to perform a given task, but once it has been assembled no further processing is required. This means that a program written in assembly language executes just as quickly and efficiently as one written in pure machine code.

A 'compiler' allows the programmer to write a program in a high-level language, yet execute it at machine speed. It does this by reading 'source' code (the text of the program), converting each statement into many, possibly hundreds, of machine instructions, and (usually) writing these out as an 'object' file. In some cases, the object file can be loaded and run directly — it is a complete ML program.

Many languages are implemented so that the object file won't run by itself, but needs an environment in

which to run. For instance, trigonometric routines (COS, SIN etc.) may be part of a language, but the actual code to execute them is not written out in the object file: it is part of the execution environment.

Because all the work of translation is done just once, during compilation, the resulting code runs with no overhead and is very fast. However, because most compilers have to cater to the general case, one can usually improve on the execution time by hand-coding the ML. That's why many commercial products, and practically all games, are written in ML.

It's a great advantage when a compiler allows one to create an 'executable' file, complete with the required environment. This feature is sometimes called 'turnkey' or 'stand-alone'. Without this capability your friends have to own a compiler to run your programs.

Between interpreting and compiling are a host of techniques. Typically, these create an intermediate file which is faster to interpret at execution time. Pascal usually produces 'p-code', which is a machine-independent assembly-level code. Forth works in either mode — interpreting for quick tests or compiling for repeated use. What's best?

Writing code is generally easier in high-level than in low-level languages, but it doesn't particularly matter whether the language is interpreted or compiled.

Testing is easiest using an interpretive language. There's no delay between seeing a bug, fixing it in the code, and running the next test. A compiler might, with slow disks (or tape!), take five minutes or more. For this reason, a facility is often provided for compiling (or assembling) small programs from memory, cutting out the delay in reading source and writing object (and often that of having to load code to do the compiling, as well).

When it comes to execution speed, interpreted languages are the slowest, then hybrids, then compiled languages. Machine language, of course, is the fastest of all.

There's supposed to be a menu-driven printer set up which might help, but I couldn't get into it. Three POKEs are documented to set the unit number, ASCII/PET-CBM, and auto linefeed. The defaults are incorrectly documented and, for a 1525, auto-line feed has to be disabled each time Pascal is loaded.

ASCII is the other printer-type option. I couldn't evaluate this support.

How fast is it

I think the product has come to a good compromise in dealing with the disk speed problem — one can develop a program in bits when necessary. Compiling speed is acceptable.

Oxford Pascal loads in 2 minutes 20 seconds from a 1541. This won't be necessary just to run an established program, but the stand-alone programs are quite large (50 blocks for a trivial program). I wrote a benchmark program to Peter Rukavina's specs (FORTH article, *TPUG Magazine* July 1984 — writing each of 256 characters to each of the 1000 screen positions). He quoted machine code 2 seconds, FORTH about a minute, and BASIC about 15 minutes. Oxford PASCAL gave a disappointing nine and a half minutes, using two nested FOR loops into an array 'ORIGINed' to the screen. This might not be the fastest method.

Summary

A person trying out a new product is entirely dependent on the manual for the first few weeks. Minor printing errors, wrong information, and missing information and so on are incredibly frustrating, and can make one lose confidence in a product. One needs to *know* that unexpected results are self-induced, or no progress can be made. As I was writing this review, I realized that most of the negative things that I was feeling no longer apply now that I have more experience with the product, but that kind of patience shouldn't be required. It's easy to forget the 99 per cent of things that work just fine because of some inconveniences. However, distributors and program authors have to realize that the market demands perfection. There were at least three other Pascal compilers advertised in *TPUG Magazine* in the August/September issue, and the less friendly products won't sell for long.

This looks like a complete implementation of Pascal, with a good set of C-64 extensions. Now that I've got past my learning problems, I have enough faith in the product to continue reprogramming the Powell family budget using it — and if you knew the way we budget, you'd appreciate my level of commitment! *TPUG*

SATAN'S HOLLOW

Malcolm O'Brien
Toronto, ON

Satan's Hollow is a Bally-Midway arcade game that has been transported to the C-64. I have a pre-release copy, but according to the preliminary documentation (which is very thorough and informative), Commodore will be releasing it on cartridge, as well as on disk. The cartridge, of course, will boot instantly, but the disk version will preserve the top ten scores for posterity.

David Berezowski at Commodore did the translation of this arcade shoot-'em-up and I'm sure that fans of the original will be very pleased with it. It includes those extra touches that are so important in a home computer game: the RESTORE key will reset the game if you get off to a bad start, RUN/STOP or the Commodore key will pause/continue the game (the fire button will continue, as well) and you can use the function keys to define game parameters. F1 selects standard controls (button fires missiles; joystick up or down engages shields). This is the default arrangement, but by pushing F3 at the title screen or high score display, the controls are reversed. F5 selects Easy mode for beginners or people who like really high scores. F7 selects Normal mode for the serious game player who wants to be fully challenged.

At the game's start, your missile launcher is placed on a detailed landscape with a chasm on the right of the screen. Satan's minions are flying above you, preparing for attack. These gargoyles will drop bombs on you and if this is not enough to stop you, they'll attack, kamikaze-style. Your resources are your missiles and shields. One hit from your missile is sufficient to destroy an attacker. And nothing will penetrate your shield. The limitation of your missiles is that you can't fire a second missile until the first either hits something or disappears off the top of the screen. The limitation of your shield is that it can only be on for 15 time units (about 1 second). When the shield is off, your power quickly returns to full strength.

Now here's the twist: these are only Satan's pawns! In order to fight the big guy, you have to build a bridge across the chasm to Satan's lair. So all the time that you're fighting to stay alive you also have to be building a bridge. Every time you destroy one of his pawns, a bridge part appears on the left of the screen that you have to pick up and

transport to the chasm on the right. If you get the bridge built you can cross into Satan's Hollow and do battle with the Prince of Darkness. Needless to say, he's not too friendly. He flies around at high speed, throwing tridents at you. If you defeat him, or just manage to stay alive until the attack is over, you are returned to the first screen to face another wave of attackers.

Each time you are victorious over an attack wave, a bonus flag is flown across the top of the screen to the Devil's Castle. These flags will result in bonus points when you shoot down the devil. Between attack waves you will have to face fire-breathing devil's heads. Destroying these results in the appearance of another bridge part and another bonus flag. Defeating the devil or the devil's head results in a sound that resembles bubble gum popping which I find quite amusing. There's not much time for chuckling, however, as each attack wave gets tougher. You'll encounter pterodactyls that bomb your

bridge with molten rocks, demons that drop lava eggs, which keep burning, on the ground *AND* some of these guys will even try to steal your extra missile launchers! Now, in addition to staying alive and building a bridge, you have to protect your future lives as well!

To be honest, I did not find the game very interesting at first but, after many hours of playing, I have discovered that the game is still growing on me and I'm having a lot of fun with it.

One last point should be noted by the reader. Because of the detail of the screens and the fine distinctions between colours in some areas, this game should be played on a colour monitor for best results. A colour TV would probably be acceptable, too. But if you try to play on a black-and-white set, you'll have a devil of a time. *TPUG*

SATAN'S HOLLOW
from Bally-Midway

SPILLS AND FILLS

Vincent Sirugo
Scarborough, ON

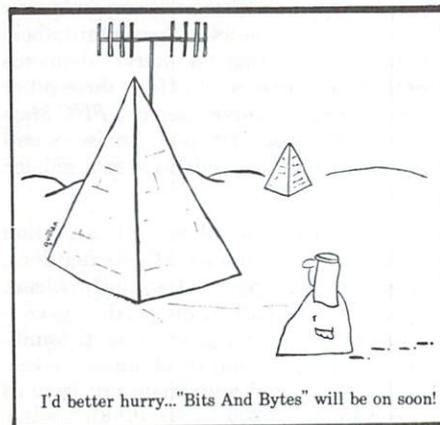
"A simple educational game for grade schoolers" best describes this VIC 20 cartridge from Creative Software—"simple" being the key word here. You are at the controls of a large crane (both realistic looking and sounding). The crane can move back and forth, via your joystick. When moved all the way to the left or right, a conveyer belt at the bottom of the screen also moves left or right, revealing different-sized beakers. Find a beaker with a little faucet on it (these are the master beakers). Now move the crane to the beaker. Lower the winch on the crane by means of your 'fire' button and pick up the beaker. Now you are ready to move the master beaker to a large faucet located at the centre of your screen. If you position the beaker under the faucet and press the 'fire' button, the beaker will fill with water. (The sound and graphics here are very realistic). Now transport the beaker to another beaker. Pressing the 'fire' button again will cause the water to be released into the second beaker. Repeat the process until all the beakers are filled. Yes: that's all there is to it!

The object of the game is to fill all the beakers using the least amount of FILLS from the faucet while avoiding any spills. If the beakers aren't positioned just right, the water will spill over when released.

All the objects in the game are very large and very easy to manoeuvre. Sound effects are excellent. I found the game boring, but I can't get my five-year-old away from it.

His rating: 8 out of 10 *TPUG*

SPILLS AND FILLS from Creative Software.



SLAMBALL

Malcolm O'Brien
Toronto, ON

SLAMBALL is terrific! Another great game from Synapse Software! Hats off to Stephen C. Biggs, who has programmed a real winner.

One of the things that I really like about this game is that it will appeal to all age groups. Even a very junior player can learn, and will enjoy playing it just as much as a sophisticated adult player. Push 'fire' to shoot the ball and pull back on the joystick to move the flippers. These are sufficient instructions for the junior player. The adult player can move left or right flippers, pulse the ball left or right, control how hard the ball is shot out of the cannon, choose a 3-ball or 5-ball game and play strategically.

The two-player version of the game is a bit different. In this case, the player plugged into Port 2 controls the flippers and the player in Port 1 controls ball motion and the cannon. The Up and Down directions are used to set how far back the cannon is drawn.

The other great thing about this game is that it gives you all the control that a real pinball game does, while maintaining the unpredictability of chance. A dynamite combination! You'll never play the same game twice.

The action of the game is faithful to true pinball action and is just as good as the pinball games you may have seen on Apple II's (although I've yet to see *Pinball Construction Set* in action). There is a difference, however — the playfield is larger than the screen and as the ball rolls down, the screen scrolls smoothly up. This sounds more distracting than it is. In actual game play you'll be following the ball, just as you would with a real pinball machine.

The bottom line of the screen is reserved for the scoreboard, which tallies points as they are scored. It also shows which ball is in play and how many targets you need in order to get to the next level. This line was full of garbage every time I loaded it. Following instructions, I flipped the disk over and loaded from the other side. This worked out fine; the line was clear, and even though I couldn't read my score from the garbage line, this did not interfere in any way with playing the game.

And playing the game is the thing. I didn't care what my score was because I was hav-

ing so much fun in the actual playing of it. My son Sean (age 7) had a great time with SLAMBALL, too (especially after he beat my high score). We had as much fun watching each other play as we had playing ourselves. This is something that I feel really contributes to giving a game a lasting appeal.

Music is another factor. The music on the title screen is super, and the music during game play is suitably subdued, but also very good. The sounds used for game events are just as good. The game events, of course, are the usual collection of rollovers, targets, round pop bumpers, rubberband kick bumpers and a special added attraction which can only be done on a computer and not on a real pinball machine.

This special feature is the addition of the "floating" bumpers. Knocking down a bank of targets releases the floating bumpers. They appear on the screen and drift about. If they touch anything, they pop like a soap bubble; but if your ball rolls over it, you score bonus points and advance the score multiplier. Take note, however, that the score multiplier advances like this: 1,2,3,4,1. In other words, after you've hit

three floating bumpers, the score multiplier is set to 4, and anything hit for points will have its point value multiplied by 4. If you strike another floater, the score multiplier will "advance" back to 1.

Bonus scoring for completing a level in a 3-ball game is worth more than in a 5-ball game. Your bonus is the current score plus the number of balls you had left \times the level completed \times 1000 (for a 5-ball game) or \times 2500 (for a 3-ball game). Another point to keep in mind is that you have a set number of ball pulses. If you jostle the ball too many times, you'll TILT and the current ball will be lost. However, the number of pulses allowed is reset whenever your ball returns to the cannon barrel.

This game is delightful. The younger set around your household will really enjoy it, and when the kids are in bed you'll be able to try your hand yourself. So get off your bumper and roll over to your local software dealer and check out SLAMBALL. You'll flip! TPUG

SLAMBALL from Synapse Software, 5221 Central Ave., Richmond CA 94803

TOOTH INVADERS

Vincent Sirugo
Scarborough, ON

If you have trouble getting your kids to brush their teeth, then this game cartridge may be the answer. Designed for grade schoolers, you are the superhero 'Plaque-man'. Armed with a toothbrush, you are in someone's mouth. Here, there are eight teeth, filled with plaque. Now use your toothbrush to brush them clean before they turn green, and decay. If you hit the 'fire' button on your joystick, you will find yourself armed with dental floss instead of a toothbrush (to clean between the teeth). Press the 'fire' button again to get your toothbrush back.

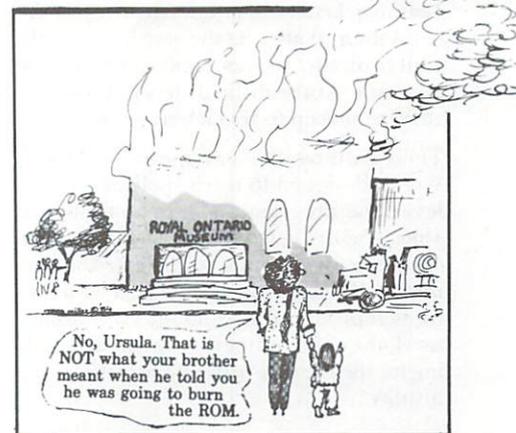
Fighting against you in your battle is a large green monster called D.K. If it gets you while you're brushing, then Plaque-man is a goner. But if you clean a tooth completely clean, it will shine bright red, a fanfare will play and you now have ten seconds to kill the terrible D.K.

The graphics on this cartridge are good,

all figures are large and easy to see and manoeuvre. With nine levels of difficulty, this game is an excellent addition to anyone's library. A nice change from the shoot-'em-ups and maze games.

Rating: 8 out of 10. TPUG

TOOTH INVADERS from Commodore. (See your local Commodore dealer).



Annihilator and Skramble!

John David
Etobicoke, ON

Games!?! Games!?! No matter if it's a sport, a card game or a keyboard entertainment, we tend to play most those games that we feel we can 'master' to some degree of success. The feeling of satisfaction brought on by improvement makes us repeatedly try our hand at certain games. That's why I'll be playing **Skramble!** more often than **Annihilator** on my C-64.

A better title for **Annihilator** (by Victory Software) would be 'Annihilated'. The tape comes with a C-64 version on one side, and an unexpanded VIC 20 version on the other. In both, you are a pilot on your way to capture slaves from the galaxy "Messier 31", while enemy ships, space rabbits (?!?) and indestructible nuclear waste containers assault your space ship. To defend the ship, the 'captain' fires rockets to destroy the attackers, or manoeuvres to avoid the waste containers. In desperation, the commander can destroy all attackers with a 'smart bomb' by pressing the space bar. However, there is only one of these per

sector (until you clear the screen of attackers) so it's a precious resource to use. Despite the fact that the ship zips about the screen and fires rapidly, there is little chance to advance in this game. Indeed the rapid movement causes as many collisions as it helps avoid. To heighten the frustration of the game the scoreboard posts eight zeroes to start, but the idea that a player can come close to a score of even *one* million in the game is doubtful. The most frequent message in **Annihilator** is, "Battle Over". There is little realistic chance for the joy of improvement as your skill develops.

Skramble! (by Microdigital Products) is a more enjoyable game. You pilot a rocket-plane that seems like a hummingbird — maybe it's the green-and-purple colouring — over a mountainous landscape dotted with unmoving enemy helicopters and missiles which fire randomly. At first, the firing seems strange, for your ship simultaneously shoots forward while bombing enemy targets below. However, in the hilly terrain, you can destroy the enemy on distant hill-sides that loom in front of you, as well as defend yourself from attack from below. In order to sustain your flight, you must bomb

fuel depots that dot the countryside. That countryside is divided into eight sectors offering more and more difficult challenges — in a cave, in a meteor storm, in a city of skyscrapers. During the flight, you continually bomb or shoot targets of varying values (a space creature is worth 1000 points!) while using the joystick to control the height and right movement of your plane. With this control you can dodge the rockets fired at you. The ultimate goal is to destroy the enemy's command centre. While the challenge is difficult, **Skramble!** provides a sense of satisfaction as your score climbs and you move closer and closer to destroying the enemy command centre.

For the 'ultimate' challenge try **Annihilator**, but if you want to sustain play and advance play **Skramble!** *TPUG*

ANNIHILATOR
Victory Software
SKRAMBLE!
Microdigital Products
P.O. Box 1110, Webster, NY 14580
(716)872-0518

Preschooler

George Shirinian
Toronto, ON

This set of six cassettes is specifically designed to teach pre-school-aged children about numbers, counting, letters and spelling. There are nine programs which incorporate colour, graphics and sound.

Learning Letters is intended to teach the child the alphabet. At the easy level, it asks which of two letters comes first in the alphabet. At the difficult level, it asks the child to put up to five letters in order.

There are three different tapes called **Making Words**, designed to teach spelling. At one level, the program displays a number of objects with their names: then gives the child the opportunity to recreate the correct spellings from the keyboard with pictures reproduced at random. At a higher level, the child must give the correct spelling for the picture, without the initial word display.

Spelling also displays a word and then asks the child to spell the same word correctly. This game differs in that the child can choose the number of words to be tested on, from 1 to 20; and that each word appears on the screen for only a few seconds before disappearing. The word must then be spelled from memory. For more of a challenge, there are three speeds affecting how long the word remains on the screen.

Learning Numbers teaches the numbers from 1 to 10. The easy level displays all ten numbers at the top of the screen and asks you to find any missing numbers in another row at the screen's centre. At the intermediate level, the row at the top is removed, so you have to remember the missing number. At the difficult level, there are two numbers missing.

Learning To Count displays abstract graphic objects on the screen and asks the child to count them and input their number.

Counting Exercise rolls two dice and asks for the correct sum. The levels of difficulty are differentiated by the amount of time allowed

for an answer. At the easy level, there is no time limit. At the difficult level, only two seconds are allowed. I must admit, this is challenging, even for me!

Pedagogically, the games are good. Preschoolers need some initial help with them, but 6- and 7-year olds can probably handle them alone. The use of colour and graphics is acceptable, but perhaps more could have been done with sound. I particularly liked the fact that the games allow you two wrong attempts before giving you the right answer. The question is then asked a third time. If the child still gets it wrong, the program says "Let's continue", which is sensible. At the end of the games, scores are given, encouraging the child to compete with himself. Although the programs are quite simple in use, the options of difficulty levels will allow the child to improve his ability, and give the programs greater longevity before they are outgrown. *TPUG*

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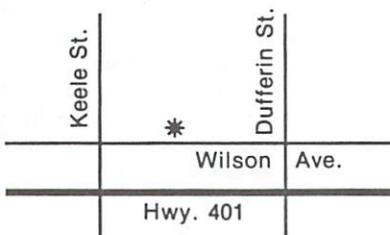
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THE CARD?/+G INTERFACE

Kevin Boardman
Richardson, TX

In this growing computer industry, many companies are making peripherals compatible with many different computers. One of the most common of these peripherals is the parallel (Centronics type) printer. While most personal computers have this interface standard, Commodore computers instead use a 6 pin serial bus. It is capable of setting up a daisy chain arrangement of peripheral devices, including Commodore disk drives and Commodore printers, but it is quite incompatible with other products on the market. To resolve this problem, many companies have created interfaces which allow you to connect parallel printers to the VIC 20 and Commodore 64. However, they are usually insufficient for the serious user, as they do not allow Commodore characters to be printed and they do not correct CBM-ASCII to coincide with standard ASCII.

If this situation has confronted you, your troubles are over. Cardco Inc. of Wichita, Kansas has created the Card ?/+G (Card print/+graphics). This ingenious interface allows you to add any parallel printer to your VIC 20 or C-64 system. This is the first and, as far as I have seen, the best printer interface on the market for Commodore computers.

The Cardco product is state-of-the-art interfacing. Not only does it reproduce Commodore characters and graphics, but it produces a much higher quality copy of Commodore graphics than the 1525 or 1526 printers do. I am using the interface with the Gemini 10X printer, and because of the Gemini's larger 9x9 dot matrix (as opposed to the 1525's 5x7), the print output is much nicer. In the manual accompanying the interface, dip switch settings are given for using the interface with all Epsoms, all Geminis, the Prowriter, C-Itoh 8510, NEC 8023, Okidata 82 and 83/92 and the Siekosha 100. For those interested, the Siekosha 100 is available under many different names, including the Gorilla Banana, Axiom 100, Panasonic JR-PO2U, Spectravideo SV-701, as well as the Commodore 1525. For printers other than the ones listed, you must call Cardco for the appropriate switch settings.

While you are running your system in the interface mode (the mode on when the computer is turned on), it offers complete emulation of the Commodore 1525 and 1526 printers. This means that any software published for the VIC 20 or C-64 which accesses

these printers will run without any modification. Of course, you can also program as if you had one of the Commodore printers. However, other than having access to all of the capabilities of the Commodore printers, you can run the interface in a lock mode, which allows you to have access to all of the capabilities of the printer you actually have. This is the same as having two printers at the same time, which is great for the minimal cost of the interface. Another advantage over actually owning a Commodore printer, such as the 1525, is that your printer will print at its full speed, even in the emulation mode. This allows me to emulate a Commodore printer at 120 cps (Gemini's top speed), instead of the 1525's 30 cps.

Three of the dip switches in the interface are optional, regardless of which printer you are using. Switch #4 allows device number selection, either device 4 or 5. Switch #7 allows one to control ASCII correction



of the interface. When on it allows software selection of ASCII correction and when off it locks in the "no ASCII correction" mode. Finally, switch #8 controls the auto line feed. When on it allows software selection of the auto line feed functions, and when off it locks the unit in the non auto line feed mode. Two new secondary addresses are also available with the interface and are not with the Commodore printers. The first one, address #3 (OPEN x,x,3), causes all characters sent to the printer to be printed out in their hexadecimal equivalents, which is very helpful in debugging. The second address, address #6 (OPEN x,x,6), causes the interface to print all characters from the character ROM within the interface.

There are many options available in listing programs using the interface. Older Cardco interfaces allow three different modes for listing programs. One gives you a listing in upper case only mode and with auto line feed. Another gives a listing in upper case without the auto line feed function. The final mode gives a listing in upper and lower case with the auto line feed function. On later revisions of the

interface, the special listing mode has been eliminated. However, there are still a multitude of listing options. By locking the interface into the non-Commodore mode and setting your printer accordingly, programs may be listed in any font or format available with your printer. I like to list longer programs in condensed mode on my Gemini, but if you wished, you could list in expanded print, emphasized print or whatever you like. Although the interface does completely emulate Commodore graphics, it does not print these confusing symbols when listing a program. Instead, it prints out a function in words (ie. reversed heart becomes (sc) for screen clear).

If you are using a wordprocessor, such as **Quick Brown Fox** or **Wordpro**, the Cardco interface allows you to lock in a non-Commodore mode by typing OPEN 4,4,25: CMD4: ?"LOCK": PRINT#4: CLOSE4. You are then able to allow your wordprocessor to control all ASCII correction, plus you have access to your printer's special functions which may not be available on Commodore printers.

Coming from the interface are three cables, two going to the computer and one to the printer. The interface uses the Commodore standard 6 pin serial bus and can therefore be connected in a continuous daisy chain arrangement, either to the computer, a disk drive or another Commodore printer. Because it connects to the serial bus instead of the user port, as other interfaces do, it can be addressed directly as a standard Commodore peripheral, and the status variable will operate with it. A 6 pin plug compatible with the cassette interface connects to the computer as the interface's power supply. It includes a male card edge as well, so that it in no way interferes with standard cassette operation. And finally, from the other end of the interface comes the standard Centronics type parallel cable.

The Card ?/+G interface is everything one could want in a parallel printer interface, and then some. For the price of the interface, you have another completely different printer with different character sets and functions, allowing for an infinite variety of printing styles available. I strongly recommend that before you buy a Commodore printer, you check out this interface and other more advanced printers which are available. *TPUG*

Cardco Inc., 313 Mathewson, Wichita, Kansas, 67214.

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HELP !

hints

If you have bought a Commodore 8K cartridge for your VIC 20, you can easily expand it to 16K. If you open the cartridge you will see that there is room for 4 other TNM2016 memory I.C.'s. You can buy them for less than \$9.00 each. You need 4 0.1 uF condensers as well. Before installing them you should remove the tin clogging the holes with a soldering iron and desoldering mesh (or desoldering pump). Be careful not to overheat — it could damage the circuit board. I did the job in about one hour and it worked perfectly.

Jacques Deschenes
495 Boul. Joliet
Hauterive, Quebec G5C 1N8

Thank you for helping me learn more about the touch-tone system for hearing-impaired people. It turns out that the people at Gallaudet College in Washington, DC were also very helpful. They sent me a brochure from Audiotone Company, PO Box 2905, Phoenix, Arizona 85062, phone 602-254-5886. The company is just beginning to market a \$350 stand-alone box, called Talkphone, which accomplishes almost all of the things I want. It is so new that no hearing aid dealers in our area have seen one, so I cannot speak about its fidelity, etc. It straps onto the receiver of the telephone and displays the letters on a two-line LED screen. Their system has no explicit provision for a mute hearing-impaired person. But since it is a device dedicated to a single purpose it should be quite easy to use. The question remains as to whether non-hearing-impaired persons will be willing to use the clumsy system.

Brian Schott
Decatur, Georgia

Some TPUG members may be having trouble with older C-1526 printers hanging up when used with the VIC 20. Typing 'SYS 64490' sets the serial port timing to the C-64's speed. The 1526 then works fine.

Howard M. Mesick
Hartly, Delaware

Where can I get information on interfacing my Commodore 64 with sensors such as photogates or temperature probes?
John Bridge, Washington

Information on this type of project can be obtained from Theodore V. Brown, 32 Lawrence Rd., Hyde Park, NY 12538.

I have a Commodore 64 that I purchased in Canada. What difficulties might I encounter if I took it to England this summer? In particular, can I hook it up to the television sets over there?

Gordon Emms, Ontario

The Commodore 64 sold in North America cannot be easily changed to interface with the PAL television system. You could take your own monitor to solve that part of the problem.

You have two other problems. The voltage in the United Kingdom is about 220 to 230 volts, which is much higher than in Canada, and the power frequency is 50 cycles per second instead of 60 as it is here. You will need a 'step-down transformer' to solve the first problem for all your devices. The second problem — frequency — doesn't seem to be too important, according to reports from people who have tried it; but it might affect disk performance slightly. Other devices, like modems and IEEE interface devices, might not work.

Jim Butterfield
Toronto, Ontario

How can I download text from Compuserve, DJNS, etc. with my C-64 and 1650 Automodem?

Dr. S.A. Randeree, Manitoba

I would suggest **TERM64** by Paul Higginbottom (public domain) — on (C)TB for use in commercial boards. Of commercial programs, I would suggest **VIP TERM** — I know it works. There are other terminal programs like **SUPERTERM**, **TELETALK**, etc. but I have not used them. Your major need would appear to be a 'capture buffer' and all of the above programs have this feature.

Ian Wright
Toronto, Ontario

How can I compose in 80 columns using superscripts, subscripts, Greek symbols and mathematical symbols? My equipment consists of: C-64, DATA 20 eighty-column card, Gemini 10 printer and Protecto word processor. Robert Speers, Ohio

The Gemini is incapable of producing special symbols, as far as I know. You can generate dot-addressable graphics on an Epson; this might be possible on the Gemini but it would be tough sledding! A good word processor (Paperclip/Wordpro/Superscript) will allow special characters to be sent, but the printer may not be able to produce them.

Ian Wright
Toronto, Ontario

One reasonably priced word processor that will work with the DATA-20 eighty-column expander is **TOTL.TEXT 2.6**, available from **TOTL SOFTWARE**, PO Box 4742, Walnut Creek, CA 94596. I may be able to help Mr. Speers with the symbols too. I have modified the **TOTL.TEXT** for use with the Epson printers, but I believe their capabilities are pretty much the same as the Gemini. I'm sure that building a fairly large number of characters directly into the WP will be as easy to do as the graphics characters I've built into my program.

Billy Burnett
Box R Northrop Corp
APO NY 09038

questions

When you reply to someone whose full address is shown with his/her question, please send a copy of the letter to the TPUG office so that we can let others know what you have had to say. For every question we list, there are always several people who are interested in the answer.

I need to make a French printer file for my Commodore 1526 printer. I use **Paperclip, version 4D**, and although I can get French accents on my monitor, they never appear on a printed copy. I went through *Appendix P* (creating a printer file) from the owner's manual without any success.

Denis Desormeaux
577 Leroux
St-Jerome, PQ J7Z 2M1

Where can I get a program that row reduces a system of linear equations and solves unknowns?

Stephen Abraham
University of Ottawa
100 Haste Ave., S-1201A
Ottawa, ON K1N 9A7

Can someone please recommend a Bulletin Board program that will operate with a C-64, a 1650 Automodem, a 1541 disk drive and/or an MSD dual disk drive? I would also appreciate any hints or suggestions on how to get a board up and running. Thank you.

Robert D. Swift
104-530 Bannatyne Avenue
Estevan, SK S4A 2G5

Be sure to read the conclusion of *Forecasting With The 8032*, by John Shepherd, in next month's issue.

I use EasyScript and Easy Spell on my C-64. Occasionally when I exit the program, it takes me back to BASIC instead of the startup of EasyScript, which is where I want to be. I use option 7 from the menu to exit the program. Since this happens only occasionally I don't understand why it is happening at all.

Secondly, the documentation for Easy Spell indicates that it can be used with dual disk drives. I have two 1541 disk drives. I have changed one in hardware to device 9. The program still won't work. In the documentation it seems to indicate that it will work with dual IEEE drives. Is there some way to fool it into thinking my dual 1541's are dual IEEE's?

I have a sector editing program that allows me to edit the machine language on my disk. Is there some way (as a last resort) of entering the programs and altering them to work with dual 1541's?

Carl C. Hansen
5404 28th Ave. SW
Naples, FL 33999
(813) 455-5919

PET-Pals

For any other *new* CBM fans. I've had my computer only one year, but I'm willing to exchange letters with other novices and exchange ideas and dreams. I am not a radical hacker, but enjoy my computer about ten hours a week. This is what home computing is really all about.

W. R. Bell
1133-62nd Pl. South
St. Petersburg, FL 33705-5628

In response to my call for Z-RAM users (*TPUG Magazine*, Aug/Sept), we have formed a Z-RAM USERS CORRESPONDENCE GROUP. There is no membership fee for participation in this group. Members will receive an occasional newsletter. Anyone who is interested should send their name and address to:

Richard W. Jones
1205 Rogers Place
Irving, TX 75060
(214) 986-6913
Comuserve ID: 75076,600

PET pals who want to share programs are invited to correspond.

Thomas Bidy
P.O. Box 249
Iroquois Falls, Ontario
P0K 1E0

I'm a writer investigating the ways parents are using their computers with their children as an educational tool. I am interested in all ages, all degrees of success. Will you share your personal experiences? Send your name and address and I'll get in touch. Thank you very much.

Edward Hoornaert
R.R. 2, Box 3206
Clearwater, BC
V0E 1N0

I have had 30 years' experience in investing, and I have been using my C-64 for investment analysis and record keeping for nearly one year. I would be interested in trying to form a subgroup of people interested in computers and investing. If anyone is interested, please let me know.

Dr. Lynn Harner, DDS
2011 Central
Dodge City, KS 67801

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TPUG Associate Club Chapter Meetings

CANADA

Commodore Owners of Muskoka

—meets at MacAulay Public School, Bracebridge, on the first Wednesday of each month at 7 p.m.

Contact Mike Wilson 705-645-6300

Edmonton Commodore Users Group

—meets at Archbishop Jordan High School, Sherwood Park on the last Friday of each month at 7 p.m.

Contact Bob Kadylo 403-465-3523

Guelph Computer Club

—meets at Co-operators Insurance Assoc. on the 2nd Wednesday of each month at 7:30 p.m.

Contact Brian Grime 519-822-4992

London Commodore Users Club

—meets at Althouse College of Education, main auditorium on the 3rd Monday of each month at 7 p.m.

Contact Dennis Trankner 519-681-5059

Niagara Commodore Users Group

—meets at Lakeport Secondary School, St. Catharines at 7:30 p.m. on the 1st Monday of the month.

Contact Ian Kerry 416-688-6464

Sarnia C-64 Users Group

—meets at Lambton College on the first Sunday of each month at 7:30 p.m.

Contact J. C. Hollemans 519-542-4710

Commodore Users Club of Sudbury

—meets at Lasalle High School in the cafeteria on the last Thursday of each month at 7 p.m.

Contact Tim Miner 705-566-9632

PET Educators Group (Windsor)

—meets at Faculty of Education Building, 600 3rd Concession, Windsor on the 3rd Wednesday of each month (not July & August) at 7 p.m.

Contact John Moore 519-253-8658

UNITED STATES

Boston Computer Society/Commodore Users Group

—meets at Minute Man Tech High School, Rt 2A (just off Rt 128) in Lexington, MA every 2nd Monday of the month at 7 p.m.

Contact Harvey W. Gendreau 617-661-9227

Commodore Computer Club of Toledo

—meets at Bedford Administration Bldg. on Temperance Rd., between Lewis and Jackman Roads on the second Friday of each month at 7:30 p.m.

Contact Jim Cychler 419-475-9160

Commodore Houston Users Group (Texas)

—Clear Lake Chapter — Nassau Bay City Hall, NASA Road #1, on the first Wednesday of each month at 7 p.m.

—Central Chapter — Farrish Hall, University of Houston main campus

—NW Chapter — Bleyl Jr. High School, 10,000 Mills Rd. (Cypress-Fairbanks SD), on the 3rd Thursday of each month at 7:30 p.m.

—Klein Chapter — Hildebrandt Middle School, 22,800 Hildebrandt Rd. (Klein ISD), on the 3rd Tuesday of each month (except July & August) at 6:30 p.m.

Contact Mary F. Howe 713-376-7000

Genesee County Area Pet Users Group (Michigan)

—meets at Bentley High School on Belsay Rd. on the 3rd Thursday of each month at 7 p.m.

Contact Gordon Hale 313-239-1366

Greater Omaha Commodore 64 Users Group

—meets at South Omaha campus of the Metropolitan Technical Community College, 27th and Q Streets in Room 120 of the Industrial Training Center on the first Thursday of the month at 7 p.m.

Contact Bob Quisenberry 402-292-2753

Manasota Commodore Users Group (Florida)

—meets at Mr. G's Computer World, 2057 Whitfield Industrial Way, Bradenton, FL on the 2nd and 4th Thursdays of the month at 7 p.m.

Contact Robert O. Bronson 813-747-1785

Michigan's Commodore 64 Users Group

—meets at Warren Woods High School in Warren on the 3rd Tuesday of each month at 7 p.m.

Call 313-773-6302

Mohawk Valley Commodore User's Group

—meets at the Clara S. Bacon School in Amsterdam, NY at 7 p.m. on the 2nd Tuesday of the month

Contact William A. Nowak 518-829-7576

Russellville CUG, Inc. (Arkansas)

—meets at Oakland Heights Elementary School on the 3rd Thursday of each month at 7:30 p.m.

Call 501-967-1822

Sacramento Commodore Computer Club (California)

—meets at Kit Carson High School on the 4th Monday of each month at 7 p.m.

Contact Geoff Worstell 916-961-8699

Southern Minnesota Commodore Users Group

—meets at Mankato State University on the first Thursday of each month at 7:30 p.m.

Contact Dean Otto 507-625-6942

Westmoreland Commodore User's Club

—meets at Westmoreland County Community College (Youngwood PA) on the 3rd Friday evening of each month

Contact Bob McKinley 412-863-3930

INTERNATIONAL

Baden Computer Club (West Germany)

—meets at CFB Baden-Soellingen on the 2nd Sunday of each month at 7 p.m.

Contact Ben Brash

Trinidad Association of Commodore Owners — TACO

—meets at St. Mary's College, Frederick Street, Port of Spain every 2nd Saturday of the month at 2 p.m.



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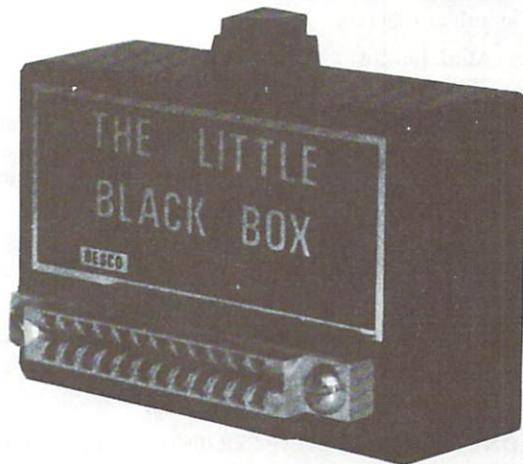
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TPUG Calendar of Events

For Toronto meeting information: (416) 782-9804

Fall/Winter Schedule

Please note: The exceptions to the 'rule' for the designated date for a meeting (e.g. 2nd Thursday) are shown in bold.

BRAMPTON CHAPTER — Central Peel Secondary School, 32 Kennedy Rd. N. on the second Thursday of the month at 7:30 p.m. in the Theatre.

Thu. Jan. 10 **Thu. Mar. 7**
Thu. Feb. 14 Thu. Apr. 11

CENTRAL CHAPTER — Leaside High School, Bayview & Eglinton Aves. on the second Wednesday of the month at 7:30 p.m. in the auditorium for PET/CBM.

Wed. Jan. 9 **Wed. Mar. 20**
Wed. Feb. 13 Wed. Apr. 10

COMAL CHAPTER — York Public Library, 1745 Eglinton Ave. W., (just east of Dufferin) on the last Thursday of the month at 7:30 p.m. in the auditorium.

Thu. Jan. 31 Thu. Mar. 28
Thu. Feb. 28 Thu. Apr. 25

Commodore 64 CHAPTER — York Mills C.I., 490 York Mills Rd., (east of Bayview) on the last Monday of the month at 7:30 p.m. in the cafetorium.

Mon. Jan. 28 Mon. Mar. 25
Mon. Feb. 25 Mon. Apr. 29

COMMUNICATION CHAPTER — York Public Library, 1745 Eglinton Ave. W., (just east of Dufferin) on the first Wednesday of the month at 7:30 p.m. in the Story Hour Room (adjacent to the auditorium).

Wed. Jan. 2 **Wed. Mar. 6**
Wed. Feb. 6 Wed. Apr. 3

EASTSIDE CHAPTER — Dunbarton High School, (from the traffic lights at Highway 2 and Whites Rd. — go north on Whites Rd. to next traffic lights — turn left to parking lots) on the second Monday of the month at 7:30 p.m.

Mon. Jan. 14 Mon. Mar. 11
Mon. Feb. 11 Mon. Apr. 8

FORTH CHAPTER — York Public Library, 1745 Eglinton Ave. W., (just east of Dufferin) on the second Tuesday of the month at 7:30 p.m. in the Story Hour Room (adjacent to the auditorium).

CANCELLED

HARDWARE CHAPTER — York Public Library, 1745 Eglinton Ave. W., (just east of Dufferin) on the first Friday of the month at 6:30 p.m. in the Story Hour Room (adjacent to the auditorium).

Tue. Jan. 8 Tue. Mar. 12
Tue. Feb. 12 Tue. Apr. 9

MACHINE LANGUAGE CHAPTER (6502) — Fenton High School, off Kennedy Rd., south of Steeles Ave., Brampton, at 7:30 p.m. in the computer room. For further information call Garry Ledez c/o 416-782-8900.

SuperPET CHAPTER — York University, Petrie Science Building (check in Room 340). Use north door of Petrie to access building. On the third Wednesday of the month at 7:30 p.m.

Wed. Jan. 16 Wed. Mar. 13
Wed. Feb. 20 Wed. Apr. 17

VIC 20 CHAPTER — York Public Library, 1745 Eglinton Ave. W., (just east of Dufferin) on the first Tuesday of the month at 7:30 p.m. in the auditorium.

Tue. Jan. 15 Tue. Mar. 5
Tue. Feb. 5 Tue. Apr. 2

WESTSIDE CHAPTER — Clarkson Secondary School, Bromsgrove just east of Winston Churchill Blvd. (south of the QEW) on the third Thursday of the month at 7:30 p.m. in the Little Theatre for PET/CBM/VIC 20/Commodore 64.

Thu. Jan. 17 Thu. Mar. 21
***Thu. Feb. 14** Thu. Apr. 18

*joint meeting with Brampton at Central Peel Secondary School in Brampton

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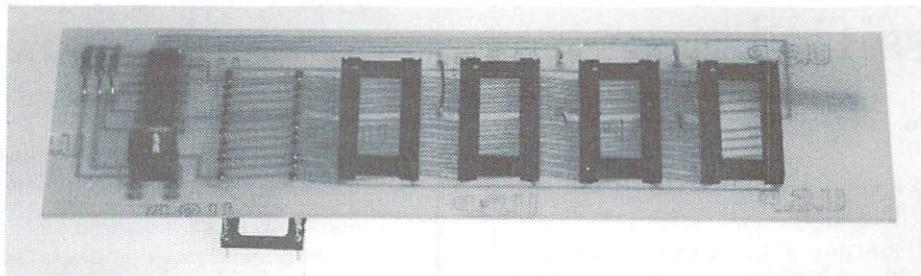
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Kris Torrey	Colton, California	KA6VQI
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(S)TJ: November 84

"describe.nov/84" SEQ This describes file.

Contributed by Avigdor Moise, CRESS York University, (416) 667-9898

This program is a communication demonstration program. It is used in conjunction with another computer running any standard communications software. This program was demonstrated at a SuperPET meeting, using two SuperPETs: one in straight pass through mode, the other running this program. The two computers are connected through the RS/232 ports, either by direct connection or through modems. This program interprets the incoming data from the other (host) computer displaying the digital representation and the ASCII character on the SuperPET screen. I have also used it connected to an IBM-PC Clone running PC-TALK III.

- 82 "foreground.asm" SEQ The main command and setup interpreter.
- 54 "background.asm" SEQ Interpret and display incoming serial port communication.
- 11 "frame.asm" SEQ Draws the initial windows.
- 46 "graph.letter.asm" SEQ Displays the wave form interpretation and the appropriate ASCII character in graphic form.
- 7 "GENERATOR" PRG A 6502 BASIC program which generates fcb entries for the graphic characters used by "graph.letter.asm"
- 6 "rs232.start.asm" SEQ Starts the foreground and background programs.
- 7 "scroll.left.asm" SEQ Moves the wave form one position left.
- 21 "watlib.exp+" SEQ The extended Watlib definitions required by these routines, for resolution in the link step.
- 1 "rs232.demo.cmd" SEQ Command file for linking these routines
- 14 "rs232.demo.mod" PRG The load module, designed to be loaded from the main menu. Place disk in drive 1 and enter 232.demo.mod. Then select the terminal settings using the interactive command processor (first line of the display) and adjust the other terminal accordingly. Enter a character on the other terminal, sit back and watch the wave form pattern scroll right to left on your screen.

This program was written by Brad Bjorn Dahl and Avigdor Moise.

This program is a Keyboard driver program which has been developed as part of the OS/9 project. It works very well on the SuperPET, replacing the standard Waterloo routine. It provides enhanced character definitions as well as better keyboard voice control. Just load from the menu at start up time, the routine will sit in high memory \$7800. It may interfere with APL workspaces.

- 97 "key1.2.asm" SEQ The source code.
- 1 "key1.2.cmd" SEQ The linker command file.
- 3 "key1.2.mod" PRG The load module. Access from the menu.
- 20 "key1.2.doc:e" SEQ Some program internals documentation.

These two programs are made available by ISPUG.

- 66 "xmon6809" PRG An exploratory tool, with hooks for added capability in this extended monitor for the 6809 side of the SuperPET. Uses all the Waterloo monitor commands, and adds a lot more.
- 98 "XMON6809" PRG Another version of xmon6809, which loads on the 6502 side, and includes MICROMON. You can switch from 6502/6809 under control of the PRG switch.
- 80 "instruct_exmon:e" SEQ Some documentation for the above two programs.

This disk assembled and described for TPUG SuperPET users by Bill Dufield.

(C)TC: October 84

(1 disk/tape)

- LIST-ME(C)T.C.L. Contains information about the programs and files on (C)TC.
- NOT BAID BOOT.C This file will load and execute "NOT BASIC AID 64".
- NOT BASIC AID 64 This is not "BASIC AID". Give all of the commands a try and you will certainly agree. (The "FLIP" command is great!)
- NBA 64 SRC PAL This is the source code for "NOT BASIC AID 64". If you make any enhancements, please send us a copy.
- SLOT.C Play against the slot machine. Loads and executes "SLOT.DATA" and "SLOT.PRIG".
- SLCT.DATA This file is loaded and used by "SLOT.C".
- SLOT.PRIG This file is loaded and used by "SLOT.C".
- WHIRLYBIRD.C Shoot down the helicopters before they escape off the screen. Any helicopters that slip past you will kill you. A great game from the author who brought us all "WET PAINT".
- ODIN.C A great game in which you must destroy all of the objects before they ram you. Another great game from the author who brought us all "WET PAINT".

- MOUNTAIN.C Ski down the mountain and avoid all of the obstacles. A very good game.
- JUKEBOX.C This program will allow you to play songs that were created using Master Composer. First the program reads the directory of your diskette. Then it will check the start address of all of the programs and display the names of only the music programs. From there you can play any of the music programs just by pressing the letter that corresponds to the title of the song you want to play.
- GHOST BOOT.C This file loads and executes "GHOST-BUSTERS".
- GHOSTBUSTERS Listen to your SID chip play "Ghostbusters".
- ROCKY 3 BOOT.C This file loads and executes "ROCKY 3 THEME".
- ROCKY 3 THEME Listen to your SID chip play "Rocky 3 Theme".
- STAIRWAY BOOT.C This file loads and executes "STAIRWAY".
- STAIRWAY Listen to your SID chip play "Stairway To Heaven".
- BEAT IT BOOT.C This file loads and executes "BEAT IT".
- BEAT IT Listen to your SID chip play "Beat It".
- BILLIE BOOT.C This file loads and executes "BILLIE JEAN".
- BILLIE JEAN Listen to your SID chip play "Billie Jean".
- 64AID.C This file contains a lot of tips and bits of information that will aid you in using all of the features of your C-64.
- ENCOUNTER.C This is an adventure game in which you encounter beings from another world. Good luck. . . ENCOUNTER.C makes use of more than 60 sequential files that are also contained on this disk.
- NOS TRANSLATOR.C This program will allow you to use programs saved on tape by other brands of computers as long as they are using this system. See TPUG Magazine (July '84) for more details.

(P)TD: November 84

(1 disk/tape)

- LIST-ME(P)TD.L Contains information about the programs on (P)TD.
- CLASS HISTOGRM.P Education - Histogram of class marks.
- DATA CREATOR.P Education - Creates BASIC lines and appends to program already in memory.
- OTHELLO FOR 2.P Game - Game board for 2 players of Othello. Program will edit input moves. A wrong move can be cancelled if the opponent types a '9'. If no move is possible, type a '0'.
- SEQ EDIT INST.P Utility - RUN for editor instructions.
- SEQ EDITOR 1.P Utility - Sequential file editor. Fast, but ends a line if a comma or semi-colon appears in data.
- SEQ EDITOR 2.P Utility - sequential file editor. Slow, but can handle commas and semi-colons in data.
- MICROEDIT INST.P Utility - RUN for instructions for "MICRO-EDITOR.P".
- MICRO-EDITOR.P Utility - documentation not available.
- GENERAL EDINST.P Utility - RUN for instructions for "GENERAL EDITOR.8".
- GENERAL EDITOR.8 Utility - An editor derived from the Pascal editor of the SuperPET has "Wedge" & BASIC 4 commands. Can convert SuperPET to CBM files.
- SOURCE CREATOR.8 Utility - disassembler, instructions included.

TEN LINE PROGRAM - CONTEST ENTRIES

- ANTI-LOCKSMITH.P Utility - Unlock programs from "LOCKSMITH".
- GRAPHIC DEWAR+ P Demo - Graphic patterns using Commodore characters.
- JUMPY.P Game - Froggie - 4=left, 6=right 8=up, 2=down.
- KILL THE BIRD.P Shooting game - RUN 100
- MACHINE CODE.P Assembler - Convert hex machine code to DATA statements.
- MORSECODE KEY.P Ham Radio - Practice Morse Code (need Sound Box).
- OTHELLO.P Game - Play Othello against the computer. RUN 100 to start.
- TAPE INDEX.P Fast tape forward program - set for 3.5K programs. Use this program to SAVE and LOAD to and from tape. By resetting the pre-set fast forward time, larger programs can be stored.
- TYPEWRITER 1.C.F Electronic typewriter for 4032 and 2022.
- TYPEWRITER 1D.P Electronic typewriter for 4022/4023/8023.
- TYPEWRTR-INST.Z Instructions for the Electronic Typewriter.

NORTHCASTLE STRUCTURED BASIC

- Similar to Waterloo Structured BASIC. Versions are also available for C-64 and VIC 20
- + VERSION 1.7 + - See "STB INSTRUCT.Z" for instructions.
- + JUNE 1984 + - This program will RUN Waterloo BASIC programs. Some Waterloo BASIC bugs are fixed.
- STB PET 3800.P PET Structured BASIC at \$3800 SYS 3*4096+8*256

- STB PET 7000.P PET Structured BASIC at \$7000 SYS 7*4096
- STB PET 6000.P PET Structured BASIC at \$6000 SYS 6*4096
- STB PET 9000.P PET Structured BASIC at \$9000 SYS 9*4096
- STB 3800 RUN.P PET Structured BASIC at \$3800 RUN as above.
- STB 6000 RUN.P as above.
- STB 7000 RUN.P as above.
- STB 9000 RUN.P as above.
- STB INSTRUCT.Z Northcastle Structured BASIC instructions - RUN
- FAST COPY-ALL.P Utility - Another copy program.
- SIMPLE.Z NCSTL Structured BASIC simple sample program.
- QUIT FOR-NEXT.Z NCSTL Structured BASIC FOR-NEXT program.
- LINE RESTORE.Z Another sample program.
- BINARY SEARCH.Z Another sample program.
- QUICKSORT.Z Another sample program.
- STB PAL 3800.P NCSTL PAL Assembler file at \$3800.
- STB PAL 6000.P NCSTL PAL Assembler file at \$6000.
- STB PAL 7000.P NCSTL PAL Assembler file at \$7000.
- STB PAL 9000.P NCSTL PAL Assembler file at \$9000.
- STB INITIALA NCSTL Initialize source code.
- STB COMMAND.A NCSTL Command Analyser source code.
- STB SETUP.A NCSTL Setup source code.
- STB LOOPING.A NCSTL Looping source code.
- STB SELECTION.A NCSTL Selection source code.
- STB PROCEDURE.A NCSTL Procedure source code.
- LIBRARY LOGA.P Utility - List your disk directories (needs dual drive). Uses an upgraded version of disk logger to produce a disk log print and a data file. Merges these data files into larger files with a listing if desired. Lists the data files produced previously.
- TDOTUP NOV.84.P Sequential data file - example file of this disk from "LIBRARY LOGA.P" program.

(V)TC: October 84

(1 disk/tape)

- LIST-ME(V)T.C.L. Contains information about the programs and files on (V)TC.
- PLANETS INST.V Instructions for "PLANETS.V".
- PLANETS.V Visual picture of planets in relation to the sun.
- WORDFINDER INST.V Instructions for "WORDFINDER.V".
- WORDFINDER.V Word search game. You build grid of up to 15 X 15 puzzle, then the computer finds the word you wish to find.
- NIGHTMARE.V Humorous machine language program. Load and run then enter all the BASIC commands you can remember.
- FINANCES 8K.V Another good loan and interest calc.
- FUGUE.V Run but be prepared to wait a minute. Then sit back and watch.
- TEASERS 8K.V This game is similar to Trivial Pursuit.
- BRAIN BENDER 1.V Take a peek at this, if you dare, but don't load it if you are a borderline psychopathic hacker.
- BRAIN BENDER 2.V View this for another laugh!
- SUPER FIGHT.V Custom character demo.
- DRAGON POWER.V Same as above.
- SHERIFF.V Same as above.
- ENTERPRIZE.V Same as above.
- SPIDER RESCUE.V Rescue people from spiders. Watch out for the fast moving low life forms.
- SPI2.V Used by above game.
- CHAR INST 8K.V Programmable character set for French alphabet. Instructions included in program.
- EXP DEMO 1 Used by above.
- DEMO 1 Used by above.
- EXP DEMO 2 Used by above.
- DEMO 2 Used by above.
- EXP DEMO 3 Used by above.
- DEMO 3 Used by above.
- EXP DEMO 4 Used by above.
- DEMO 4 Used by above.
- TAPE DIRECTORY.V Very good multi-page directory with unusual ending.
- UNUSUAL ENDING.V A rather funny prog with, as the name says, an unusual ending.
- PADDLE NOISE.V Requires paddles.
- LOTTO 649.V Requires printer - randomly picks numbers.
- QBF CHANGER.V If you can figure this one out, let us in on it.
- GEMINI PRINT.V Prints directory.
- TINY DIRECTORY.V Requires a printer.
- LPRECORD TIMER.V Can be used with printer. Calculates time for an album.
- I2-TONE MUSIC.V Plays music based on Arnold Schoenberg's piano suite.
- FRENCH (DISK).V Translator Eng/Fr. Fr/Eng. Very good.
- FRENCH (TAPE).V Translator Eng/Fr. Fr/Eng. Very good.
- F.V File used by FRENCH (Disk and Tape). V.
- Same as above with more words.
- FRENCH DISK 8K.V File used by "FRENCH (DISK) 8K.V"
- FRENCH 2 8K.V File used by "FRENCH (DISK) 8K.V"
- 8F.V
- FR ACC PRAC.V This program is designed to test what you have learned in the above programs.
- DRUM BOOGIE.V A music prog - very amusing.
- O CANADA.V A very familiar song. Don't forget to stand at attention.
- PERCENT CHART.V Educational utility for calculating percentages on marks.

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Book Review

BASIC COMMODORE 64 BASIC

By James S. Coan

Hayden Book Co.
250 pages. (price ?)

This is a good teaching book for beginners. It contains a few programs, all fully annotated, and builds them slowly and systematically into larger and more elaborate units. When the programs begin to grow too large, sections are separated out for special treatment or explanation. Arrows direct attention to the key points in the listings which are being discussed. It's easy on the reader.

I like the style of the code. In most cases, it is simple and short, although there is one thing I *don't* like: single statements per line. While this probably makes a book easier to read, it is more work to type the programs in and subsequently harder to read them on the screen, unless you have 'POWER' or something similar to scroll the listings.

Major sections end with a subsection called *Programmer's Corner*, where additional details about the material already discussed is presented. Here also is a list of suggested problems to solve, to which the answers are given in the back of the book. One minor problem: while the organization of the book is flawless, the answer section is hard to follow. The programs are sideways: one sees four quadrants when the book is open and it is hard to tell where to go in order to continue. The typesetting, however, is very clear and there are no number zero/letter 'O' or number one/letter 'l' ambiguities. The few graphics characters in the text are clear. The chapters and sub-chapters are clearly labelled. The index is vast and seems to be correct. The table of contents is quite clear and descriptive.

Most of the material is standard BASIC and, with a few exceptions having to do with files (discussed below), the information seems correct. There is one deviation from the standard: using a POKE 198 to clear the keyboard buffer before GET or INPUT. I know it is a recent C-64 fad to use that POKE, but I can't think of one good reason to use it in preference to normal BASIC commands. No harm done, really, but it stands out in an otherwise non-gimmicky book.

The author describes many features of each command, shows their uses, provides exercises for them, and generally clarifies and adds to the material that is contained in the Commodore books. Numbers, arrays, character strings, high-resolution graphics, sprite graphics and sound are covered well.

One feature that stands out is that routines that tend to make a mess of the computer (graphics!) have nice, clean exits. Many other books require you to use STOP/RESTORE to quit a program, but not this one. I like that. However, there is little guidance provided to help you cope with typing errors in this kind of program.

The chapter on sequential files is well done. It discusses what they are for, how to build them and how to maintain them. The little routines use error channel checking correctly. The programs show how to write and read data. I have one objection to the method used: the programs write and read the counting variable. This is OK for small amounts of data, but in larger projects it is preferable to use ST. However, that's a point the readers can learn later.

There are some problems with the sequential file chapter (disk only!) and the appendix about the disk commands.

File writing commands are given correctly, and while I haven't typed in the programs I see no reason to expect that they won't work. However, don't follow the sugges-

tion given in the text to send commas between the items being written.

File expansion is done by rewriting a file, which is OK, (the COPY and APPEND commands aren't mentioned), but there is also the curious assertion that error 50 tells about the end of file. This just isn't so: error 50 has nothing to do with sequential files.

The syntax of the disk commands is all right for the single drives, but even so I would have preferred to see that zero for the drive number included. The disk just works better with it. The Initialize command isn't covered quite correctly: the author suggests to use it infrequently and says that 'I' restores the drive to its condition at power up.

I recommend this book highly to any person who is learning about BASIC and the C-64. If you already have experience on the C-64, you can perhaps still profit from some clear talk, but it will be most useful for the range of users from beginner through intermediate. *TPUG*

—Elizabeth Deal

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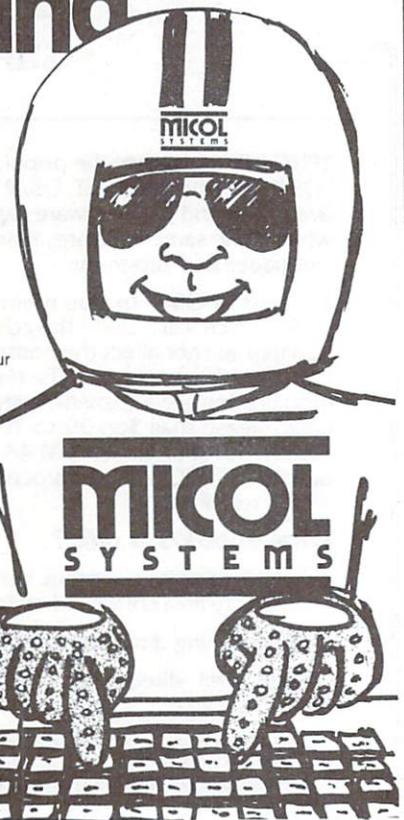
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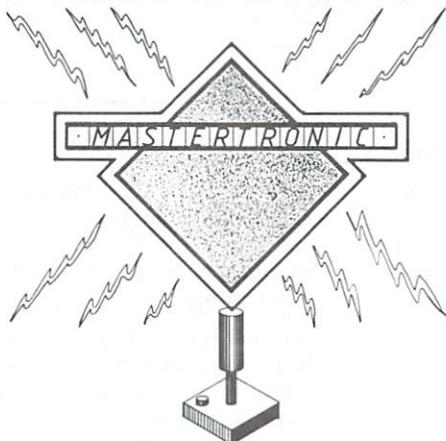
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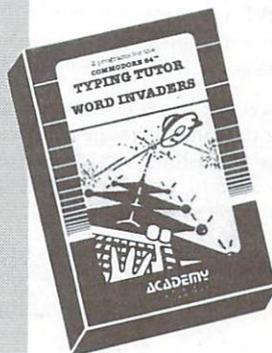
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The Beginner And The Disk: Part Six

Or: Things Mother Commodore Never Told You

David A. Hook

Barrie, ON

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Our previous five instalments have considered the disk commands; now it's time to turn to the subject of files. BASIC programs often contain embedded information: an address book program, for example, might include a series of DATA statements to contain the various pieces of information about each individual. When the program is SAVEd, the DATA items go with it.

So far so good – but perhaps you have a Christmas card list that could use the same data. Re-entering the DATA statements would be both redundant and, if the list is at all long, extremely time consuming. What we want instead is a method of storing data that will enable more than one program to get at them.

That means using files. Learning how to prepare and access files is not as complex as you may have been told. In fact, due to the interactive nature of BASIC, you don't even need a program to write them!

Definitions

Before we delve into the topic further we ought to provide definitions of several terms:

File, <i>n.</i>	Instrument, usually of steel with roughened surface(s), for reducing or smoothing objects.
Record, <i>n.</i>	Flat plate-like object, usually of plastic, for playback of audio signals.
Field, <i>n.</i>	Piece of ground, especially one used for pasture or tillage, and usually bounded by hedges, etc.

My mother always told me to look it up in the dictionary, but perhaps the *Concise Oxford* is not the one to use on this occasion. Consulting a data processing reference instead, we see:

File, <i>n.</i>	A collection of one or more records.
Record, <i>n.</i>	A collection of fields related to a specific unit of information.
Field, <i>n.</i>	A unit of data within a record.

The definitions may seem a little circular, but they aren't really. For an address file, we have information about a number of people (the records). Within each record there may be a number of fields (first name, last name, street address, phone number, etc.). Each field is one unit of the data and can be represented by a BASIC variable, whether string or numeric. So the field is the 'atom': the smallest unit of data we're likely to be interested in.

A filing cabinet might be organized similarly. It might contain several files; among them, perhaps, an invoice file. In the invoice file folder, we will have a number of records (the individual customer invoices). The individual invoice records contain several fields (customer name, customer address, product, unit cost, etc.). So the organization of data files with a computer follows real world practice quite closely.

File Organization

Files can be organized in different ways. Computer types will dazzle you with terminology: sequential, relative or direct, and indexed. You already know that tape is a sequential medium only – you cannot get the fifth tune on an audio tape until you have passed over the ones preceding.

Disks can be organized sequentially too. They offer the additional advantage that they can be accessed randomly. With random (also called 'direct') organization, we can fetch an individual record without having to look at any others. On your audio turntable you can move the tone-arm directly to the fifth tune with little extra effort.

Indexed organization is only possible with disk, and employs an index to allow recovery of the stored records in either sequential or random order.

File Numbers and OPEN

Before we can use a file, it must be OPENed, just like our real world file cabinet. Since many files can be used simultaneously, we assign each one a 'file number' in its OPEN statement. The number, which is usually in the range 1-127, appears immediately after the word 'OPEN' in the OPEN statement. Afterwards the machine will know which file you are referring to whenever this number is called.

Device Numbers

The OPEN statement in BASIC must serve to communicate with all the external devices that the computer is connected to, so you can understand that more information is necessary.

Depending on which unit is involved, this information must include the device's address, or 'unit number', as a bare minimum. Here are the common device number allocations:

Unit	PET/CBM	VIC 20/C-64
0	Keyboard	Keyboard
1	Tape #1	Tape
2	Tape #2	RS232 Port (Modem)
3	Screen	Screen
4	Printer	Printer
5	Modem or Alternate Printer	Alternate Printer
8	Disk Drive	Disk Drive
9	Alternate Disk Drive	Alternate Disk Drive

Secondary Addresses

If you refer to earlier articles, you will notice that our disk commands have required a third value, as part of OPEN. This is the 'secondary address'. When commands rather than data are sent to the disk, the secondary address always has the value 15.

For data files on disk, use secondary addresses from 2-14, and make sure that the value chosen is not currently in use elsewhere in the program.

With tape data files, the secondary address you use denotes whether the file is being opened for reading or writing. Use a value of 0 (zero) for reading and a value of 1 (one) to signify a file is to be written.

Filenames

Disk data files must have a name, else how could you ever locate the data again? Tape allows you the option of no file name, but use one anyway. Once two such files exist, how do you know what is contained on the tape?

The disk file name may not exceed sixteen characters, and you must send with it a couple more identifiers: what type of data file you're working with, and whether you want to read or write.

It's long past time for a real example:

```
OPEN 2, 8, 3, "0:STUFF,SEQ,WRITE"  
OPEN 2, 8, 3, "0:STUFF,S,W"
```

The sequential data file called 'STUFF' is being opened for writing on Drive#0 (of a dual drive). The disk drive is device #8. Our file number is 2, to which we'll refer frequently. The secondary address chosen was '3', and we won't need to do anything more with it again. In fact we could have chosen '2' with no conflict, but '3' is just as good. Whichever we have chosen, we'll note it and not use it for another file in this program.

To open a tape data file, use the following syntax:

```
OPEN 2, 1, 1, "STUFF"
```

The file number is again number '2' and the device number for tape is '1'. The latter '1' is the secondary address to indicate we're going to write a data file. The filename is the same.

Create a Sequential File

Now it's your turn. Get out a fresh tape or disk (formatted) and mount it in the drive. Issue the appropriate OPEN command from above.

With tape, you'll first get the familiar PRESS RECORD & PLAY message. Thirteen seconds later the READY message appears on the screen. The data file *header* has now been stored on the tape.

With disk, the drive activity light will come on and stay lit, indicating that the file is ready to accept data. The READY message will show on the screen.

From here on the procedure is the same for tape and disk both.

Writing Data

Enter the following lines in direct mode, pressing RETURN after each entry:

```
PRINT#2,"IT IS REALLY EASY TO WRITE A "  
PRINT#2,"DATA FILE TO TAPE. THESE ARE "  
PRINT#2,"STRING LITERALS, BUT A "  
PRINT#2,"VARIABLE IS JUST AS EASY TO "  
PRINT#2,"WRITE TO THE FILE. YOU JUST "  
PRINT#2,"IDENTIFY ITS NAME AFTER THE "  
PRINT#2,"COMMA. USE ONLY ONE VALUE PER"  
PRINT#2,"LINE, OR ELSE YOU ARE ASKING "  
PRINT#2,"FOR TROUBLE! NOTE THAT THE "  
PRINT#2,"TAPE OR DISK DOESN'T MOVE "  
PRINT#2,"AFTER EVERY LINE IS TYPED."
```

The computer has a cassette *buffer* in RAM to hold the data temporarily. After 191 characters or more, the tape must be written and the buffer emptied to make room for the new characters. That doesn't happen until the "COMMA. . ." line.

The disk buffer is within the disk's RAM, and can hold 254 data characters. The data are written from this buffer, onto the diskette, after the "TAPE OR. . ." line has been received.

CLOSE The File

Since the buffers are likely to have some data in them, we must be sure they're empty when we are finished with the file. This is where the CLOSE statement is essential:

```
CLOSE 2
```

This will wrap things up neatly, and make sure the last of the data is not banished into limbo. CLOSE is *very* important.

Reading the File

Although we can write to a file in direct mode, we cannot read from it without a program. The reason is that the buffer used to hold the data we're reading is the same one used to store direct commands.

Make your choice of OPEN statements. The first two, for disk, are exactly equivalent. The third is for use with tape:

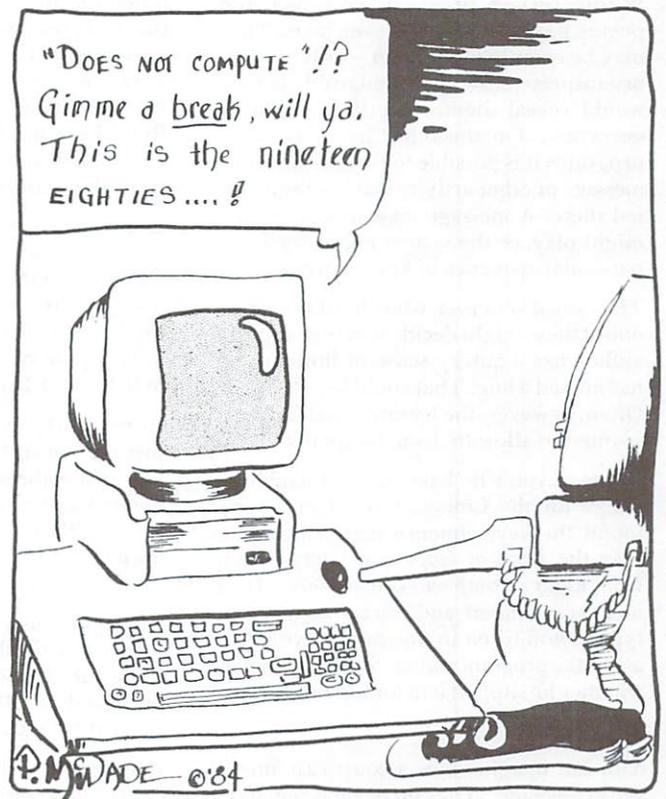
```
100 OPEN 6, 8, 6, "0:STUFF,SEQ,READ"  
100 OPEN 6, 8, 6, "0:STUFF,S,R"  
100 OPEN 6, 1, 0, "STUFF"
```

Here's the rest of the program:

```
110 INPUT#6, A$  
120 SS = ST  
130 PRINT A$  
140 IF SS = 0 THEN 110  
150 CLOSE 6
```

By changing the filename, this program will read most sequential files for you, and display their contents on the screen. We'll leave it as an exercise for you to follow the logic.

See you next month. If you have any comments or questions on this or the other articles in the series, please forward them through the editor. TPUG



Jim Butterfield

SECRETS IN SOFTWARE



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When is a bug not a bug? When it's there deliberately. But why would anyone put a deliberate bug into a program? To positively identify it. To give the program an unmistakable 'signature'.

I was once told that there's only one sure-fire way to copyright a program. Here's how you do it: within the program, you write a small original poem. It doesn't have anything to do with the program, but it's there in memory. If anyone produces illicit copies of your program, you now have a guaranteed way of going after them. The law isn't completely clear on what constitutes program theft, but it's very specific about the theft of artistic works such as poetry. According to my advisor, you can get the thief for stealing your poem.

I can't say if that's correct legal advice, but it does draw attention to an interesting side-light of identifying a program for copyright purposes. You can embed things in a program that are not useful, but that may be highly visible if the program is stolen.

Within certain programs you may find poems, names, music, and even jokes. They may be completely hidden — only a memory inspection by a knowledgeable person would reveal them, since they might be encrypted. On the other hand, in some programs it is possible to invoke the secret message or other activity that has been buried there. A message may appear, a tune might play, or the system might crash if a particular sequence of keys is pressed.

The casual observer who stumbles across one of these might decide that the program author has a quirky sense of humour, or has missed a bug. That could be, of course. Often, however, the feature is deliberately planted to allow thefts to be spotted.

Those of you who have the EasyScript cartridge for the Commodore 64 may have found the key sequence that causes it to play the *Land of Hope and Glory* theme from Elgar's *Pomp and Circumstance*. It's a nice arrangement, and you can continue to type as you listen to the music. I've never asked the program author, Simon Tranmer, whether he slipped it in for fun or for more serious purposes.

You can imagine how a court case might go. Prosecutor: "Your program is remarka-

bly similar to EasyScript". Pirate: "Purely accidental: I suppose that to achieve the same type of word processing performance, I ended up writing similar code". Prosecutor: "What about the music?" Pirate: "What music?" Prosecutor: "Your honour, I give you exhibit X... press key F1, then CTRL-3". Pandemonium in the courtroom as music issues from the computer system.

Such features should normally be kept secret by the author, of course, so that a knowledgeable pirate will leave them in place, thus unmistakably tipping off the program's true source. Some features, such as the EasyScript music, become fairly well known to users. But more than one curious feature can be embedded into a single program. Finding all the signatures can be a very difficult job, since some of it is hidden within the code itself.

Microsoft, who wrote the original version of BASIC that is used in Commodore machines, was very strong on signature protection. Embedded in all early PET BASIC versions — and BASIC in many other computer systems — was the word 'MICROSOFT!' complete with exclamation point. It was very difficult to find, since it was hidden within a sequence of floating point constants used for trigonometric function evaluations. To make it even trickier, there were random high bits sprinkled over the message. Most people looking through the ROM logic would skip this area: it didn't disassemble, and seemed to be totally mathematical in nature.

It might be there yet; but Microsoft gave the game away. In the Commodore PET's Upgrade ROM (some call it ROM 2 and some BASIC 3), a key sequence was added to allow this to be displayed. On that machine only, typing WAIT6502,10 would cause the MICROSOFT! message to print ten times.

In my ROM memory maps, I called this piece of coding 'Microsoft joke'. It seemed like a joke: the computer powered up with the message 'Commodore Basic', and nowhere in the documentation could you find the name of Microsoft. But they had slipped their signature in there.

Perhaps it was a mistake to make their signature too visible. Certainly, Commodore made sure that it was removed when they produced BASIC 4.0 and subsequent versions of BASIC.

A few years ago, I ran across another bug in BASIC that might be intended to serve as a

signature. It exists in all Microsoft BASIC 6502 versions that I have examined, and I sometimes wonder if a comparable bug has been deliberately placed in other processor implementations.

Here's how it works on Commodore computers: if you type 350800 into the computer in any line number context, the computer will behave erratically and perhaps crash when this line number reference is reached. In other words, LIST350800 will do the deed; or GOSUB350800; or the number 350800 followed by a BASIC statement. Note that it's quite OK to say X=350800; the number is only poisoned when used as a line number.

The same thing happens on other brands of computer, but a different number is needed to do the job. The reason for the system failure is very complex, but it doesn't seem accidental. It looks like a signature to me.

Some time ago, I finally sent in this anomaly as a 'bug report' to Commodore. I have noticed that the bug has been removed from the newest Commodore products (B system, Commodore 16 and Plus 4). It's been there since the first Commodore computers. Somehow I feel a sense of loss.

Sometimes quirks are there for a reason. And sometimes bugs have a purpose.

So, next time you have a program that crashes and a user complains about it, you can try looking nonchalant and saying, "That's just my signature". TPUG

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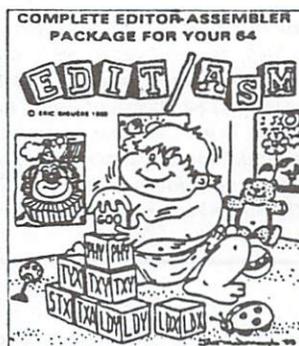
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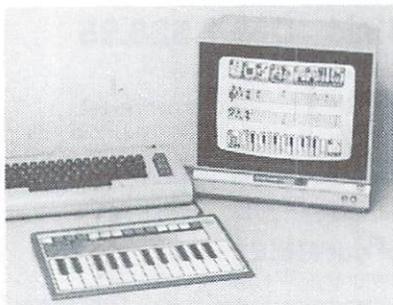
le...product parade...product parade...product parade.



In this month's Product Parade we continue to present products which, in most cases, were demonstrated for the first time at the Electronic Show in Las Vegas last summer. The variety of new software and hardware products for Commodore computers introduced at Las Vegas show was so astonishing that we feel we will be publishing product announcements from the show in a few more issues of TBUG Magazine. However, there will always be "last minute" news. We hope this arrangement satisfies our readers. And manufacturers too!



ColorTone Keyboard from Waveform Corporation



The ColorTone Keyboard consists of a touch-sensitive membrane keyboard with 25 piano-like keys, a touch strip that performs as a musical harp, and 14 function keys. A user makes selections with the help of color pictures describing the use of each function key. Driven by the keyboard's accompanying software, the function keys let the user choose among eight different instrument sounds; play along with 12 different preset background songs; select one of 12 musical scales to play in harmony with background accompaniment; and create compositions for later playback.

The ColorTone Keyboard has been designed for both adults and children who have had no previous music training. To build up their confidence the designers provided a special feature which allows the beginner to use the ColorTone Keyboard as "no-fault" music system. In practice it means that the user can play along with pre-programmed melodies, without hitting dissonant notes. However, more advanced user has a choice of overriding the no-fault feature, compose without accompanying pre-recorded scores, and adjust the tempo of the music. Another significant feature of the keyboard is that the program displays true musical notation on the screen as the user plays. At the same time a piano graphic displays which key is being played.

The ColorTone Keyboard runs on the Commodore 64, either independently with its own software, or with MusiCalc 1, also by Waveform, a software package that turns the Commodore 64 into a three-voice synthesizer and step sequencer. A built-in cable connects the ColorTone Keyboard to the Commodore's 64 joystick port.

Retail price: \$79.95 U.S. ColorTone Keyboard is available at computer and software specialty stores, department stores and retail chains.

For more information contact: Waveform Corporation, 1912 Bonita Way, Berkeley, CA 94704, (415)841-9866

THE WRITE FILE, YOUR HOME OFFICE for C-64 from International Tri Micro

THE WRITE FILE is an integrated word processor and data base. Information can be exchanged freely to generate customized reports and letters. The data base allows records to be sorted into any order desired, up to three fields in a single sort. Additionally, the user can define parameters in order to create sub-files. Reports can read the entire file or the selected sub-file only.

YOU^R HOME OFFICE is an integrated word processor and spreadsheet. A windowing capability allows data to be viewed in one screen, while working with another set of data in another screen. The spreadsheet lets the user reference data by cell name as well as by cell coordinate. A convenient feature, called 'block map', transfers the contents of the spreadsheet to the word processor to incorporate any portion of the spreadsheet file into a report or letter.

The word processing files of both systems are completely compatible and offer the user many functions: enhanced printing, block delete and insert, search and replace, variable margin settings and page lengths, pagination footers. A particularly useful

feature is the ability to link files between disks, giving the user unlimited document length.

Prices: WRITE FILE — \$49.95 U.S.; YOUR HOME OFFICE — \$49.95 U.S. More information is available at (714)771-4038 from International Tri Micro at 1010 N. Batavia, Unit G, Orange CA 92667

FORTH 64 from Handic Software Inc.

FORTH 64 is a powerful operating system with a programming language that, in many respects, is very different from other computer languages. Some of its specific features are as follows:

- Interactive, structured program environment.
- Virtual memory makes creating a very large program possible.
- A compact, compiled and extremely fast code.
- Functions in any numeric base.
- Extendable language structure; user defined data and program structures are easily definable.
- Text Editor and Macro Assembler included in program.
- Parts, or all of the program can be coded in assembler.
- Supports disk and printer I/O.

FORTH 64 is a standard fig-FORTH with many extensions including double-precision arithmetic and file handling words. Special words allow dictionaries to be read and written to cassette, with optional naming. The program contains nearly 400 words and can be continuously expanded by the user.

FORTH 64 comes on a plug-in cartridge and is available for C-64 and VIC 20 with 3K of RAM

Price: \$39.95 U.S. For more information contact: Handic Software, 520 Fellowship Rd., Suite B206, Mount Laurel, NJ 08054, (609)866-1001

ADVENTUREWRITER from Codewriter Corporation

ADVENTUREWRITER is a software package that allows the user to design games by programming in simple English. The user is instructed how to proceed through a systematic process of building a format and asked to type in appropriate responses in English.

Throughout the programming process, **ADVENTUREWRITER** provides "open windows" that allow the operator to build new concepts into the game. Treasure hunting, jungle escapes, mazes, etc. can be designed by the user.

Once the game is set, **ADVENTUREWRITER** automatically converts the English responses into computer language and the game can be recorded on the user's own diskette.

Price: \$69.95 Cdn. For dealer information contact: Micro Marketing Canada, 169 Inglewood Drive, Toronto

Mastertronic games
from Bullock Industries

Bullock Industries announces affordable software. With the idea that software games are not unlike record albums in their lifespan, Bullock Industries is distributing the Mastertronic line of software games for the C-64 and VIC 20. An unqualified success in Europe, these games are available in Canada for \$9.99 for the Commodore 64 and \$7.99 for the VIC 20.

Bullock Industries Ltd., 60 Bullock Drive, Unit 5, Markham, Ont. L3P 3P2, (416)471-5858

Reading Skill Adventures with Gulliver's Travels
from International Software Systems

Gulliver's Travels is the third "Reading Skill Adventure" story in the Educational Story Series. The stories in this series are interactive adventures designed for reading pleasure. Their main aim is to improve children's reading skills and comprehension.

Reading Skill Adventures with Gulliver's Travels is based on the classic story from the Brothers Grimm collection and is written for grades two through five.

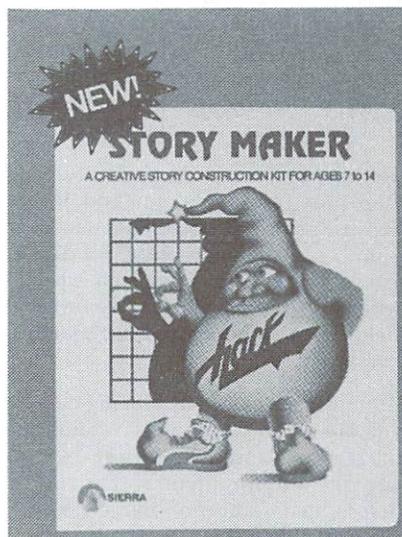
As children read **Gulliver**, they control the plot line, discovering dozens and dozens of story lines and endings. With three

levels of vocabulary, children can even reread adventures with more challenging words.

ISS also has available **Reading Skill Adventures with Tom Thumb** for preschool through grade two, and **Reading Skills Adventures with Masters of the Galaxy** for grades three through six.

Price: \$35.95 Cdn. In Toronto area the Educational Story Series are available in Coles Books Stores. For more information contact: International Software Systems, P.O. Box 5427, Richmond, VA 23220, (804)359-2211.

STORY MAKER from Sierra On-Line



STORY MAKER, for ages 7 to 14, is a creative story construction kit. The program teaches children writing skills. Adult supervision is not required.

A zany character named Hack guides children through all the steps necessary to create their title, name their characters, write sentences with a built-in word processor, and create their own original illustrations. The story and the graphics can then be computer-integrated and saved on an independent disk. There is no limit to the number of compositions which can be created. **STORY MAKER** contains a Master Disk, a blank disk, author labels and a *Book of Tips*, an introduction to the art of creative writing.

Price: \$34.95 U.S. For more information contact Sierra On-Line Building, Coarsegold, CA 93614, (209)683-6858

Babysitter Volume 2 from Soft Magic Corporation

Babysitter Volume 2, for C-64, contains four programs to teach preschoolers and early school-aged children elementary skills in numbers and logic.

Clarity Clock has three levels teaching children the skills required for telling time both by the clock face as well as digitally. This program also uses voice instructions which do not require additional hardware for use.

Krazy Kaleidoscope allows children to experiment with colour and pattern designs.

Monkey Maze is a maze manipulation skills game that can be played from the keyboard or with a joystick.

Nutty Numbers, the last program, consists of three different games to teach number logic.

Babysitter Volume 2 will be available in U.S. for Christmas and in Canada — after Christmas.

Price: \$12.99 U.S. For more information contact: Soft Magic Corporation, 1213 W. High St., Bryan, Ohio 43506

CLAS from MicroEd Inc.

CLAS, which stands for Computerized Lesson Authoring System, has been designed to enable educators to create their own courseware easily and quickly by using latest computer technology. The designers have assumed that the first-time user of **CLASS** would have no previous computer experience and made the program very user-friendly.

CLAS can be used to design a single lesson or entire semester's course in any subject for any grade level, from kindergarten to high school grades.

CLAS lesson can take many forms; it can consist of reading materials followed by problem sets made up of multiple choice, fill-in-the-blanks, and/or True-False questions. The program allows the teacher to retain his/her own individual style and teaching methods.

The **CLAS** package consists of one Author disk, one Student disk and the User's Guide.

Price: \$89.95 U.S. For more information contact: MicroEd, Inc., P.O. Box 444005, Eden Prairie, MN 55344, (612)944-8750

Flexfile 2.1 Database Manager

George Shirinian
Toronto, ON

AB Computers, 252 Bethlehem Pike, Colmar, PA 18915, U.S.A. \$59.00 U.S. Commodore 8032, 4032, 2001, 64, VIC 20, disk drive required.

Flexfile 2.1 is a database management program noteworthy for being relatively inexpensive, yet remarkably powerful. It can be configured to run on any Commodore computer with at least 16K of memory and has special features to work with any CBM disk drive.

Flexfile 2.1 is available on disk for all Commodore computers. It uses an interesting copy-protection technique. The protection method does not use a dongle, nor special DOS coding. This method requires you to customize the program to your particular equipment configuration by answering a few simple menu prompts. Once the program has been customized, it will not run on other configurations. A customized disk cannot be re-customized. Only the owner of an original disk can make backups that can be customized.

The 78-page manual is clear and helpful even for beginners. It is assembled in a 7 by 9-inch 3-ring binder that takes up little desk space and lies flat for easy reading. The information is well written and well laid out. The approach is more of a tutorial than a reference guide, which is perfectly acceptable, since the program itself is so easy to learn and use. A noticeable omission is an index. One nice feature is that 10 of the 20 chapters are marked as "must-read" items for anyone using the program. The other chapters contain information on more advanced applications.

The manual has not been consistently updated from the old one. For example, we are told on pages 25 and 44 that commas, colons and semi-colons are not accepted during input. This is no longer true (thank goodness!).

The producers stand behind the program. Early versions had a major bug that caused misfiling and loss of records. The fix was rushed to customers as soon as this was discovered. I know of one user who has been in telephone contact with the author, Michael Riley, and received the help he needed.

The program allows a maximum field length of 80 characters (including return); maximum number of fields is 20 (with provision in the program for more); maximum record

length is 254 characters. You are not asked to specify the length of a field since fields are stored end to end and space that is not used is not reserved. In an application where field length varies among records, this results in greater flexibility and a real saving of space.

The entire program actually consists of 14 menu-driven modules loaded by a main program, each module with its own specific job to do. Operating with an IEEE bus, this is no problem, but on a normal C-64, with its serial bus, there are pauses of 20 seconds or more as the various modules load.

Data entry is line oriented, with the fields lining up one beneath the other. Editing must be done on the current line and to edit a previous line you must wait until the record is completed to be prompted if there are any changes.

Flexfile provides some nice features. The Replicate (a record command) is useful because records often contain data in common. This command reuses all data from the previous record. Usually, however, you will want the data from only one or two fields, so the other fields must be edited or overwritten.

Prompting is excellent. During data input you are asked for any corrections before the record is stored. You are also warned if you try to input more than the predetermined number of characters, and are cycled through the record to try again.

A particularly valuable feature is the ability to dump your random file into a sequential file. This is a blessing when, after working with your file for a time you discover the need to add an extra field, key or the like. You can salvage your data, structure a whole new record format, then load the sequential file into the new format.

Being written mostly in BASIC and totally listable, the program is readily modifiable by those so inclined. The listing is generously annotated and the manual also provides valuable information. Additional modules and features exist in the program that are not currently utilized, but can be accessed by the adventurous. For example, the number of fields can be made more than 20 by changing a single line. REM statements indicate other features.

The Mailing List module is useful not only for names and addresses, but also allows a

suitable printed format for bibliographies. The Report Writer module, on the other hand, is designed for output on a single line and for numerical calculations.

For handling numerical data, the Report Writer has several nice features. It allows you to specify individual column widths, up to the capacity of your printer, title each column, perform decimal alignment, column totals, column averages and up to 5 levels of subtotals. Up to 20 calculations can be performed for each record, allowing, for example, the quantity in one column to be multiplied by the unit cost in another column, thus providing a convenient spreadsheet or "calc" function.

The File Calculation module allows you to use a mathematical formula to change the contents of a numerical field across a number of records automatically. This differs from the calc features of the Report Writer, which change the values of a column in a report during output, but does not change the actual contents of the records in a file.

Output can be directed to the screen, printer or to a sequential disk file. When outputting to paper, provision has been made for both Commodore and non-Commodore printers. There are some limitations on the placing of fields to be printed on paper. A nice touch is the ability to specify a certain range of records to be printed, rather than the entire file.

You have nine ways to search for a record, including pattern matching, which allows "wild card" characters and endings. Logical operations may be included in the search criteria. With all the fields displayed on screen, you select your search strategy from a menu and simply fill in the blanks. Note that the program does distinguish between upper and lower case, so be sure of your capitalization. Note also that the logical operators include "and", "or", but not "not".

A critical element in searching is speed, and I did a few timing tests. With 131 bibliographic records, the fastest time to search the file and print the results out to paper was 140 seconds, using a CBM 8032 and 4040. Since it reads every record in the file performing its search function, the Report Writer is quite slow. Using a C-64 and 1541 drive to search a similar database of 101 records took 130 seconds, surprisingly not much slower.

The Direct File Maintenance module has a much faster search capability. When defining your record structure in the first place,

you are allowed to specify certain fields as keys on which sorting is done. These keys can be nested up to 5 fields deep. For example, you can sort alphabetically by surname; then all the same surnames can be further sorted by first name; then all the records with the same surname and first name can be sorted chronologically (e.g., all the articles by an author can be sorted by date of publication), and so on.

If only the first few characters of a search string are entered, the FIND command will locate the first record whose key begins with those letters. There may be times when two or more records have the same key. The program will locate the first record that matches. The rest will be found by using the NEXT command to step through the records in order.

There is now a "Snapshot" command for printing the results of your search out to paper in Direct File Maintenance, one record at a time. This is a significant improvement and worthwhile convenience.

Using the program with a single disk drive is painfully awkward, requiring several disk swaps for the most elementary functions. Flexfile is well suited to a dual drive. I am happy to report that it works well with the RTC 64-Link, and will probably work with any IEEE interface. If you do not have access to a dual drive, it is recommended that you put the essential program modules on the same disk as your data, if your database can spare the room. This will alleviate a lot of disk swapping.

Disk commands are limited. You can view a directory from the opening menu without losing the data in memory. Scratching a data file, however, only deletes the pointers and filename, and you will see fewer blocks available in your directory than expected. If you have to scratch a file in order to recover space, you might need to NEW the whole disk.

Flexfile has good error messaging and recovery. In case of a complete crash, you can recover by typing GOTO 100. I did

manage to produce two irrecoverable errors: one by trying to save a batch file to a write-protected disk, the other by specifying a non-existent report format in the Report Writer module. Curiously, specifying a non-existent format in Mail Labels will return you to the menu, but this is not the case with the Report Writer, which endlessly asked me for a file name.

Flexfile is a praiseworthy program, with many features I am unable to describe here, but also with limitations. Field and record length are limited. Searching, though powerful, is very slow.

It allows you to build large data files and manipulate, search and report them with great flexibility. There are numerous mathematical calculations available. The program is flexible and easily modified. It is straightforward to use, with logical and helpful prompts and menus, and will not take long to learn. Considering Flexfile's price against its capabilities, the program is a bargain. TPUG

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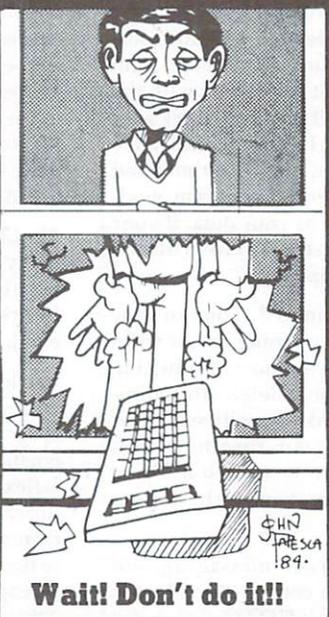
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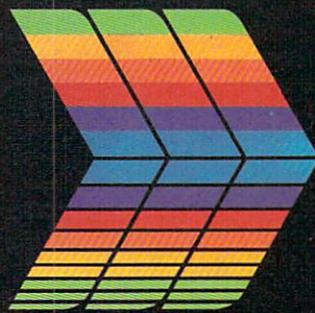
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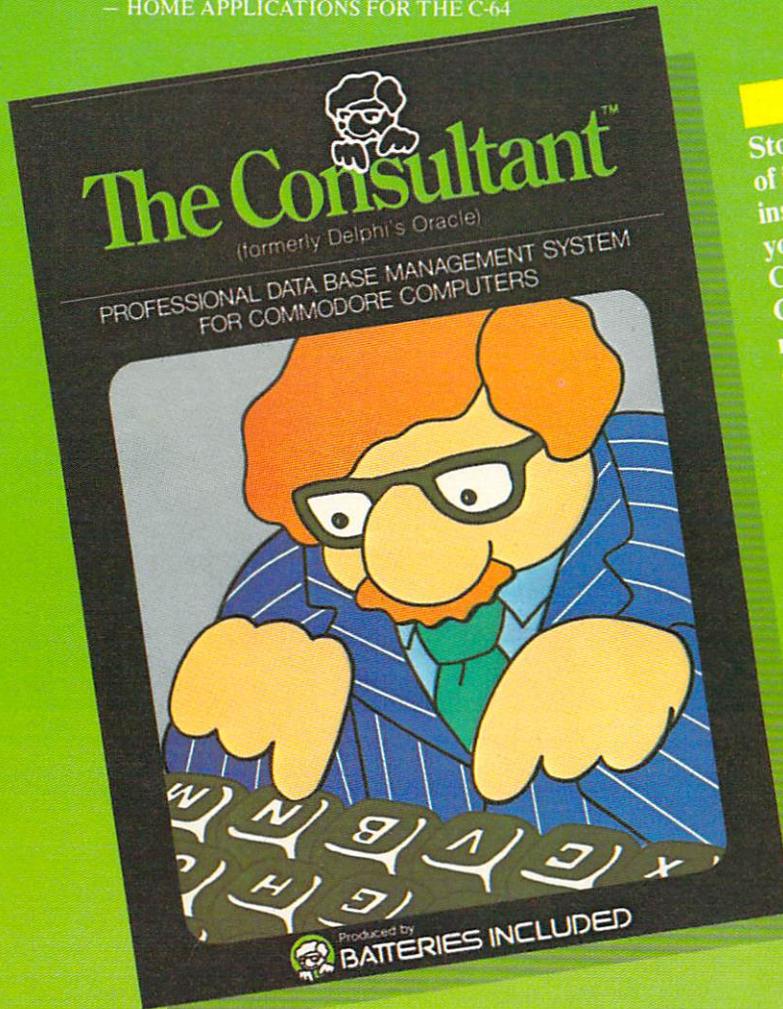
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