

U.S.A. \$2.95
Canada \$3.50
August 1984
A CWC/I Publication

RUN

The Commodore 64 & VIC-20 Magazine

Program of the Month—
Take Control of Your Sprites

Uncover the Secret Of Buried Treasure!



Also Inside:

- The Robots Are Coming!
- Sound Off with Your Joystick
- Programming Made Easy—Let Your C-64 Do It!



www.commodore.ca
74670012069 Without Permission



GROUND ZERO

The ultimate nuclear war simulation. Fast action and realistic arcade quality 3-D graphics make GROUND ZERO a must. From launch through space and back to earth, destroy the ICBM's and save Washington from destruction. Multiple HI-resolution screens, speech synthesis, fast action, and 3-D arcade quality graphics.

Suggested Retail: \$39.95

Commodore 64



ATARI

PRO-DATA

Pro-Data is a powerful yet easy to use DATA BASE MANAGEMENT SYSTEM for the Commodore 64 computer. Pro-Data will let you ADD, REMOVE, UPDATE, VIEW, SEARCH and PRINT your records. It features:

- Free form entry screen design; including graphic characters with full cursor wrap-around.
- Change key field at ANY time, permanently or temporarily
- Custom report/label generator allows you to lock print formats to disk for later use.
- Up to 800 records
- Up to 80 characters per field
- Up to 80 fields per record
- Calculate fields
- Sort records
- View all or partial list of records
- Screen print available at any input prompt
- Full disk utilities built in
- Color bar to adjust monitor
- Customize color combinations and lock them to disk
- Select AUTO REPEAT keys, ON or OFF mode
- Previously designed report/label format selection from on-screen directory.

Suggested Retail \$66.00

Commodore 64

PRO-SCHEDULE

Pro-Schedule will make scheduling of employees and labor control a snitch. On-screen math functions show how many hours an employee worked, your expenditure on his labor, overbudget warnings, merging with Pro-Data and Pro-Account. Can be used by employers and employees for time wage and budget tracking. All self-calculating, while you enter data it already shows results.

Suggested Retail: \$44.00

Commodore 64

PRO-ASSEMBLER

Pro-Assembler, the world's first macro-cross assembler for home computers, is now available for Commodore 64 owners. Pro-Assembler supports all major 8 & 16 bit CPU's including the 6502, 65C02, 6510, Z80, 8086, 8088, 68000 & Z8000 3 pass macro-cross assembler supports conditional assembly, base 16, 10, 8 and 2 number systems, leaves all available Basic ram (38911 bytes) free for source text and has label length of up to 255 characters. Supports: Addition, Subtraction, Multiplication, Quasi Division, and all basic conditionals.

Fully implemented extensive screen editor with 10 extensions to regular basic commands and shorthand load and save functions, including complete DOS support commands, fully supports commodore Z80 CP/M cartridge and includes a CP/M loader to execute Z80 object code generated by Pro-Assembler and much more. Now you can use your 64 to develop software for IBM, MCINTOSH, CP/M, TRS80 and others without purchasing the expensive hardware. Special use for developmental projects, schools, and higher education.

Suggested Retail: \$88.00

Commodore 64

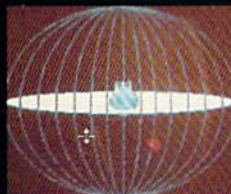
CRAZY ALIEN

Fast action arcade quality graphics and an ever increasing speed make this VIC 20 game a winner. Shoot your way through the scroling barrier, avoiding the alien's onslaught of mines and the mutant guardian.

Clear the zone by destroying the alien, just to find yourself in another more frantic zone to complete.

Suggested Retail \$28.00

VIC 20 with at least 8k memory



ALPHA-OMEGA-RUN

The year is 3012 and your mission is to defend an outpost planet from the evil overlord's squadrons. From your outpost in space, an orbiting scene, the fight over the drench, down to defending the city, only your wits and skill will prevent the invasion's success. 5 action packed, hi-resolution 3-D graphics game screens will test if you are made of what it takes to make the Alpha-Omega-Run...to last from the beginning to the end.

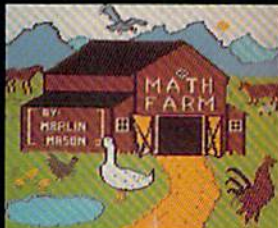
Suggested Retail: \$39.95

Commodore 64

MATH-FARM

This exciting educational game features vivid, colorful screens that support any child's imagination. Teaches multiplication, division, addition and subtraction using large, easy to read numbers, linked with object and relational techniques. Hi-res color graphics and sound are supported and optimized by the use of speech synthesis. Speech is program supported and no additional hardware is necessary. Now learning is fun...now the computer talks to your child.

Suggested Retail: \$39.95



SEPTEMBER RELEASES

PRO-ACCOUNT

At last, a totally integrated accounting system, which includes General Ledger, Accounts Receivable, Accounts Payable and Payroll, all of which are interactively compatible with Pro-Data, Pro-Schedule and Pro-Inventory, which eliminates typing the same data over and over. Also no more time consuming back and forth loading of individual options, each module is totally self-contained and requires no extra loading of sub options, so your time is not spent waiting for the computer, instead it is spent entering data.

Suggested Retail: \$99.00

Commodore 64

PRO-COMPILER

Finally the compiler you have been waiting for. Full 32 bit arithmetic, during compilation other basic programs or subroutines can be included. A true compiler by all means, it does not generate slow P-code or its own library overhead! It compiles your BASIC program right down to the real thing: straight machine code. And while it is doing this, it optimizes your code. Now your compiled program can have up to 48k.

Suggested Retail \$99.00

Commodore 64
IBM version available early '85

HACKER

The ultimate text adventure. Written in its entirety in machine language, for fast response, Hacker puts you into the programmers chair. Your objective is to break into the local bank computer, but that's not easy! To get there, you first have to crack the library computer, the police computer, etc., all of which have hidden clues in their databanks. The simulation is so complete, that you won't know it is not really happening. If you are ready for a real challenge and consider yourself a hacker, then this is the one for you.

The biggest text adventure written for a 64, utilizes almost the full disk capacity.

Suggested Retail: \$44.00

Commodore 64

NANOSEC™ CORPORATION

3544 Lincoln Plaza, Ogden, Utah 84401 ★ 1-801-392-0109

Dealer & Distributor Inquiries Welcome

Commodore 64 is a Trademark of Commodore Electronics Ltd.

www.commodore.ca
May Not Reprint Without Permission



SAME DAY SHIPPING
IF ORDERED BY 2 PM



Circle 150 on Reader Service card.



RUN

August 1984
Vol. 1, No. 8

p. 36



FEATURES

36 Battleship War

Defend your fleet from enemy attack and learn this programmer's memory-management tips to take advantage of the C-64's special graphics features.
By Keith Meade

48 Beale's Buried Treasure

There's 20 million dollars worth of treasure buried somewhere in Virginia, and the secret's hidden in a baffling code that your C-64 could help you crack.
By Douglas Nicklow

58 Pokes Without Pain

Do you shudder at the prospect of doing the calculations involved in figuring the Poke values for your custom-designed graphics characters? Well, quake no more—this program will ease and speed up your work.
By Craig Howarth

64 Sprite Control

Get a firm grip on your sprites with this program that lets you manipulate them quickly and easily.
By M.J. Clifford

70 The Robots Are Coming!

The time is drawing near when robots will be as prevalent as, say, Commodore computers.
By Peggy Herrington

78 Post a Notice

Do you have something to say, something to sell or something to sing about? Turn your line into a sign and post it.
By W. G. Voight

80 Program Generators

If you're itching to create your own software—but lack the necessary programming skills—put a program generator to work for you.
By Joseph Rotello, Jr.

90 Sound Off With Your Joystick

Using only your joystick and this program, you can take full advantage of your Commodore's sound capabilities.
By Larry Cotton

96 S—l—i—d—e

Are you willing to match wits with your C-64 in this five-in-a-row tic-tac-toe game of strategy?
By Robert Rossa

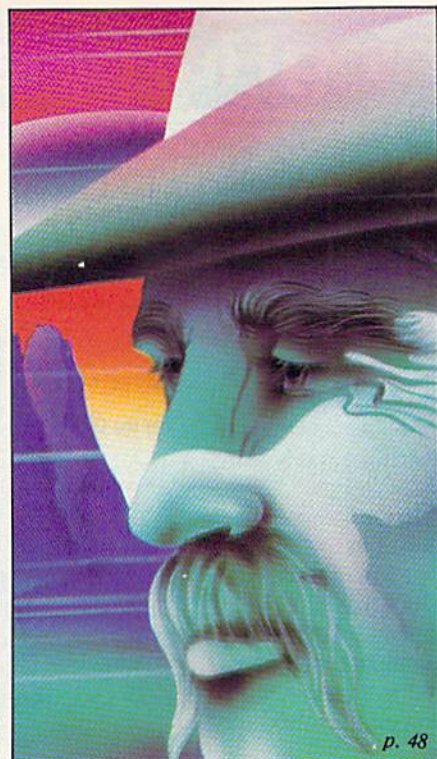
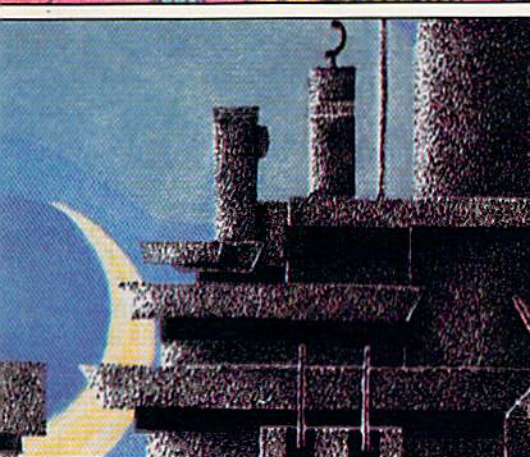
104 The Art and Science Of Programming

Learn various techniques to help you become a more creative and more competent programmer.
By John Kula



RUN (0741-4285) is an independent journal not connected with Commodore Business Machines, Inc. *RUN* is published monthly by CW Communications/Peterborough, Inc., 80 Pine St., Peterborough, NH 03458. U.S. subscription rates \$19.97, one year; \$29.97, two years; \$41.97, three years. Canada and Mexico \$22.97, one year, U.S. funds drawn on U.S. bank. Foreign \$39.97, one year, U.S. funds drawn on U.S. bank. Foreign air mail subscriptions—please inquire. Application to mail at 2nd class postage rates is pending at Peterborough, N.H. 03458, and at additional mailing offices. Phone: 603-924-9471. Entire contents copyright 1984 by CW Communications/Peterborough, Inc. No part of this publication may be reprinted or otherwise reproduced without written permission from the publisher. Postmaster: send address changes to *RUN*, Subscription Services, PO Box 954, Farmingdale, NY 11737. Nationally distributed by International Circulation Distributors. *RUN* makes every effort to assure the accuracy of articles, listings and circuits published in the magazine. *RUN* assumes no responsibility for damages due to errors or omissions.

Manuscripts: Contributions in the form of manuscripts with drawings and/or photographs are welcome and will be considered for possible publication. *RUN* assumes no responsibility for loss or damage to any material. Please enclose a self-addressed, stamped envelope with each submission. Payment for the use of any unsolicited material will be made upon acceptance. All contributions and editorial correspondence (typed and double-spaced, please) should be directed to *RUN* Editorial Offices, 80 Pine Street, Peterborough, NH 03458; telephone: 603-924-9471. **Advertising Inquiries** should be directed to Advertising Offices, CW Communications/Peterborough, Inc., Elm Street, Peterborough, NH 03458; telephone: 603-924-7138. **To subscribe, renew or change an address:** Write to *RUN*, Subscription Department, PO Box 954, Farmingdale, NY 11737. **Problems with advertisers:** Send a description of the problem and your current address to: *RUN*, Rt. 101 & Elm Street, Peterborough, NH 03458, ATTN: Rita B. Rivard, Customer Service Manager. If urgent, call 1-800-441-4403.



DEPARTMENTS

6 RUNning Ruminations

Colorful contest winners announced.

8 Commodore Clinic

A questions and answers column to help your ailing computer.

14 Magic

Hints and tips that let you perform computing wizardry.

18 Software Gallery

Solo Flight
Turtle Toyland Jr.
Software Automatic Mouth
Mothership
Smithwriter

28 Video Casino

There's a deadline to be met—can you meet it?

30 Computer Tutor

This new column looks at the latest in children's educational programs.

124 Hardware Gallery

Ramax
Commodore 64 Training Tape
MCI Mail

130 Mail RUN

132 Book Gallery

VIC-20: The Affordable Learning Tool for the Mature Adult
Commodore 64 Programs for the Home
Music and Sound for the Commodore 64

135 RUN Amok

136 Club Notes

138 New Products RUNdown

Cover illustration by Anna Davidian.
Designed by Suzanne Torsheya.

RUN is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes 52 computer publications in 19 major countries. Members of the group include: Argentina's *Computerworld/Argentina*; Australia's *Australia Computerworld*, *Australian Micro Computer Magazine*, *Australian PC World* and *Directories*; Brazil's *DataNews* and *MicroMundo*; China's *China Computerworld*; Denmark's *Computerworld/Danmark* and *MicroVerden*; Finland's *Mikro*; France's *Le Monde Informatique*, *Golden (Apple)* and *OPC (IBM)*; Germany's *Computerwoche*, *Microcomputerwelt*, *PC Welt*, *Software Markt*, *CW Edition/Seminar*, *Computer Business* and *Commodore Magazine*; Italy's *Computerworld Italia*; Japan's *Computerworld Japan* and *Perso ComWorld*; Mexico's *Computerworld/Mexico* and *CompuMundo*; Netherland's *CW Benelux* and *Micro/Info*; Norway's *Computerworld Norge* and *MikroData*; Saudi Arabia's *Saudi Computerworld*; Singapore's *The Asian Computerworld*; Spain's *Computerworld/Espana* and *MicroSistemas*; Sweden's *ComputerSweden*, *MikroDatorn* and *Min Hemdator*; the UK's *Computer Management* and *Computer Business Europe*; United States: *Computerworld*, *HOT CoCo*, *inCider*, *InfoWorld*, *jr*, *MacWorld*, *Micro MarketWorld*, *Microcomputing*, *PC World*, *PC Jr. World*, *RUN*, *73 Magazine* and *80 Micro*.

www.commodore.ca

May Not Reprint Without Permission

EDITORIAL DIRECTOR
Jeff DeTray

EDITOR-IN-CHIEF

Dennis Brisson
TECHNICAL EDITOR
Guy Wright
MANAGING EDITOR
Swain Pratt
REVIEW EDITOR
Shawn Laflamme
ASSISTANT EDITOR
Marilyn Annucci

EDITORIAL ASSISTANT

Susan Tanona
ASSISTANT TECHNICAL EDITOR
Margaret Morabito
PROOFREADER
Harold Bjornsen
ASSOCIATE EDITORS
Robert Baker, Tom Benford, David Busch,
Louis F. Sander, Jim Strasma

PRODUCTION DIRECTOR

Nancy Salmon
ASST. PRODUCTION MANAGER/MFG.
Susan Gross

LAYOUT EDITORS

Joan Ahern, Nicholas Diaz, Phil Geraci, Maurelle Godoy,
Sue Hays, Judy Oliver, Phyllis Pittet, Lynne Simonson,
Glenn Suokko

PASTE-UP ARTISTS

Lahri Bond, Cindy Boucher, Linda Drew,
Sandra Duket, Star Kachadoorian, Marlene Mowbray,
Kenneth Sutcliffe,

AD PRODUCTION

Jane Preston

AD COORDINATORS

Jean Southworth, Pat Bradley, Paula Ramsey

FILM PRODUCTION

Donna Hartwell, Laurie Jennison, Robert Villeneuve,
Leslie Walden

TYPESETTING

Dennis Christensen, manager; Darlene Bailey,
Marie Barker, Prem Krishna Gongaju, Lynn Haines,
Cynthia Letourneau, Kimberly Nadeau, Debbie Nutting,
Lindy Palmisano, Heidi N. Thomas, Susan Weller

DARKROOM PRODUCTION

Nathaniel Haynes, supervisor; Laurie Gardos, Carol Lake,
Jeanne Quickmire, Sturdy Thomas

CREATIVE DIRECTOR

Christine Destremes

DESIGN MANAGER

Joyce Pillarella

DESIGN CONSULTANT

Suzanne Torsheya

CHIEF COPYWRITER

Steve Tripp

PUBLISHER/PRESIDENT

Wayne Green

VICE PRESIDENT/GENERAL MANAGER

Debra Wetherbee

VICE PRESIDENT/FINANCE

Roger Murphy

DIRECTOR OF CREDIT AND COLLECTIONS

William M. Boyer

ASSISTANT TO THE PRESIDENT/VP

Matt Smith

ASSISTANT TO THE VP/FINANCE

Dominique Smith

DIRECTOR OF MARKETING & SALES

David Schissler

DIRECTOR OF CIRCULATION

William P. Howard

(603) 924-9471

RETAIL & NEWSSTAND SALES MANAGER

Ginnie Boudrieau

(800) 343-0728

ASSISTANT CIRCULATION MANAGER

Frank S. Smith

DIRECTOR OF ADVERTISING

Stephen Twombly

ADVERTISING SALES

Harold Stephens, Louise O'Sullivan;

Heather Guinard, coordinator

(603) 924-7138 or (800) 441-4403

WEST COAST SALES OFFICE

Giorgio Saluti, Sales Manager

Allison Walsh, Karen Letendre

(415) 328-3470

PUBLIC RELATIONS

Jim Leonard, manager; Michele Christian

MPA

Colors Challenge

In April we challenged our readers to come up with a program that would display all possible screen, border and text colors in six lines or less. The response was tremendous! Out of the hundreds of people that sent in their solutions, we could only choose a few to publish in *RUN*. The choice was a difficult one.

Here are a few of the answers that we received, chosen not because they were that much better than any of the others, but because they displayed either creative programming techniques or were good examples of the ways in which other people solved the problem. All of you gave correct solutions, but as you can see by some of these answers, computer programs, like cats, can be de-furred in a multitude of manners. (Of the hundreds of solutions we received, no two persons solved the problem in the same way.)

If your solution doesn't appear here, it isn't because you were wrong—it's simply because we did not have enough space to print them all. Perhaps, using some of the tricks these people used, you can better meet the next *RUN* Challenge.

GW

Technical Editor

(Note: In order to enter some of these program lines, some commands must be abbreviated. We have printed the programs exactly as you should type them, with the commands already abbreviated for you. When listed, the lines will appear as if the words had been spelled out. For example, '?' will list as 'PRINT', 'P{SHFT 0}' will list as 'POKE', 'N{SHFT E}' will list as 'NEXT', etc. For more information on abbreviating commands, see Appendix D in your user's guide.)

The Grand Winner! — TBS Colors

```
1 FORI=4TO6:X=642+I-(I<4)*52633:Y=(P{SHFT E}(X)-(P{SHFT E}(197)=I)AND15:P{SHFT O}X,Y:PY:N{SHFT E}:P{SHFT U}
```

The function keys F1, F3 and F5 control this program, modifying the text, border and screen colors (in that order). If you hold down the F1 key, all 16 colors of the text can be seen simultaneously, and if you hold down any other function key, that function will auto-repeat. Three numbers, corresponding to the three colors that are currently being used, appear continuously. If left alone for a few seconds, the text will seem to stop scrolling, but the flickering of the bottom line will tell you that it really has not.

Note: The optional line to stop the scrolling with the space bar: 0 IF PEEK(197)=60 THEN 0.

Emerson J. Perkins
Westminster, CA

Cleverest-Use-of-GET-Statement Award

For the VIC-20:

```
1 POKE650,128:FORI=0TO15:FORJ=0TO7:POKE646,J:FORK=0TO7:POKE36879,(I*16+8)ORK
2 GETA$:ON-(A$="")GOTO20:PRINT"COMMODORE";:NEXTK,J,I
```

For the C-64:

```
1 POKE650,128:FORI=0TO15:POKE53281,I:FORJ=0TO15:POKE646,J:FORK=0TO15:POKE53280,K
2 GETA$:ON-(A$="")GOTO20:PRINT"COMMODORE";:NEXTK,J,I
```

By pressing the run/stop key and printing the variables, the actual values for a pleasing combination can be found. The program will wait until any key is pressed before displaying the next combination. The Poke to 650 allows all keys to repeat automatically, so a key may be held down to rapidly cycle through the colors.

Bob Retelle
Ypsilanti, MI

Machine-Language Award

```
10 FORAD=49152TO49202:READM:POKEAD,M:NEXT:PRINT"PRESS B,C,E, OR X":SYS49152
20 DATA32,228,255,240,251,201,69,208,3,238,32,208,201,66,208,3,238,33,208,201
30 DATA 67,208,23,162,250,254,255,215,254,249,216,254,243,217,254,237,218,202
40 DATA 208,241,238,134,2,24,144,210,201,88,208,206,96
```

Type in this program and save it to disk or tape, as an error in the Data statements could cause your computer to lock up. To change a color combination, type in SYS 49152. Press B to change the background color, E to change the border color and C to change the color of all the characters on the screen. Press X to get out of the color-change routine.

Frederick Simon
Alexandria, VA

Most-Confusing-Solution Award

```
1 ?"{SHFT CLR}":X=53280:J=P{SHFT E}(X):GOSUB2:X=X+1:J=P{SHFT E}(X):GOSUB2:X=646:J=PEEK(X):GOSUB2:GOTO1
2 POKEJ,X:MID$(" {SHFT Q}",-(X<646)+1):PRINTX$"{CRSR LF}";:TS="":GETT$:IFTS=""THEN2
3 V=PEEK(770)+256*PEEK(771)-820:POKE820,96:T=ASC(T$):IFT=135THENRETURN
4 V=820+V*-(T=136):SYSV:J=(J-SGN(T-133.5))AND15:GOTO2
```

Press F1 to change the border color and continue pressing this key to view all possible border colors. (To cycle back to a previous color, press F3.) To move on to the Background mode, press the F5 key and once again use the F1 and F3 keys to view all possible colors.

After choosing a color, press the F5 key again to move on to the Text mode. A dot on the screen shows the current color of the text. Choose the text color using the same two function keys (F1 and F3). Press the F5 key after choosing a text color, and you will return to the Border mode. You will remain in this color loop until you press the F7 key, which

(continued on p. 134)

STOCK ANALYZER...

your investment advantage!

Stock Analyzer is the only complete portfolio management program for the Commodore 64. Designed to assist your investment decisions, through automatic calculations, it accurately records your stocks' performance, including: percentage and dollar gain, loss, sales, purchases, splits, and more. At the touch of a key a full series of statistical reports and charts can be generated for both individual stocks or the entire portfolio.

Stock Analyzer is the advantage you need to get maximum results from your money.

For Commodore 64

THE WALL STREET

What's

FRIDAY

© 1984 Dow Jones & Company, Inc. All rights reserved.

12862 406

WADED

AU

115

-80

-82

Virginia
Housing

-83

ROCKAWAY CORPORATION

COMMON
PAR VALUE \$10

ZAVA

Stock
Analyzer

Commodore 64

ORBYTE

Circle 26 on Reader Service card

ORBYTE
SOFTWARE

170 G. 8th St., Waterbury, CT 06720 203-621-9361

May Not Reprint Without Permission
Commodore is the registered trademark of Commodore Business Machines.

Commodore Clinic

By Jim Strasma

Commodore Clinic is a monthly column designed to help you, the RUN reader, through any troubles or questions you have as you use your VIC-20 or C-64 computer. Send your questions along with a business-size envelope to:

Jim Strasma
Commodore Clinic
1238 Richland Ave.
Lincoln, IL 62656

So this column can help as many as possible, please try to limit your questions to topics of general interest, and one question per letter. Including a full-sized stamped, self-addressed envelope usually brings you a reply before your question appears in print.

Software

Q: I load the C-64 WEDGE from the demo disk supplied with the 1541 as follows: LOAD "C-64 WEDGE",8. I then type RUN, and get a Ready display, but when I type any of the abbreviated symbols, I get a Syntax error. Any suggestions would be greatly appreciated.

Robert Lyons
Rensselaer, NY

A: Your Load and Run commands are slightly faulty for this program. Load the Wedge with: LOAD "C-64 WEDGE",8,1 and run it with: SYS 52224.

Q: Could you fill me in a bit about the SYS and Data statements on the VIC?

Chris Anderson
Omaha, NE

A: When used together with the SYS command, the Data statement usually contains a series of numbers

separated by commas. In use, these are read into a variable and then Poked into a predetermined part of memory, where they become usable as a machine language program that is activated by the SYS command.

SYS is much like the GOSUB statement, except that the subroutine it goes to (and hopefully returns from) is written in machine language instead of Basic.

Q: In 73 Magazine, I found the following program for a Timex computer that prints the memory used by the program.

```
520 PRINT "MEMORY USED:";PEEK  
16396 + 256 * PEEK 16397 - 16509
```

Is there a similar statement for the VIC?

Jaime Vega
Las Vegas, NV

A: All that? On any of Commodore's computers, simply type: ? FRE(0). (Further notes: 64 owners will get a negative answer whenever they have more than 32K left, and B 128 owners will need to replace the 0 inside the parentheses with a 1 or 2, depending on which bank of memory they are testing.)

Q: In reading some articles, I notice the use of a VIC MON. What is it and how is it used? When do I need one? (Also, I would ask the same questions about an assembler.) Thank you.

Ed Daniel
Prescott, AZ

A: VIC MON is a cartridge sold by Commodore for the VIC. It allows you to list and change machine language programs, much as Basic's editor allows you to view and alter Basic programs. You'll need one only after you know Basic well enough to be aware of its lim-

itations, and are ready to go beyond them.

At Lincoln College, where I teach, students begin serious work with a machine language monitor like VIC MON in their third or fourth semester of programming. As for an assembler, it is a powerful aid to machine language programming. It will become useful to you about the same time as VIC MON.

Q: I bought a 5¼-inch CP/M disk from a Heath user group. I figured it would run with CP/M on the 64, but all I get is a Bad Sector message. I'd appreciate any help you can give.

Del Nelson
Marshall, MN

A: Although all CP/M programs are somewhat compatible once loaded, there are hundreds of incompatible disk formats around, all labeled CP/M. You can't take a Heath disk, put it into a 64 and expect it to work, with or without CP/M. Commodore disks are intentionally not compatible with those of any other brand of computer. (Each company thinks it can do it better its own way.)

Q: I would like to know exactly what a compiler does and how it is used on the 64.

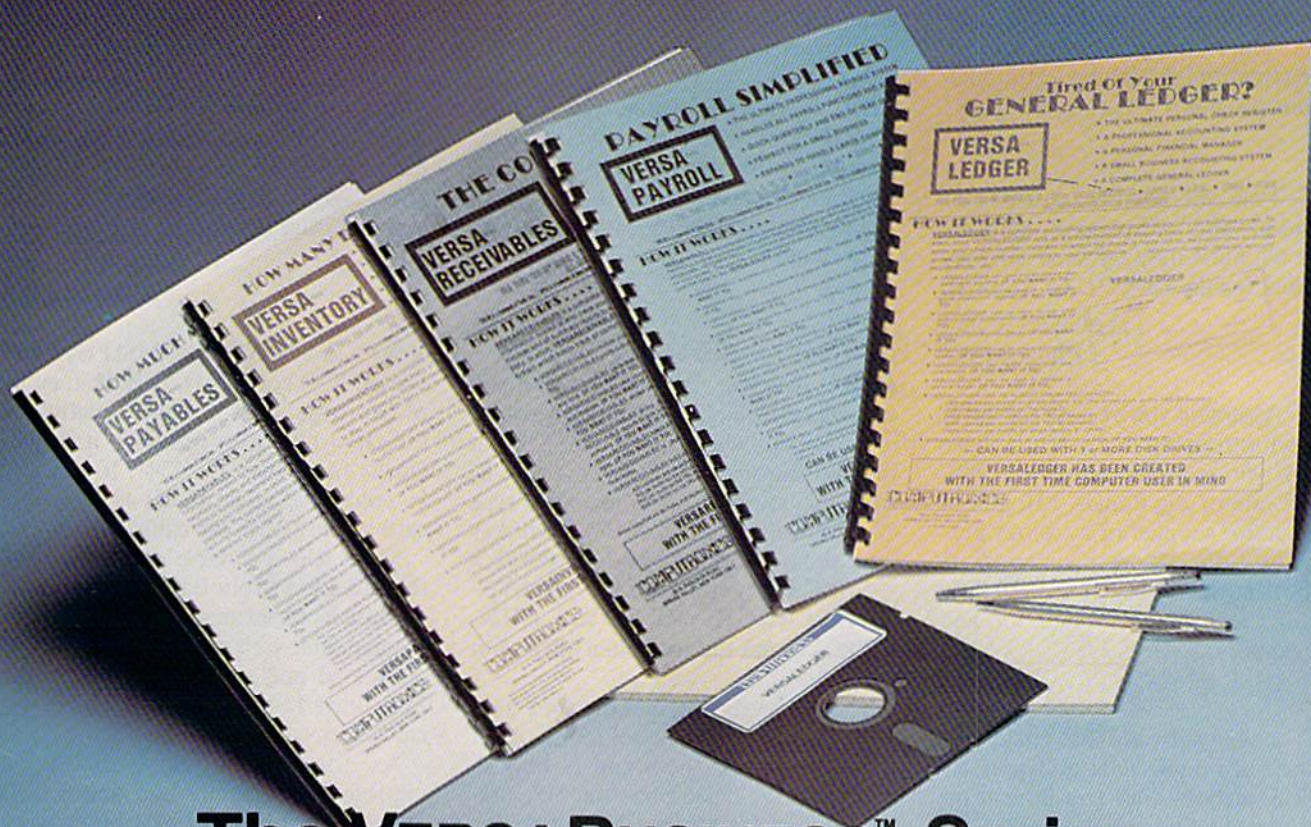
Ron Turner
McAllen, TX

A: A compiler attempts to convert a Basic program into either true machine language, or a separate low-level form known as p-code. The goal is to speed up the program, or hide its lines from prying eyes.

Two good compilers have been around for Commodore systems for some time: DTL Basic, from Drive Technology of England (the 64 version

Introducing the Most Powerful Business Software Ever!

FOR YOUR TRS-80 • IBM • APPLE • KAYPRO • **COMMODORE 64** • MSDOS OR CP/M COMPUTER*



The VERSABUSINESS™ Series

Each VERSABUSINESS module can be purchased and used independently, or can be linked in any combination to form a complete, coordinated business system.

VERSARECEIVABLES™

\$99.95

VERSARECEIVABLES™ is a complete menu-driven accounts receivable, invoicing, and monthly statement-generating system. It keeps track of all information related to who owes you or your company money, and can provide automatic billing for past due accounts. VERSARECEIVABLES™ prints all necessary statements, invoices, and summary reports and can be linked with VERSALEDGER II™ and VERSAINVENTORY™.

VERSAPAYABLES™

\$99.95

VERSAPAYABLES™ is designed to keep track of current and aged payables, keeping you in touch with all information regarding how much money your company owes, and to whom. VERSAPAYABLES™ maintains a complete record on each vendor, prints checks, check registers, vouchers, transaction reports, aged payables reports, vendor reports, and more. With VERSAPAYABLES™, you can even let your computer automatically select which vouchers are to be paid.

VERSAPAYROLL™

\$99.95

VERSAPAYROLL™ is a powerful and sophisticated, but easy to use payroll system that keeps track of all government-required payroll information. Complete employee records are maintained, and all necessary payroll calculations are performed automatically, with totals displayed on screen for operator approval. A payroll can be run totally, automatically, or the operator can intervene to prevent a check from being printed, or to alter information on it. If desired, totals may be posted to the VERSALEDGER II™ system.

VERSAINVENTORY™

\$99.95

VERSAINVENTORY™ is a complete inventory control system that gives you instant access to data on any item. VERSAINVENTORY™ keeps track of all information related to what items are in stock, out of stock, on backorder, etc., stores sales and pricing data, alerts you when an item falls below a preset reorder point, and allows you to enter and print invoices directly or to link with the VERSARECEIVABLES™ system. VERSAINVENTORY™ prints all needed inventory listings, reports of items below reorder point, inventory value reports, period and year-to-date sales reports, price lists, inventory checklists, etc.

VERSALEDGER II™

\$149.95

VERSALEDGER II™ is a complete accounting system that grows as your business grows. VERSALEDGER II™ can be used as a simple personal checkbook register, expanded to a small business bookkeeping system or developed into a large corporate general ledger system **without any additional software.**

- VERSALEDGER II™ gives you almost unlimited storage capacity (300 to 10,000 entries per month, depending on the system),
- stores all check and general ledger information forever,
- prints tractor-feed checks,
- handles multiple checkbooks and general ledgers,
- prints 17 customized accounting reports including check registers, balance sheets, income statements, transaction reports, account listings, etc.

VERSALEDGER II™ comes with a professionally-written 160 page manual designed for first-time users. The VERSALEDGER II™ manual will help you become quickly familiar with VERSALEDGER II™, using complete sample data files supplied on diskette and more than 50 pages of sample printouts.

SATISFACTION GUARANTEED!

Every VERSABUSINESS™ module is guaranteed to outperform all other competitive systems, and at a fraction of their cost. If you are not satisfied with any VERSABUSINESS™ module, you may return it within 30 days for a refund. Manuals for any VERSABUSINESS™ module may be purchased for \$25 each, credited toward a later purchase of that module. All CP/M-based Computers must be equipped with Microsoft BASIC (MBASIC or BASIC 80)

To Order:

Write or call Toll-free (800) 431-2818
(N.Y.S. residents call 914-425-1535)

- * add \$3 for shipping in UPS areas
- * add \$4 for C.O.D. or non-UPS areas

- * add \$5 to CANADA or MEXICO
- * add proper postage elsewhere

DEALER INQUIRIES WELCOME

All prices and specifications subject to change / Delivery subject to availability.

COMPUTRONICS!

50 N. PASCACK ROAD, SPRING VALLEY, N.Y. 10977

The VersaBusiness Series is available for TRS-80 · IBM · APPLE · KAYPRO · COMMODORE 64 · OSBORNE · XEROX · TELEVIDEO · SANYO · ZENITH · NEC · DEC · TI · EPSON · MORROW
MICRODECISION · NORTHSTAR · MSDOS and CP/M computers with 8" disk drives (Computer names are tradenames and/or trademarks of their respective manufacturers).

Circle 9 on Reader Service card.

is reportedly now sold by Cimmaron in the U.S.), and PETspeed, from Oxford Computer Systems, also of England (the 64 version was reportedly bought by Commodore and has recently been difficult to find).

Before buying, be sure the DTL compiler no longer requires a separate \$50 dongle (security key) for each computer that runs programs you compile.

Q: I am interested in obtaining astronomical and astrological software for the 64, but I only see such software advertised for the IBM PC or Apple II.

Ferdinand Richey
Phoenix, AZ

A: Assuming you've seen the cover article on astronomy in the March issue of *RUN*, you may want to contact Matrix Software of Big Rapids, MI, an old and reputable supplier of astrology programs for Commodore equipment. (I have not, however, tested any of their programs, and cannot vouch for any supposed accuracy.)

Q: I need software that could process socio-economic data and perform statistical analysis. Can you inform me where I could find good software for this purpose?

Jorge Baanante
Ahoskie, NC

A: One such package was reviewed very favorably in issue 18 of my *Midnite Software Gazette*. It is the Number Cruncher Statistical System, from Jerry Hintze, 865 E 400 N, Kaysville, UT 84037. Another statistical package now under review at *Midnite* is Handic Software's Stat 64 cartridge, which adds several statistics and graphing commands to Basic. You might wish to investigate both products.

Hardware

Q: Why is it that when extra memory is added to the VIC, the memory locations scatter all over the place? Was this problem overlooked when the computer was designed, or what?

Bill Moffatt
Bartow, FL

A: According to Bill Seiler, co-designer of the VIC, the decision to move memory addresses was very intentional. The goal was to allow even buyers of the bare 5K VIC to use all of its features, including hi-res graphics. This required some shuffling.

Q: Sometimes while I'm typing, I'll strike the delete key and the program begins to run, the keyboard locks up, the thing goes catatonic and I can resume control only by shutting down. How come?

R.W. Holland
APO, SF

A: Ah yes, the infamous *push-wrap crash*, which afflicted early 64s. It only happens when editing a long line at the bottom of the screen. To create it, go to the bottom left of the screen, type 82 characters, then press the delete key three times and stand back! If yours is a -01 ROM 64, you'll see LOAD, SYNTAX ERROR, READY., RUN, READY., and the computer will be out to lunch.

There is a way out, and there are temporary and permanent solutions. After it happens, press the 9 and N keys simultaneously. Then press the play button on your Datassette. As soon as the screen goes blank, press the stop key on your computer and you'll be back in business.

The temporary fix is to change your text color to white by pressing CTRL and 2 together. This will last until the cursor color changes again. The permanent solution is to replace your kernal ROM with a current one, available through authorized Commodore service centers. You want a 901227-02 or later ROM for socket U4.

Q: I have just purchased a VIC, and was wondering what special hardware I need to use software cartridges on it, and where do I plug them in?

Victor Swindell
Chapel Hill, NC

A: Good news! You don't need any special hardware at all. Simply buy cartridges marked for the VIC. To plug them in, simply push the long side with the gold-covered fingers (edge connectors) into the longest slot on the rear of

the VIC, with the label of the cartridge facing up.

Do all this with the computer turned off. Then, to run the cartridge, simply turn the computer on again. Most cartridges will start immediately, and the rest will include printed instructions telling what to do next.

Q: How compatible is the MSD disk drive with Commodore 64 programs? Will it plug into the serial bus or is an interface necessary?

Doug Shandonay
Gladstone, MI

A: An MSD disk (MSD Systems, Dallas, TX) connects to the 64 in either of two ways. First, it plugs directly into the serial bus. Run this way, it is marginally faster than the 1541. It may also be connected to an IEEE-488 interface card via an IEEE-488 cable.

MSD sells a suitable card, but I use the Bus Card (from Batteries Included), because its phantom cartridge technique is compatible with more programs. MSD disks load and save information about four times faster through an IEEE-488 card than via the serial bus.


As for compatibility, nearly all unprotected programs and about 90% of the protected ones I have tested work properly with the MSD drive. MSD reports it has sent drives to companies whose products are incompatible, and hopes this will be corrected. As always, test the disk and essential programs together before you buy.

Q: I have had the 64 for just over a year, but continue to have trouble plugging in cartridges. Why is it so difficult to insert and remove the cartridge?

Keith Hom
Brooklyn, NY

A: Early on, some cartridge makers didn't size their products for the 64 quite properly. This may explain some of your difficulties. Another reason for tight operation is to avoid at all costs the opposite problem of inadequate contact. As you continue to plug things in and out, the socket will inevitably wear, and eventually fail. Starting with tight contacts delays that sad day.

You may want to get an expansion interface (also called a motherboard) and



Commodore 64™ Owners, Relax...

with Mirage Concepts software



Mirage Concepts has mastered the art of uncomplicating software. Before you buy—we help you determine which Mirage Concepts package will meet your need. No guesswork! With your purchase comes a menu-driven program ranked by independent evaluators nationwide as among the finest available. Relax as you learn how to operate your program with clear, concise tutorials written by professional writers... not programmers. For consultation on your special questions, technical support personnel are standing by on a toll-free basis.

For Brochures, Support
and Information, Call...

(800) 641-1441

In California, Call...

(800) 641-1442



DATABASE MANAGER, \$89.95

- 100% Machine Language • Free Form Design • Sort On Any Field • Calculated Fields
- Interfaces to W.P. • Record Size = 2,000 Characters

ADVANCED REPORT GENERATOR, \$49.95

- Companion to Database • Totals and Subtotals • Field Matching • Expanded Reports
- Sorting (Up & Down) • Calculated Fields

WORD PROCESSOR, Professional Version \$89.95

- 80 Col w/o Add'l Hdwr • 100% Machine Language • Spelling Checker (30,000 Words)
- Over 70 Single Keystroke Commands • Printer Command File • Interfaces to Database

WORD PROCESSOR, Personal Version \$39.95

- 100% Machine Language • True Word Wrap • Printed page/line/character counters
- Right Justify, Center • Printer Command File • Interfaces to Database

MIRAGE CONCEPTS, INC.

2519 W. Shaw Ave., #106 • Fresno, CA 93711

TM - Commodore 64 is a Registered Trade Mark of Commodore Electronics, Ltd.

Circle 20 on Reader Service card.

plug your cartridges into that, instead of directly into the 64. It may be easier to fit your cartridges into, and will reduce wear on the original port. One that I've tested successfully is the CB-5, from Cardco, Wichita, KS.

Q: What are the advantages and disadvantages of a thermal printer, aside from the special paper needed?

Gary Payne
Fresno, CA

A: Some advantages of a thermal printer are extremely quiet operation, low purchase cost and compact size. Some disadvantages are the very high long-term cost, difficulty in finding the necessary coated paper and relatively fragile printouts that may become difficult to read after a couple of years.

Q: Should one leave the power supply for the VIC or 64 plugged in when not in use, or should it be disconnected?

C.E. McDougal
Salinas, CA

A: I plug mine into a switched multi-outlet power strip, along with the rest of the computer system, and switch them on and off with everything else. This works very well and avoids the whole problem.

Q: I have a Tandon disk drive that I would like to interface to my 64. What interface would you recommend?

William Douglas
Northglenn, CO

A: This is not a do-it-yourself project. It would be easier to build a 64 from scratch. Commodore's disks are as complex as the computers themselves.

Q: I have a problem with the Check Disk program supplied with the 1541 drive. The program takes so long to run through a disk that I normally give up before it checks 500 blocks. This is not good, as I have had programs lock up when they're loading data and find a bad block.

The symptoms are: the first few

blocks take about 1 second per block, but at block 450 it's taking 13 seconds per block; if the program has been running a while and finds a bad block, all the following blocks seem bad; and lastly, I usually give up after two hours, try to load a program, and the program is never found. I believe the problem is with heat in the drive. A fan may help, but how long should Check Disk take? (I'm used to 3 to 10 minutes on other computers.)

Barry Hoefermann
Oreland, PA

A: You've done a good job of investigating the problem. Unfortunately, the results you report are typical for the Check Disk program on the 1541—over two hours to run, and increasing delays as it moves the read/write head further from the block where it keeps its results.

Few 1541s are solid enough to complete the Check Disk program without reporting spurious errors. The then-overheated drive may indeed refuse to load other programs. Adding a fan may ease the problem, but at the cost of introducing more dirt than normal into the drive. Your 1541 sounds heat-sensitive enough to need it.

Avoid the Check Disk program except as a torture test for new 1541 drives. The header (disk NEW) command, which formats disks, already writes to and then verifies every byte on the disk's surface. You will rarely need any further assurance that the disk is good. I've never had a disk that succeeded in formatting suffer an error that couldn't be fixed by reheadering the disk. Also, buy good disks, and replace important ones before they wear out.

Q: I want to be able to do word processing in Spanish and French. I have a Prowriter printer and use the Paperclip word processor, which has a French character set that looks fine on the screen, but I have not been able to print the special French characters.

Hugh Caddess
San Antonio, TX

A: Spanish and French are not among the language options of the Prowriter. Perhaps this would be a good time to add a daisy wheel printer to your system, provided it offers wheels with

French and Spanish characters. Or you could trade your Prowriter for one that offers either those characters or a completely loadable character set.

Q: I was wondering if Commodore or any other company makes dust covers for the VIC or 64 and other hardware.

Joe Lind
Yuba City, CA

A: Commodore has announced plans to offer such covers, but I've not seen them yet. The only one I've tested (on a CBM 8032) came from Pro Line Software of Mississauga, Ontario, and is excellent. Several other companies also advertise covers.

Programming

Q: My manual states I should use OPEN 15,8,15,"UI-":CLOSE 15 whenever I turn the disk on with my VIC. Even when I forget, the drive functions fine. Do I have to do this?

Ken Waldrip

A: Only if you need the slight additional speed it adds to disk operations. The 1541 was slowed relative to the former 1540 VIC disk drive to make it compatible with the 64. This command allows VIC owners to regain the 1540's speed.

Q: I want to know how to make a program run off a printed form. I have the 64 and the 801 printer. I don't want to use a word processor to do it.

Fred Jones
Louisiana, KY

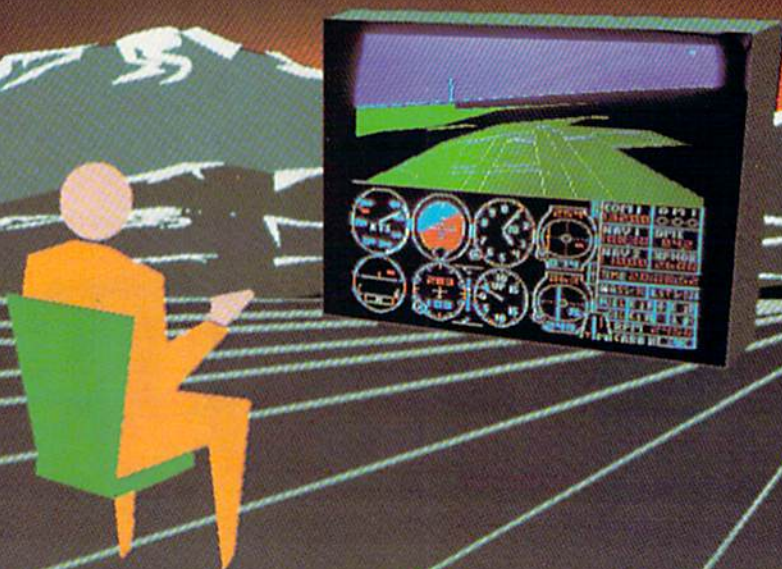
A: From the form you enclosed, you know how to use the Print statements to make text and graphics appear on the screen. To send the same information to the printer, just change each occurrence of the Print statement in your program to Print#4, instead. (Do not abbreviate this as ?#, and be sure to include the comma after the 4.)

Then, at the start of your program,

(continued on page 114)

Flight Simulator II

For
the Commodore 64™




Put yourself in the pilot's seat of a Piper 181 Cherokee Archer for an awe-inspiring flight over realistic scenery from New York to Los Angeles. High speed color-filled 3D graphics will give you a beautiful panoramic view as you practice takeoffs, landings, and aerobatics. Complete documentation will get you airborne quickly even if you've never flown before. When you think you're ready, you can play the World War I Ace aerial battle game. Flight Simulator II features include ■ animated color 3D graphics ■ day, dusk, and night flying modes ■ over 80 airports in four scenery areas: New York, Chicago, Los Angeles, Seattle, with additional scenery areas available ■ user-variable weather, from clear blue skies to grey cloudy conditions ■ complete flight instrumentation ■ VOR, ILS, ADF, and DME radio equipped ■ navigation facilities and course plotting ■ World War I Ace aerial battle game ■ complete information manual and flight handbook.

See your dealer . . .

or write or call for more information. For direct orders please add \$1.50 for shipping and specify UPS or first class mail delivery. American Express, Diner's Club, MasterCard, and Visa accepted.

Order Line: 800/637-4983

subLOGIC
Corporation
713 Edgebrook Drive
Champaign IL 61820
(217) 359-8482 Telex: 206995



MAGIC is tricks, MAGIC is fun.
MAGIC is doing what cannot be done.

Magic

Compiled by Louis F. Sander

MAGIC is a monthly column of hints, tricks and odds and ends from the worlds of software, hardware and applications.

Every month, MAGIC brings you brief and useful computer tricks from around the world—tricks that others have found to make computing easier, more enjoyable or more exciting.

MAGIC features simple hardware ideas, one-line programs, useful programming techniques, little-known computer facts and similar items of interest. We look for new or recycled material that is of current value to Commodore computerists and that can be implemented with a minimum of time, effort, or theoretical knowledge.

Send your own tricks to:

MAGIC
c/o Louis F. Sander
P.O. Box 101011
Pittsburgh, PA 15237
U.S.A.

RUN will pay up to \$50 for each original trick we print.

MAGIC's tricks are numbered in hex, the number system of sorcery and computers.

Back in March, we noted that Magic seeks tricks from diverse geographical locations. By now you can see our sorcery seeking seems somewhat successful—we've printed tricks from every state in the U.S., not to mention an ever-growing group of tricks from other lands. *RUN*'s {CTRL 2} magic seems to have *everyone* under its spell, and the situation shows no signs of {CTRL 9}ing.

Rumor has it that even the astronauts run for *RUN* as soon as they CHR\$(13) CHR\$(19) from CHR\$(32), but of course we have no way of knowing for sure. We can verify the answer to last month's word trick: the hidden incantation is somersault.

This month, Atari users gave us some tricks. So did shamans of the Commodore stripe, and here are their august efforts:

\$AA Debugging tip—You can check the status of any variable in your program, at any point in the program, by pressing the stop key (*not* stop/restore!), then typing PRINT, the variable name and hitting the return key. The computer will print the current value of that variable. You can print as many values as you need, or even change values, then restart your program by entering CONT.

Michael Berry
Kewanee, IL

\$AB Son of BURROW—For an amazing surprise on your C-64 or VIC, try entering POKE 214,30 while in Direct mode. Then hold down the CRSR DN key and watch what happens. Don't worry, the screen will return to normal after you've held the key down awhile.

David D. Panzer
Ft. Knox, KY

\$AC Scratch remover—*The 1541 User's Manual* says the following form of the Load command will cause the last program accessed on the disk to be loaded.

LOAD "*" ,8

This command is also useful in recovering a program file inadvertently scratched, providing no other programs have been accessed from that disk since the deletion occurred. This worked very well with my VIC-20 and should work equally well for the C-64. To test this trick, try the following.

- Set up a short test program.
- Save the program to disk.
- Execute the Verify command to ensure the disk copy is all right.
- Type NEW to delete the program from RAM.
- Delete the disk version of the program.
- List the disk directory to verify the program has been deleted.
- Type LOAD "*" ,8
- Type LIST to verify that the program has been recovered.

Now the program is ready to save to disk again.

O. F. Brissette
Pawtucket, RI

\$AD Wedge tricks—When using the C-64 Wedge, if you hit the space bar while listing your directory, the scrolling will stop. Hitting the space bar again will resume

the listing. Pressing the stop key will terminate it.

To load a program while using the Wedge, just get its directory entry on screen, then press the stop key. Move your cursor to the first position on the same line as the directory entry, then type a slash or an up arrow. Press the return key, and, presto, your program will load. If you used the up-arrow key, your program will run automatically.

Hiram Rivera
Stillwater, OK

\$AE Disk buyer's guide—When buying floppy disks, look at the exposed part of the disk around the center hole. Quality disks have a clear or colored reinforcement ring in this area, to protect them from wear caused by the disk drive. Disks without the protective ring might not last as long.

Russell P. Marsella
Lincoln, RI

\$AF Making boots—When you want to easily load and execute a machine language program, a small Basic program called a boot can be very helpful. There's a little trick to bootmaking; its necessity is illustrated in the following program, which will never get to line 20.

```
10 LOAD "WAND",8,1
20 SYS49152
```

Line 20 will never be executed because the Program mode Load command causes a program to be loaded, then immediately starts executing whatever Basic program is in memory, retaining the values of all variables from the previous run.

So line 10 will load WAND, then the computer will execute line 10, which will again load WAND and so on, *ad infinitum*. The following program will run properly, since it includes a test to see whether the Load command has been executed.

```
10 IF TEST=0 THEN TEST=1 : LOAD "WAND",8,1
20 SYS49152
```

When you type RUN, all variables, including TEST, will be set to zero. The If...Then will succeed, TEST will be set to 1 and WAND will be loaded. When line 10 is executed again, the If...Then will fail, so control will transfer to line 20 and the SYS will be performed.

Errol Lisonbee
Salt Lake City, UT

\$BO More on connectors—Male pc edge connections for the expansion ports can be made from pc breadboards. For the VIC-20, Radio Shack bread-board 276-152, 44-pin, .156 spacing will fit perfectly.

For the 64, Vector makes a bread-board, 3719-1, which has 72 pins on .100 inch spacing and can be cut down to fit. Another source of expansion-port connectors is blown cartridges (see your dealer).

William C. LaRue
Boise, ID

\$B1 Saving machine language—You do not need a monitor program to save a machine language program or block of data stored in RAM. First determine the starting and ending addresses of the memory block you wish to

save, then add 1 to the ending address. Poke the low and high bytes of the starting address (HI=INT(ADDRESS/256); LO=ADDRESS-256*HI) into memory locations 43 and 44. (The low byte goes into 43 and the high byte goes into 44.)

Next, Poke the low and high bytes of the end address into memory locations 45 and 46, respectively. Finally, save the block with the usual Basic command: SAVE "programname",8. When the Save is finished, you must reset your computer, since your Pokes have hopelessly upset some important Basic pointers.

J. Winnie
Kila, MT

\$B2 Improved automatic Save routine—When you are developing a program and regularly putting new versions onto the disk, you can automate saving and backing up by using the following lines.

```
59999 END
60000 PNS="programname":OPEN 15,8,15
60010 PRINT#15,"S0:" + PNS + ".BKUP"
60020 PRINT #15,"R0:" + PNS + ".BKUP=" +
      PNS
60030 CLOSE 15
60040 SAVE PNS,8
```

When you're ready to save your latest version, just enter GOTO 60000. Lines 60000-60020 will rename the previously saved version as a backup, and line 60030 will put the current version onto the disk. Of course, "programname" must contain eleven or fewer letters.

James Llanos
Ketchikan, AK

\$B3 Defeating program protection—If you ever try to list a program and the listing terminates suddenly with an empty REM statement followed by a Syntax error, the cause is a shifted L following the REM. You can clear up the list disable by moving the cursor to the colon, then using the space bar to delete the colon and the REM.

Your program should then list perfectly, and unless the program protector was especially sneaky, it should run perfectly, as well.

Paul James
Cleveland, TN

\$B4 Printer hint—When you know you will be making a printed copy of a program you are writing, use character codes (CHR\$) for such functions as Screen Clear and CRSR DN, so your printout will not be muddled with unreadable black dots.

Screen Clear, for example, would be PRINTCHR\$(147). It may cost a bit more memory, but it will make your program easier to read and debug.

D. Mataconis
Piscataway, NJ

\$B5 1526 printer tip—One advantage of the Commodore 1526 printer is that it can be used with single sheets of paper. But you may not get as many lines on a single sheet as you do when you use fanfold paper and tractor feed.

When you get towards the bottom of the single sheet, the

printer will stop, with the lighted paper advance button flashing an Out of Paper warning.

To get the rest of your lines on the paper, simply slip a blank sheet in the paper feed behind the sheet you're printing to. Make sure the left side lever is set to the friction position and feed the spare sheet as far as you can. Now press the blinking paper advance button. Printing will continue, and you'll have all your lines on a single sheet.

Don Morgan
Parsippany, NJ

\$B6 1526 printer tip—When using the 1526 printer and the 1541 disk drive, there is a tendency for the disk drive to hang up with a Searching for XXX message on the screen. Nothing seems to help except turning the system off and back on.

I've found the trouble to be with the sequence in which the various units are turned on. The manuals recommend you turn the computer on last, but if you have this problem, disregard the manuals and turn the printer on last. For me, that is the secret to avoiding disk hangups.

Barney H. Roberts
Huntsville, AL

\$B7 ML monitor hard copy—The following simple line will cause a machine language monitor's output, prompts and all, to be printed on your printer.

```
OPEN 4,4 : CMD4 : SYS xxxx : PRINT#4 : CLOSE4
```

The xxxx refers to whatever SYS number activates your monitor. When you press the return key, screen output will be directed to the printer instead.

I've used this with Hesmon, Minimon, Micromon, Monitor \$0C00, Monitor \$8000 and Supermon64.V1, all with excellent results. With Supermon, and perhaps with others, you must first run the monitor, exit back to Basic with the X command, then use the command line above.

Dale Sowell
Senatobia, MS

\$B8 Easy Script trick—Working with Easy Script, I have learned to appreciate more and more the power of this program. It even plays music! To hear it, go into Command mode by pressing the f1 key. Once in the Command mode, hold down the CTRL key while you press the 3 key. Incredible!

Steven Cavener
Oklahoma City, OK

\$B9 Screen dump—The following short program works on a C-64 with an Alphacom printer, but should also work or be easily adapted to other printers.

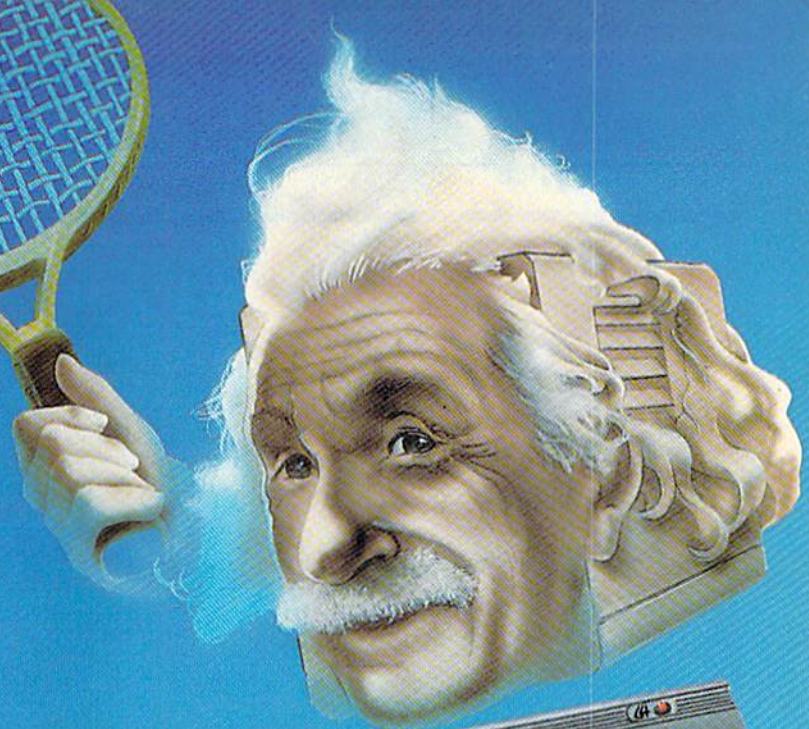
```
10 OPEN4,4,7:FORN=1024TO2023:P=PEEK(N)
20 IFP<32ORP>95THENP=P+64:GOTO40
30 IFP>63ANDP<96THENP=P+32
40 PRINT#4,CHR$(P);:NEXT:CLOSE4
```

In the Open statement, the 7 calls for upper-/lowercase mode. An 8 here will print the uppercase/graphics mode. The If . . . Then statements convert screen codes to ASCII codes.

The program can be typed in or loaded and then run off the screen with the cursor. Compose anything you desire

(continued on p. 118)

IS YOUR 64™ STILL PLAYING GAMES WITH YOU?



If you've been having a hard time teaching your newly-adopted computer there's more to life than fun and games, you're not alone.

Now, you can introduce your Commodore 64™ to the Work Force: affordable, easy-to-use software and hardware that will unleash the power you always expected from your Commodore 64™, but thought you might never see.

PaperClip™

is simply the best word processing program of its kind—loaded with advanced features, yet so easy to use even a novice can get professional results. With **SpellPack™**, it even corrects your spelling! Once you've tried it, you'll never use a typewriter again.

The Consultant™

(formerly Delphi's Oracle)

is like a computerized filing cabinet with a brain. Organize files for recipes, albums, or the membership of your service club. Then search, sort, arrange and analyze your information with speed and flexibility that's simply astounding.

SpellPack™

teaches your 64 to spell. It checks an entire document in 2 to 4 minutes against a dictionary of over 20,000 words. And you can add up to 5,000 of your own specialized terms. Type letter perfect every time!

BusCard II™

is a magic box that lets you transform your humble home computer into a powerful business machine. It gives you the added power of BASIC 4.0, and lets you add IEEE disk drives, hard disk, virtually any parallel printer, and other peripherals without extra interfaces. Completely software invisible.

B.I.-80™ Column Adaptor

gives you crystal clear 80 column display. Using the highest quality hardware, we've eliminated the problems of snow, fuzziness and interference. Basic 4.0 commands greatly simplify disk drive access. Switches easily from 40 to 80 column display.

Discover the true power of your Commodore 64™. Ask your dealer about the Commodore 64™ Work Force, from Batteries Included—the company that doesn't leave anything out when it comes to making things simple for you.



BATTERIES INCLUDED

"Excellence in Software"

Circle 101 on Reader Service card.

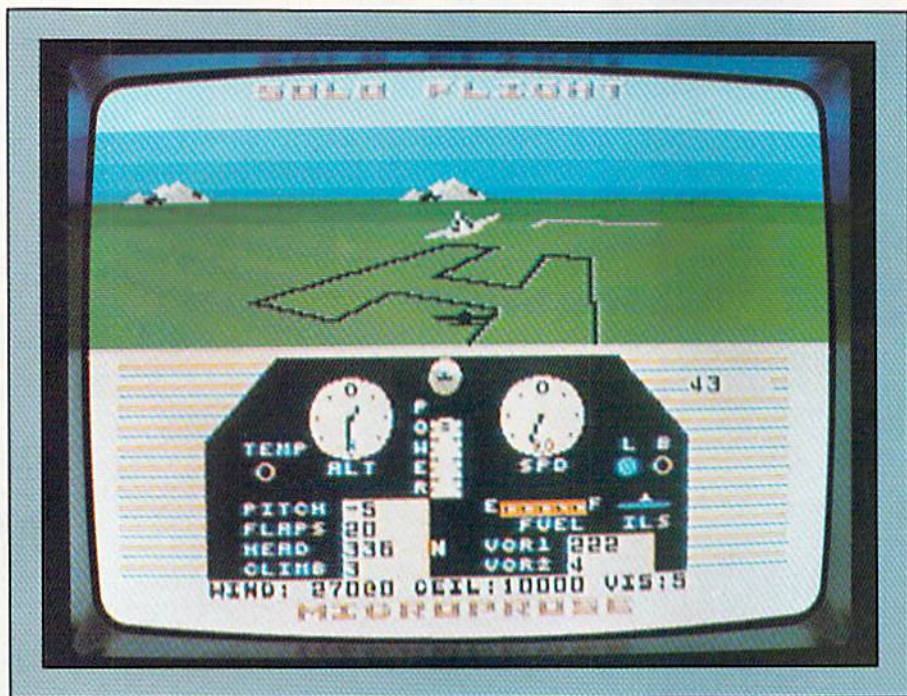
These products have been developed specifically for Commodore computers by Batteries Included and are totally compatible with each other. For a full color brochure write to:

www.Commodore.ca
186 Queen Street West Toronto, Canada M5V 1Z1 (416) 596-1405 / 3303 Harbor Blvd., Costa Mesa, CA. 92626 (714) 979-0920
May Not Reprint Without Permission

64 AND COMMODORE 64 ARE REGISTERED TRADE MARKS OF COMMODORE BUSINESS MACHINES

Software Gallery

Compiled by Shawn Laflamme



a truly good flight simulator for the Commodore 64 would not be easy to find. The many variables that must be considered by a computer program to produce a realistic simulation would be difficult even for the most advanced computer. I felt that the C-64 had a fighting chance, since it has much of the necessary graphics-handling routines already built in. The missing link was a good programmer who knew what real flying was like. The people at Micro-Prose knew.

Changing Horizons

Most flight simulators have approached the changing horizon problem in much the same way—that is, by tilting the horizon when the aircraft is turned. This takes huge chunks of memory and time, factors which take away from the realism of other flying aspects. Solo Flight does it a little differently—they have placed the small plane out in front of the pilot. The plane is then tilted in the direction of the turn. The effect is much like flying a radio-controlled model. It is easier to tell what the aircraft is doing in response to your commands. You get the feeling that you are following behind the plane that you are controlling.

When you tilt your plane, the landscape does not tilt; instead, it sweeps by in an arc below. To add realism to the depth perception, mountains have been added on the horizon that also sweep to the right or left as you turn.

The Instrument Panel

The program puts you at the controls of a vintage, single-engine plane. Even retractable landing gears and flaps are provided. Two Navcom radios continuously plot your position by reading two separate VOR beacons, and the control panel has an artificial horizon, an instrument landing system (ILS), a digital compass, an altimeter, an airspeed indi-

Report Card

A

Superb!

An exceptional program that outshines all others.

B

Very Good.

One of the better programs available in its category. A worthy addition to your software library.

C

Good.

Lives up to its billing. No hassles, headaches or disappointments here.

D

Mediocre.

There are some problems with this program. There are better on the market.

E

Poor.

Substandard, with many problems. Should be deep-sixed!

Solo Flight

This New Flight Simulation Is an Elevating Experience For Keyboard Pilots

A

Have you ever wanted to pilot your own plane without having to go through the hassle and expense of flight school? Now that fantasy can be realized with a new release by Micro-Prose Software. Their excellent disk-based flight simulator, Solo Flight, has everything the average keyboard flyer could want.

Having done a little actual flying in my more adventurous days, I knew that



THE
HOME ORGANIZER™
SERIES

**Finally . . . software that makes
your Commodore 64 feel
comfortable at home**

Now your home computer can help you cook, keep your accounts, find an address or keep track of your record and book libraries—with first-class software specially tailored for the home environment.

The Home Organizer™ series includes a wide range of separate and individual programs for different activities like stamp collecting, personal banking, or home photo and movie collections. Each one is pre-programmed with a “page” format planned out by experts to make it easy for you to store and retrieve the information you’ll want for your special activity. You don’t have to program anything yourself. Just load the disk and start feeding in your data.

If you’re used to run-of-the-mill home computer software, the speed and simplicity of the Home Organizer™ series will surprise you. Each program is written entirely in “machine language”, the most basic computer code. So they search, sort and analyze your data with amazing speed.

The Home Organizer™ is fast enough to sort through your household belongings in seconds, yet so simple the children can use it to look up a phone number. Choose any or all program modules that fit your needs. They make ideal gifts, too!



BATTERIES INCLUDED

“Excellence in Software”

Circle 101 on Reader Service card.

For a full color brochure write to:

Batteries Included, 186 Queen Street West, Toronto, Canada M5V 1Z1 (416) 596-1405 / 3303 Harbor Blvd., Costa Mesa, CA. 92626 (714) 979-0920

 May Not Reproduce Without Permission

COMMODORE 64 IS A REGISTERED TRADE MARK OF COMMODORE BUSINESS MACHINES

*Whether you're a novice or old pro,
Solo Flight has so many features
that it may take months to master.*

erator and a throttle-setting dial. Several indicator lights and digital readouts on the panel provide you with information on your flap setting, landing gear and brakes.

The Controls

Your plane is turned with the joystick from port 2. Moving the stick to the right or left results in a bank of the plane in the desired direction. Back pressure on the stick raises the nose of the plane; the altitude starts to increase and the landscape drops away. The keys numbered 0 to 9 control your throttle. If not enough throttle is given, the plane will slow to a stall and rapidly nose-dive once flying speed is lost. To make the simulator more realistic, motor sound has been added. Many experienced pilots use the sound of the engine as an indicator of airspeed. If you aren't watching the panel and start dropping altitude, the motor sound will alert you as the pitch begins to increase.

Options

There are several options and difficulty levels available before takeoff. You can choose one of three different states: Washington, Kansas or Colorado. The terrain and elevations are quite different in each location. Kansas, of course, is flat and the runways are long and wide. This is a must for first-time practice. Colorado has short runways and high mountains. The manual gives excellent maps for plotting your course.

I usually choose the novice (student) level, since the more advanced levels can present you with unexpected emergencies, ranging all the way from turbulence to a stalled engine. You can also choose the weather conditions: windy, clear or instrument (IFR). IFR allows you to take off under clear conditions, but your view starts to fade as you hit the low cloud ceiling. You can either fly in the clouds by referring to your instruments, or you can attempt to get above them. There is also an option for practicing landings.

Takeoffs

Takeoffs are started using full power down the runway. You must reach flying speed (85 mph) before you pull back on the joystick. Your wing may drop if you rotate too early, and ground loops are possible. Lifting off the ground is a great feeling—it gives you that special thrill known only to those who have actually flown. A touch of the L key retracts your landing gear, and your speed increases as the little wheels on the plane disappear! What's even more amazing is that you can press the cursor keys and look out any of the windows, including the rear. I like to watch the runway sinking below me as I look back. As you make a turn, you can watch the runway out of the side window.

Cross-Country Flying

For flying cross-country, distances have been shortened so that you are never more than three to five minutes away from your destination. This is still enough time to get completely lost if you don't pay strict attention to your heading and the VOR readings. When flying in Colorado, you must constantly check your charts, since your altimeter reads sea-level zero, and elevations in Colorado change drastically. You can smack into the ground even though the meter is reading 2000 feet! Mountains appear and get closer as you fly toward them; they are shown as three lines in a pyramid shape. Mountains can be easily avoided in clear weather, but under instrument flight rules, they can be deadly.

Flying over the colorful landscape provides a good simulation of real flying. Farms (appearing as gray squares), VOR towers and an occasional runway are visible in the distance. The movements and 3-D perspectives are handled well here. The screen is updated only twice each second, causing a bit of jumpiness, but this is soon forgotten as you concentrate on your controls and indicators.

In Solo Flight, all variables and controls interact with each of the other aspects of flight. Low fuel, for example,

causes the engine to quit. Loss of airspeed causes a decrease in altitude. High altitudes make the controls sluggish. Turns must be coordinated with a little up elevator to keep the same altitude. If the engine is kept at full power for a long period, it will overheat and quit.

Landings

If you manage to make it to an airport, you may find the task of getting down to be the most difficult of all. The good graphics and distance perspectives will help, but the actual landing is up to you alone. It has to be rather precise—there's not a lot of margin for error. You should have some power since stalls are easy when trying to hold the nose up. Keep your wings level, watch the glide-slope, put your landing gear down, ease back power (not too much!) and add a little back pressure for the flair out. Don't worry—the runway is longer than it looks. Now touch the brakes and you're safe.

Mail Pilot

In the game Mail Pilot (on the Solo Flight disk), you are a mail pilot who must deliver bags of mail to various cities. If you load too much fuel and mail, you may not make it off the end of the runway. If you are lucky enough to drag yourself up with a full load, the engine can rapidly overheat. It's a fascinating simulation, giving you points for time between delivery, your route planning and landings. After each delivery, your flight path is plotted on the map to keep you advised of your progress and to aid you in planning the next leg.

Summary

Although this simulator is not FAA approved, it is real enough to earn you a few points with your flying instructor. It will teach you to use the VOR coordinates, which in itself is worth the price of the program.

If you buy Solo Flight, be prepared to stay at the controls for at least a week. It has so many features that it may take months to master the program. It is an excellent buy, and a real joy for novices and old pros alike.

Now let's see... where did I put my charts? I'm due in Aspen in five minutes! (*MicroProse Software, 10616 Beaver Dam Road, Hunt Valley, MD 21030. \$34.95.*)

Jim Stephens
Nashville, TN

Turtle Toyland Jr.

This Multifaceted Program Offers a Playful, Creative Approach to Computer Learning

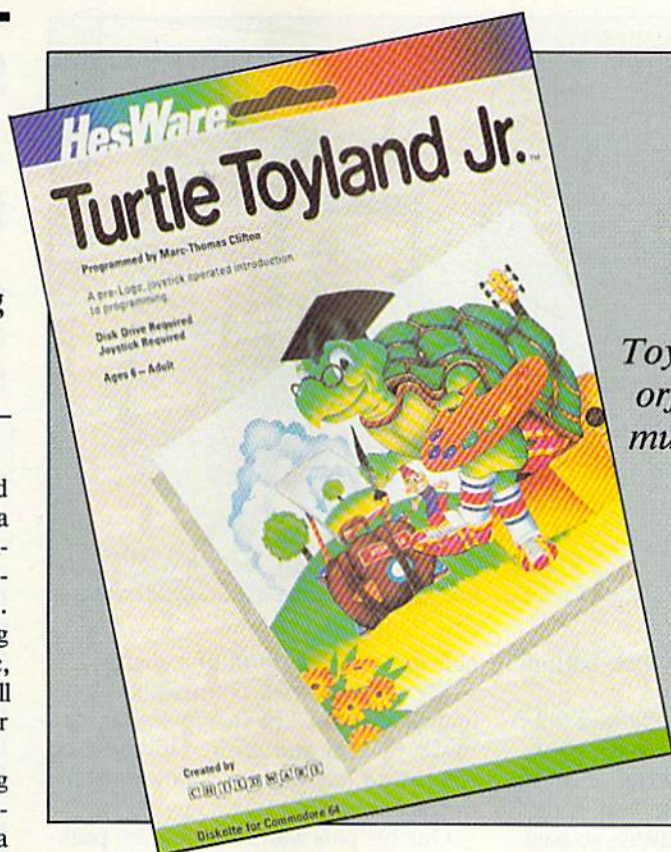
A

The child receiving Turtle Toyland Jr. is like the proverbial kid in a penny candy store, staring in anticipation at the many choices available before deciding upon the first selection. Toyland Jr. is a colorful and exciting learning/game program with music, drawing and even animation, and it will provide many hours of creative fun for children and parents alike.

Turtle Toyland Jr. is not something you can jump into and understand completely the very first time you try it—a certain amount of time, effort and learning are required. If you or your child require instant gratification, you're likely to be disappointed. But if your child is inquisitive and willing to try new things, then forge ahead!

The manual advises parents to try the program first alone, and then later let the youngsters loose on it. That way you can explain it all to the poor dears should they falter. This isn't how I approached it, though. Why? Because Toyland Jr. is almost "too friendly" for an adult. Although the manual does use words to explain, you must still rely heavily on numerous symbols (called icons) to do anything with this program. (This is rather alien to me, but apparently not to my five-year-old son.)

It's tough to explain the program briefly because of the many options available, but here's a quick look at it. After loading the program from tape or disk, you are treated to a short and brilliantly colorful intro. Then, a box labelled Learn and another labelled Program appear on the screen. The turtle is flashing in the Learn box, but you can use the joystick to move him into the Program box, if you wish. Try the Learn mode first by pressing the joystick button. Now you or your child will receive some basic joystick training.



Toyland Jr. is a colorful program with music, drawing and even animation.

Learning to "Turtle"

Your joystick controls the movement of the turtle. I love the graphics of this program, especially the turtle. His feet and tail move as he walks, and he really does look like a turtle. A musical note is played every time the turtle moves.

Several exercises are provided in the Learn mode, to give the child practice with the joystick and familiarize him with the movement of the turtle. It's good training for a child unaccustomed to the joystick. This is important, since joystick control is an integral part of the program. In fact, according to Human Engineered Software, "by allowing nearly complete control of the product through the joystick controller, the need for keyboard skills is virtually eliminated."

Advanced "Turtling"

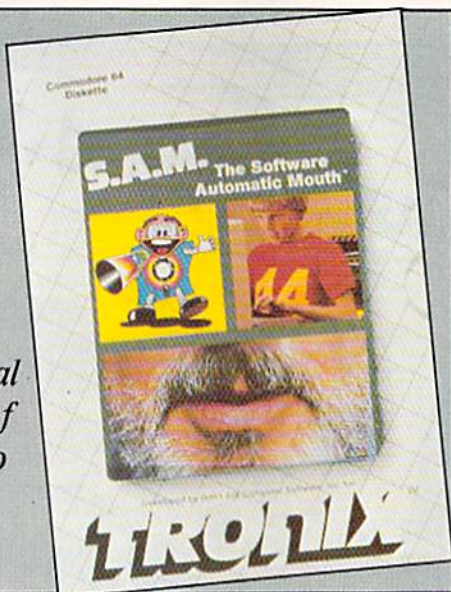
Moving to the screen labelled Crossroads, your available options are represented by symbols: Training Land (turtle), Music Land (musical note), Sprite Land (bug), Toybox (box with four squares), I/O Land (floppy disk) and Playground (diamond). Move the joystick until you reach the icon you want, then press the joystick button.

From now on, you're into heavy symbolism. At the bottom of each screen you'll see at least four symbols. Every time you want to use one of them to make your turtle draw, play music or whatever, you must pull back on the joystick to get into the menu mode. Then move onto the right symbol and push the joystick button.

Let's say your child has decided to try Training Land. In this part of the program, the menu at the bottom of your screen depicts a turtle for drawing, a crossroads sign, a paint pot to change your colors, a box to change background color, a box to change border color, an eraser to eliminate the last few commands, a trash can to erase everything and finally an arrow to turn your pen on or off or change its width.

My son decided to use very wide purple strokes to create a huge, scrawly drawing. He pulled back on the joystick to get into the menu. Then he moved the cursor over the paint pot and pressed the joystick button until the pot turned purple. He moved to the pen arrow and pressed the joystick button until he was satisfied with the width displayed. Next, he moved the cursor back to the turtle and pressed the joystick which got him back to the screen. After

SAM requires no additional hardware. He comes out of the box on a disk, ready to talk.



one more press of the joystick button, he began drawing.

If you want to temporarily save your drawing, you must go back to the Crossroads. From there you can move on to the Toybox, where music and sprites can be stored. You must always go back to the Crossroads to change what you're doing. "You can't get there from here," unless you go to the Crossroads.

In Music Land, you can select from a piano, horn, guitar or flute to create your own tunes. This is not a program for a budding Beethoven—the range is somewhat limited, and you may find the joystick a little awkward. However, it's still a lot of fun as well as a valuable learning experience. When you have finished composing, you can go back to the Toybox via Crossroads and save your music.

What if you'd like to create your own sprites? That's possible too in this amazingly multifaceted program. In Sprite Land, you can create your own sprites and ultimately build your own little filmstrip, with music, brilliant color and animation. There's a clock for timing, a function for selecting angles, and several other rather sophisticated options.

Pluses and Minuses

The manual explains the program in general terms, but I still had to read it several times while running through the program before it made any sense to me. Human Engineered Software now includes a Joystick Controller Quick Reference Guide that explains the avail-

able moves in the form of a chart.

My son never felt constrained by his inability to read—he rapidly learned the basics by trial and error. However, he still had to rely on me to look up some of the symbols.

One big plus with this program package is that both disk and cassette versions are included for the usual price of one. So, if you own both a disk drive and cassette player, you can use the tape for your emergency backup or give it to a friend. If you're limited to tapes, you can give the disk away or save it in case you decide to add a disk drive to your system.

Conclusion

Turtle Toyland Jr. is recommended for children ages six and up. "It's not a throw-away product; it's something a child can enjoy at age six and still love at age ten," explained Dr. Sueann Ambros, Director of Educational Software at Human Engineered Software. I agree. Like all good programs, this one grows with you. In fact, of the 25 to 30 children's educational programs I've seen, this one is the best.

Perhaps my son and I will create something gorgeous together—this is a program to share! Turtle Toyland Jr. is like starting off with lemon drops and working your way up to fancy petits fours! If you're a parent, I strongly recommend that you try it. (*Human Engineered Software, 150 North Hill Drive, Brisbane, CA 94005. \$34.95.*)

Christine Adamec
Palm Bay, FL

Software Automatic Mouth

Give your C-64 the Gift Of Speech with This Software-Based Synthesizer

B

The Software Automatic Mouth (SAM) is a completely software-based speech synthesizer for the Commodore 64. No additional hardware is needed when you use SAM. He comes out of the box on a standard disk, ready to talk. Actually, you get several programs with the package. SAM is the bare bones speech synthesis program. The SAM Wedge patches some additional commands into Commodore Basic.

After the program is loaded, simply issue the command SAY, along with the desired message, and your C-64 will begin speaking to you. The speech is for the most part quite clear, but it does have a rhythm that might remind you of a Norwegian fisherman.

Using nothing but SAM and the SAM Wedge, you must use phonetic spelling to input the words you want SAM to speak. In this mode, SAM uses phonemes, which are the basic units of speech. Here's an example of the phonetic spelling used with SAM:

MAY4 NEYM IHZ SAE4M

In ordinary English, this means, "My name is Sam." By using this phonetic method of spelling, SAM can be made to utter virtually any word in any language. The numbers used in the example above, along with a few other special characters, allow you to vary the stress or inflection of the speech. The number 1 indicates extreme stress (which you would use if you were to hear that you just won the lottery), while an 8 indicates an extreme drop, expressing disappointment or depression.

This is a lot more control than even the more expensive outboard units will give you, but we have only begun to see all the things SAM can do. SAM's voice

can also be changed in several ways. Normally SAM speaks in a male voice, but by varying the pitch, everything from a deep bass voice to an alto is possible. You can even adjust the rate of speech for a southern drawl. The possibilities don't stop there, either. You have additional control over SAM's "throat" and "mouth." These will change the overall tonal quality of SAM's speech. All of these can be adjusted using the additional Basic commands made possible by the SAM Wedge.

Sam has a companion called Reciter (on the same disk with SAM). Reciter understands 450 of the most important rules of the English language. With Reciter loaded and activated, you can input your words and sentences in plain English, and Reciter will help SAM say them for you. It is far from perfect speech, but it does a more than adequate job.

There are some limitations when using SAM. Under normal conditions, SAM prefers to work in the dark and consequently blanks the screen every time he speaks. It is possible using one of SAM's additional commands to turn the screen back on. SAM also disables interrupts in order to keep his own voice intact. One Poke will re-enable the interrupts.

SAM has just a bit of trouble breathing, so he can only sustain speech for about two and one-half seconds without a break. This isn't really much of a limitation, though. After all, how often do you use a word such as "antidisestablishmentarianism"?

On the same disk with SAM and Reciter are some additional programs, used to demonstrate the power and versatility of SAM. In the Demo program, SAM sings the Star Spangled Banner and recites the Gettysburg Address and the famous soliloquy from Hamlet. A simple program called Guessnum (guess the number) suggests the type of interactive learning or game programs that can be created with SAM. A program called Sayit lets you experiment with SAM's different voices.

The documentation is quite good. There is a dictionary included that contains the phonetic spelling for many popular words. Though the compatibility of the SAM program with other software packages is not guaranteed, customer support is available. The disk is guaranteed for a period of 90 days.

*Normally SAM speaks in a male voice,
but everything from a deep bass
to an alto is possible.*

After that, there is a \$5 replacement fee for a damaged disk, provided you are a registered SAM owner.

In the short time SAM has been with me, I have put him to work in several of my programs. Voice synthesis has obvious applications for those with vision impairments. I have a modified version of Totl Software's Totl.Text word processing program that speaks the words as you type them in.

I ran into some problems in trying to use SAM with a modem program. The problem appears to be that when an RS-232 channel is opened for communications, all variables are zeroed. The program works for the first few words, and then it seems that the string variable storage area gets confused. At this point SAM beeps at you indicating an error. By typing the error command, SAM will tell you what he didn't like about the string you fed him! With any luck, these problems can be overcome, and I'll be able to create a fully voiced modem program in the future. (*Tronix, 8295 South LaCienega Blvd., Inglewood, CA 90301. \$59.95.*)

**Jim Grubbs
Springfield, IL**

Mothership

**Hostile Enemy Fighters
Block Your Quest to
Capture the Mothership**



Three games in one! That's the most outstanding feature of Softsync's Mothership, an arcade-style offering for the Commodore 64.

In the first screen, gamers pilot a spacecraft through a trench, destroying enemy drones as they are launched from the Mothership, hovering motionless overhead. Similar to the celebrated Star Wars scene, this action-packed sequence takes place in the midst of the Zarway, a space corridor.

Eliminating twelve drones in a row, without the loss of a single fighter, advances space jockeys to the middle screen of this multi-screen game. Good luck!

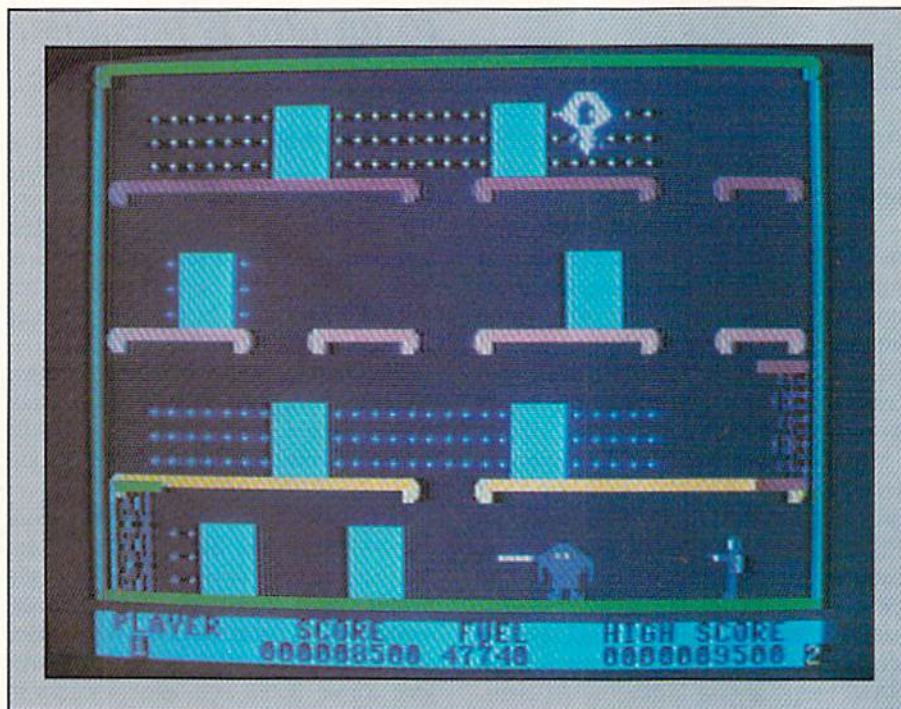
Here, you must battle your way from the lowest to the highest level of the Mothership itself to usurp control of the hostile craft from its ill-intentioned owners. Starting at the lower right side, you must guide your on-screen surrogate across floors and into elevators in order to advance upward. Along the way, mutants attack and flying scanners make their rounds, attempting to dematerialize you. You're armed with nothing more than a one-shot-at-a-time laser weapon.

Left and right joystick maneuvers are used to move the on-screen figure accordingly. Pushing up on the stick allows you to jump the gaps in the floor. Though not fatal, falling through the holes forces a repeat of an earlier level. Not a nice predicament to face!

While you are in the elevator, the nasties can't get you, but neither can you dispose of them. Timing is of the essence here, since the elevators move slowly and the mutant meanies appear instantly. Sometimes they even pop up between your on-screen figure and the weapon in his outstretched hand. That's a certain curtain for one of the three game lives allotted for completion of this monumental task.

As if that's not enough, the control pod on the top level must be taken over before the fuel is depleted. Accomplishing this goal advances you to the final showdown. Controlling the Mothership

Although it contains some major rough spots, Mothership is an achievement of sorts.



now, you must guide it through the defenses of its home planet to destroy the power generators. Naturally, the defenses aren't all passive—you must beware of deadly energy torpedoes.

Amassing points along the way doesn't earn any special accolades or extra lives. Even beating the final screen does no more than reset the game to the initial screen, though at a faster pace.

The disk version loads in about 90 seconds, the cassette takes about ten minutes. If this seems like an eternity, that's because it is. The F1 key is used to select the one-player game, while F2 sets up the two-player version. The numerical keys (1, 2 and 3) are used to choose the difficulty levels: easy, medium or difficult. The game does have higher skill levels listed as 4 and 5, but these can only be attained through superior play.

The diversity of the three screens is tied together well by the plot. However, the execution is a bit off the mark.

The simulated 3-D effect of the Zarway Corridor just doesn't have enough

oomph to it. The enemy drones increase in size as they approach, but your fighter can only move up, down, or left and right. This detracts from the attempted realism.

Also, the enemy fire sometimes destroys your fighter when it appears as though your fighter is out of the enemy's range. These are the major rough spots in the mechanics of the gameplay. The graphics are also rough, with limited detail.

Mothership is tough to play, even on the easy level—a quick-reacting joystick like the Amiga Powerstick helps a lot!

The sound effects are solid, but not outstanding. They certainly don't elevate the program.

Mothership is an achievement of sorts, since it provides three distinctive games in a tightly woven package. As noted before, the execution is not as good as the concept. Give it a test run before you buy. (*Softsync, Inc., 14 East 34th St., New York, NY 10016. \$29.95.*)

**Ted Salamone
Bridgeport, CT**

Smithwriter

**For Manipulating Text,
This C-64 Word Processor
Is Right at Home**



Smithwriter (available in both disk and cassette versions) has one of the best instruction manuals for C-64 word processing I have yet seen. It is written in plain English and is understandable to the beginner without insulting the more knowledgeable user.

Furthermore, the manual is backed up by a foldout card that lists the various symbols and commands. Unfortunately, there isn't an alphabetized index for the manual or foldout card, which makes looking up certain specifics difficult.

Goodies

Every word processing program seems to have both goodies and gaps. Smithwriter starts its goodies with a Configuration mode, which allows you to decide on the colors of the screen display (to adjust to your particular monitor) and indicate your type of printer and method of storing text files (which is jargon for what you have just finished typing and want to save).

Unlike some other word processing programs for the C-64, Smithwriter lets you type in up to 17,000 characters before you have to print or store them. That gives you six pages of text, so you don't have to worry about overloading or running out of space. However, if you *do* get carried away and exceed the magic number of characters allowed, Smithwriter erases everything you've written. That ought to teach you to pay attention to the "FREE = ####" at the bottom of the text/edit screen. When it gets close to 0, store the text on disk or tape, erase it from the computer's memory and carry on.

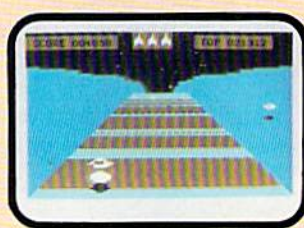
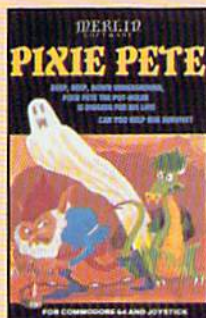
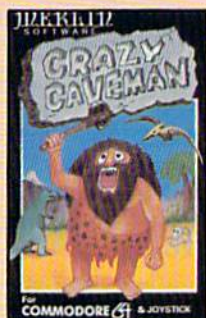
As with the instruction manual, the prompts (instructions) on the screen are clear and easily found. They make storing, moving, editing, printing and all other manipulation of the text easy.

This program lets you adjust line length and tab settings, and provides a number of options for printing the text.

NEW

EUROPEAN Software

from ENGLAND



CRAZY CAVEMAN

(Merlin Software)
Journey back to prehistoric times. The first men are sharing the planet with weird and terrifying creatures. You are one of the hunters: ambushed by a sabre-toothed tiger and separated from your companions, you begin the hazardous trek home.
C-64/disc or tape/\$19.95

PIXIE PETE *(Merlin Software)*
Deep, deep down underground, Pixie Pete the pot-holer is digging his own maze for survival. You must help him escape from Desmond the Dragon. But even if you manage to destroy Desmond he'll return to haunt you as Gorgo the Ghost.
C-64/disc or tape/\$19.95

BLUE MOON *(Merlin Software)*
You are the pilot of an intergalactic spacecraft. Can you triumph over the fast action deathtraps of Blue Bouncers, Comets, Bell Birds, Droids and Tecom Aliens to rescue the crew of a sister-ship trapped on a hostile planet?
C-64/disc or tape/\$19.95

QUASAR *(Voyager Software)*
You are piloting the most sophisticated space fighter yet conceived. If your mission fails the awesome Etron rocket attacks will destroy your galaxy. A 100% machine code arcade style game with ingenious use of 3-D graphics.
C-64/tape/\$16.95



ABRACALC *(Abrasco)*
The Electronic Spreadsheet. Set up a home budget system, business calculations, cash flow analysis, sales forecasts, etc. Ask "What if" questions and see the answers appear instantly. Abracalc is simple to use and comes with a comprehensive manual.
C-64/disc/\$53.95



HOME MANAGER *(Abrasco)*
Put your feet up and let your electronic brain take the strain. Abrasco's Home Manager suite of programs gives you: a diary, an address book, a budget program, a bank manager, and a loan calculator. Speedy, foolproof programs to make life run a lot easier.
C-64/disc/\$29.95



SUPA CATCHA TROOPA *(Abrasco)*
Be quick as they parachute down in pairs and threes. You are the rescue boat and their only hope from the perils of the sea. Should you miss them the jaws of the shark won't. Their lives depend on you.
C-64/tape/\$16.95

DISTRIBUTOR AND DEALER INQUIRIES INVITED!
Contact us for a free catalog of our complete line of educational and recreational software, for C-64, VIC-20, AT400/800, T199/4.

3R IMPORT and EXPORT CORPORATION is the exclusive importer and representative in the U.S.A. of the following British software manufacturers: Abrasco Ltd., Merlin Software, Games Machine Ltd., Beyond Challenging Software, Sulis Software, Voyager Software, and Richard Shepherd Software.

To order direct: Add \$2.00 for shipping and handling. N.Y. State residents add 7% Sales Tax. Enclose cashier's check, money order, or personal check. Allow 2-3 weeks delivery (subject to availability).

Circle 94 on Reader Service card.

3R IMPORT and EXPORT CORPORATION



*Keep Smithwriter on your list
of good C-64 word processors
—at least for home use.*

Among these printing options are centering, condensed print and double-strike. Unfortunately, these options do not work on my daisywheel typewriter—not even the centering command. They don't work on my tiny printer either, but, with the line length set at 24, the little printer will handle the text in Smithwriter.

Badies

Now a few words involving word wrap (splitting words arbitrarily, or moving them down to the next line to keep them whole). To proofread and edit a document of any length, the words should either be complete or properly hyphenated. When a word is split improperly, it is difficult to proof-

read accurately, and Smithwriter splits words this way on every other screen line.

Smithwriter enables you to set the line length at 39, but you cannot reset anything typed at this length. This makes proofreading possible, but printed line lengths ridiculous. I haven't figured a way around this, although I have tried.

As mentioned above, the embedded printing commands are only for certain printers. Since there is no way to access the ASCII codes with this program, I cannot program my printer to use any of its more sophisticated functions, such as underlining, strikeover, degree symbols and the like. When I have a printer with these functions, I certainly want my

word processing program to make them accessible.

Wrapping It Up

Thus, the lack of word wrap in half of the displayed lines, the lack of access to the ASCII codes for utilization of certain printer functions, the lack of any form of window to see what the finished document will look like when printed and some smaller details eliminate Smithwriter from the category of word processing programs for professional purposes.

However, its well-written instructions, the clarity and availability of the on-screen prompts, the holding of six pages of text in memory and some of the lesser goodies keep Smithwriter on the list of good word processing programs for the Commodore 64, at least for home use such as letter writing, filing and the like. (Softsmith Corp., 2935 Whipple Road, Union City, CA 94587. \$29.95.)

G. Scott Wright
Albany, NY

Circle 154 on Reader Service card.

BOUNTY HUNTER

Journey back with us into the days of Jessie James and Billy the Kid where the only form of justice was a loaded revolver and a hangman's noose. In this full-length text adventure, you play the role of Bounty Hunter, battling against ruthless outlaws, hostile Indians, wild animals and the elements of the wilderness with only your wits and your six gun. Average solving time: 20-30 hours. If you love adventures, this one is a real treat. Available for **COMMODORE 64**, the **VIC-20** (with expander), and **COLECO ADAM**. See your dealer.

\$19⁹⁵
Cassette

Published by:

Star-Byte, Inc.
A Division of Robinson-Halpern Company

2564 Industry Lane • Norristown, PA 19403 • 215-539-4300

ADAM is a trademark of Coleco, Inc. COMMODORE 64 is a trademark of Commodore Business Machines, Inc. VIC-20 is a trademark of Commodore Business Machines, Inc.

**Victory
Software**



"Now Your Commodore 64™ Can Print Like a Pro!"



Grappler™ Printer Interface

The Revolutionary Printer Interface for the Commodore 64™

A New Era in Commodore Printing Power.

Grappler CD offers the first complete answer to your printer interfacing requirements, with many powerful capabilities unique in the Commodore marketplace. Complete signal translation allows many popular name brand printers to operate perfectly with the Commodore 64, or to imitate Commodore's own printer. Even Commodore's graphic character set can be reproduced on Epson, Okidata, Star, ProWriter and other popular printers.

Exclusive Grappler CD features provide a variety of graphic screen dumps, text screen dumps and formatting. No other Commodore interface can offer this.

If you own a Commodore 64...

If you're serious about quality, trouble free printing... You need the Grappler CD.

Contact your nearest Commodore dealer or call Orange Micro for a dealer near you.

A Uniquely Intelligent Interface:

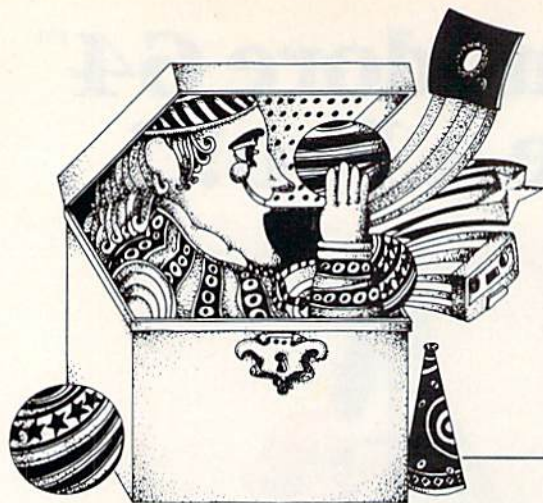
- Prints Screen Graphics Without Software
- Graphics Screen Dump Routines Include Rotated, Inversed, Enhanced and Double Sized Graphics.
- Full Code Translation From Commodore's PET ASCII to Standard ASCII, the Language of Most Printers.
- Complete Emulation of the Commodore 1525 Printer for printing of Commodore's Special Characters.
- Dip Switch Printer Selection for Epson, Star, Okidata, ProWriter and other popular printers.
- Conversion Mode for Easy Reading of Special Commodore Codes.
- Text Screen Dump and Formatting Commands
- 22 Unique Text and Graphics Commands

 **Orange Micro**
inc.

1400 N. LAKEVIEW AVE., ANAHEIM, CA 92807 U.S.A.
(714) 779-2772 TELEX: 183511CSMA

© Orange Micro, Inc., 1983

Circle 195 on Reader Service card.



Video Casino

By David D. Busch

If you have a lot of nerve, some intuition and the ability to make a fast decision, then Deadline might be the exciting game you've been looking for.

In *Deadline*, you must accumulate 500 points before your opponent. The computer selects a random number from 100 to 599, but you won't know which number. If your intuition or computer ESP gives you a clue, you'll be far ahead of the game.

The computer then will begin counting off the numbers from 1 to its random choice on the screen. You may stop the count at any time by pressing any key, but the goal is to wait as long as possible. Hitting a key too soon can be disastrous. Waiting too long is worse. The number could be 580 or 114.

Scoring is fairly simple. If the computer chose 365 and reaches that number before you've pressed a key, then 365 will be subtracted from your score.

Why not just press a key too soon and collect a modest number of points? Not so simple. The computer always *subtracts* the number of points it has yet to display from the number of points it has already displayed. So, if you press too soon, you might get a negative score.

For example, assume that the computer was counting to 500, and you pressed a key at 200. Three hundred

points were left undisplayed, so 300 is subtracted from 200, leaving a negative 100. Therefore, 100 will be subtracted from your score.

If you had allowed the game to continue to 300 points, then only 200 points would remain undisplayed. That would net you 100 positive points. In other words, you must allow the count to continue to the halfway point (wherever that is!) to break even. After halfway, the points start rolling in. If you chicken out at 598 (a good idea, since the maximum is 599), then you'll only lose a maximum of 2 points and gain a whopping 596. Such occurrences will be rare, however, and it will probably take you a few turns before you reach the game-winning total of 500 points.

The Program

You might want to wait until you've

played the game a few times before reading the rest of this column, as I reveal a few secrets that you might want to discover on your own.

The ceiling for each turn is selected in line 340 (line 300 in the VIC-20 listing). PT is equal to a random number from 1 to 499 plus 100. The smallest number chosen will be 101, and the largest 599. The game will be more fun if the players do not know this at first. After some play, they'll notice a pattern and catch on.

In fact, one of the most enjoyable things about *Deadline* is that discovering the ground rules and limits are part of the play. Early on, some players will hit a key very soon. The penalty points will show them the error of their ways. More cagey players will figure out a strategy that will let them take advantage of the odds.

RUN It Right

VIC-20
Commodore 64

Address all author correspondence to David D. Busch, 5217-C Cline Road, Kent, OH 44240.



Display of the numbers is just a For...Next loop, from 1 to PT, using a sound routine at line 770 (line 740 in the VIC-20 listing). A GET A\$ line pauses only if a key is pressed.

Waiting too long results in the gain, GA, becoming a minus value. Pressing a key causes the program to calculate the difference between high number reached and possible high, and awards points on that basis.

After each turn, if the variable, Player, was 1, it becomes 2, and vice versa, effectively bringing the next player on board. Several clever sound routines were added to this game to make it more fun.

As in recent months, we're offering suggestions on how you might change the rules of Deadline to add variety and excitement. How about adding a line that will produce a different upper or

*Hitting a key too soon
can be disastrous,
but waiting too long
is worse.*

lower limit for each game played? In other words, program the computer to select numbers no lower than 200—or as low as 50! Or make it choose numbers that will be no higher than 600 or as high as 1000.

Within each game, the limits should always remain the same. This will give the players an opportunity to try and guess what limits have been established for that game. However, the limits will change from playing to playing, so the game will always be new and interesting.

For another variation, have the computer choose the winning point total at random each game. Instead of fixing it at 500, allow the computer to change the winning total to 400 for some games, 800 for others. But don't tell the players what the goal is. That way, not only will they have to guess what number to stop at—but at how many more points they need to accumulate to win.

For hints on how to command the Commodore 64 or VIC-20 to choose a number in a given random range, examine line 340 (line 300 in the VIC-20 listing). R

Listing 1. Deadline program for the C-64.

```

10 REM *****
20 REM *{10 SPACES}*
30 REM * DEADLINE *
40 REM *{10 SPACES}*
50 REM *****
60 POKE 53281,1
70 VOLUME=54296
80 VCE=54273
90 POKE 54276,33
100 PRINT"{SHFT CLR}{2 CRSR DNs}"
110 PRINTTAB(12)"{CTRL 9}{CTRL 4}DEADLINE{CTRL 7}{2 CRS
R DNs}"
120 PRINTTAB(8)"TWO PLAYERS WAIT"
130 PRINTTAB(8)"AS LONG AS THEY DARE"
140 PRINTTAB(8)"BEFORE PRESSING KEY."
150 PRINTTAB(8)"CLOSER YOU GET TO"
160 PRINTTAB(8)"THE DEADLINE, THE"
170 PRINTTAB(8)"MORE POINTS YOU GET."
180 PRINT"{3 CRSR DNs}";TAB(12)"{CTRL 9}{CTRL 3}HIT ANY
KEY"
190 PRINTTAB(10)"{CTRL 9}FOR FIRST ROUND{CTRL 7}"
200 GET A$:IF A$="" GOTO 200
210 PLAYER=1
220 FOR N=1 TO 2
230 PRINT"{SHFT CLR}{2 CRSR DNs}"
240 PRINTTAB(8)"ENTER NAME OF"
250 PRINTTAB(8)"PLAYER #";N
260 INPUT PLAYER$(N)
270 NEXT N
280 PRINT"{SHFT CLR}"
290 PRINTTAB(8)"IT IS NOW"
300 PRINTTAB(8)PLAYER$(PLAYER);"'S TURN."
310 PRINT"{3 CRSR DNs}";TAB(12)"{CTRL 9}{CTRL 3}HIT ANY
KEY"
320 PRINTTAB(10)"{CTRL 9}FOR NEXT ROUND{CTRL 7}"
330 GET A$:IF A$="" GOTO 330
340 PT=INT(RND(1)*500)+100
350 FOR N=1 TO PT
360 GOSUB 770
370 GET A$
380 IF A$<>"" GOTO 490
390 PRINTTAB(16)N
400 NEXT N
410 GOSUB 770
420 PRINT"{SHFT CLR}{2 CRSR DNs}"
430 PRINTTAB(8)"SORRY, SPORT. TIME{CRSR DN}"
440 PRINTTAB(8)"HAS RUN OUT.YOU LOSE{CRSR DN}"
450 PRINTTAB(8)PT;" POINTS.{2 CRSR DNs}"
460 GA=-PT
470 GOTO 590
480 GOTO 590
490 GOSUB 770
500 PRINT"{SHFT CLR}"
510 IF INT(PT/2)>N THEN PRINTTAB(8)"SORRY, SPORT.{CRSR
DN}"
520 PRINTTAB(8)"YOU GOT UP TO{CRSR DN}"
530 PRINTTAB(8)N;" AND COULD{CRSR DN}"
540 PRINTTAB(8)"HAVE GONE AS FAR AS{CRSR DN}"
550 PRINTTAB(8)PT;" . YOU GET SOME{CRSR DN}"
560 DF=PT-N
570 GA=N-DF
580 PRINTTAB(8)GA;"POINTS.{CRSR DN}"
590 PP(PLAYER)=PP(PLAYER)+GA
600 IF PP(PLAYER)>499 GOTO 680
610 PRINTTAB(8)"YOUR SCORE:";PP(PLAYER)
620 PRINT"{3 CRSR DNs}";TAB(12)"{CTRL 9}{CTRL 3}HIT ANY
KEY"
630 PRINTTAB(11)"{CTRL 9}FOR NEXT ROUND{CTRL 7}"
640 GET A$:IF A$="" GOTO 640
650 IF PLAYER=1 THEN PLAYER=2:GOTO 280
660 PLAYER=1

```

(continued on page 122)

Computer Tutor

By Christine Adamec

With software manufacturers scrambling to cash in on the burgeoning educational field, RUN introduces a bimonthly series that takes a close look at some of the better-known commercially available educational programs—suitable for learning at home or at school. Welcome to the Computer Tutor.

Relax for a moment and travel back in your mind...to when you were about seven years old. Okay, got it? The scenario is that you're learning some basic math. Now, as you successfully added $3 + 3$, did you get brilliant flashing colors, rousing music, pretty pictures or points as your reward for the right answer?

Of course not! It was $3 + 3 = 6$, and that was it. Ho hum. And whether you caught on right away, or it took you awhile to figure it out, you could have been turned off by this boring subject for years.

But now your children can learn math and have fun doing it. As their knowledge grows, so too may their desire to know more.

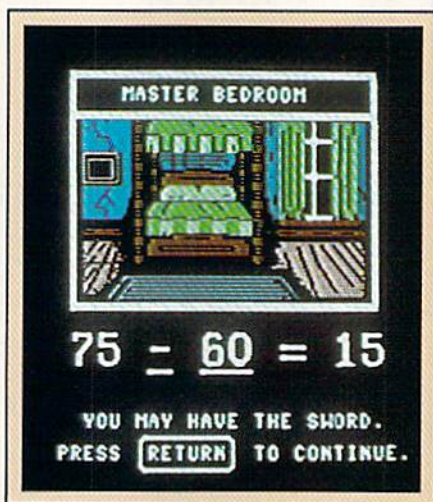
Today, highly interactive and creative children's math programs are available for your C-64. These programs enable your kids to proceed at their own pace, rather than at the "lowest common denominator" of understanding in a classroom. Even if your children are highly motivated and/or have inherited your math-whiz genes, they could still profit from these educational programs.

This month, you'll learn about four exciting and outstanding math programs—Tri-Math, Piece of Cake, Math

Blaster and Space Math. They're all programs for elementary-school children, and they cover the basics of learning and reinforcing addition, subtraction, multiplication and division. (Math Blaster also includes decimals and percents.)

Tri-Math

Tri-Math is a three-part program from Human Engineered Software (150 North Hill Drive, Brisbane, CA 94005; \$34.95, disk). This program gives you



Tri-Math is an adventure game and educational program in one.

three options: Math Mansion, Alien Invaders or Digitosaurus.

Math Mansion has outstanding graphics, depicting a scary old mansion and the rooms inside it (complete with flickering candles, flying bats and so on). It's a children's adventure game—you've entered the house and now must find your way out.

You're given a choice of rooms to enter in your search for the exit, but before meandering from, say, the nursery to the ballroom, you must first answer a fill-in-the-blanks math problem. For example, $5 \times 6 = 30$. You could answer $5 \times 6 = 30$ or $5 + 25 = 30$; both are right.

As you move through the rooms, you're given the opportunities to pick up a sledgehammer, rope and other objects you'll need to break through the brick wall, swing across the pit and so on. If you answer correctly, you get to move to the next room. If your answer is incorrect, you stay where you are for the moment. (You don't die; it'll just take more turns to get out of the house.)

The game of Alien Invaders tests your math skills by pitting you against the alien, who will try to find the answer before you do. You select from four to 12 problems and whether you want addition, subtraction and so on; then the game begins.

You're given a spaceship with wings displayed in a circular pattern around a problem. On each wing is an answer. Using the $<$ and $>$ keys on your C-64 keyboard, you move the little blue dot to the correct answer, then press the space bar. I like the dramatic sound as the wing fills up with color when you give the correct answer. (And, of course, if your answer is wrong, the alien wins. We earthlings must prevail over alien "visitors"!)

In the game Digitosaurus, you're presented with three problems (without the answers), and it's your job to move the dinosaur to the problem with the largest answer. You then must tell the computer what the answer actually is. After you've answered, the dinosaur moves across the screen, swishing his tail against the wrong answers, which disappear in an array of stars. (This is ac-



Info Designs™... Making Home Town Business Grow

Info Designs is the leading producer of accounting software for the Commodore 64... home town businesses made us **Number 1**. We specialize in Accounting Software and market only the highest quality business systems. Our integrated systems have helped businesses become more prosperous through better management of their money and resources. Info Designs five accounting packages make it possible for you to computerize your business cost effectively. Our proven business software packages have been purchased for \$595 each. With **100,000** programs sold, you can be assured of a proven value at **\$79.95** per Commodore-64 program.

Select the disk programs you need—

- Accounts Receivable/Billing
- Account Payable/Checkwriting
- General Ledger
- Inventory Management
- Payroll

Customer Support Plan

An optional telephone consulting service is available to support installation and ongoing operations.

To Purchase

See your local Commodore-64 Dealer or call us directly at **(313) 540-7772**.

Circle 102 on Reader Service card.

Info Designs Inc.
6905 Telegraph Road
Birmingham, MI 48010

Info Designs™

companied by simple music.) This game's a little slow, but reassuringly so to many children.

Math Blaster

Math Blaster, from Davidson & Associates (6069 Groveoak Place #12, Rancho Palos Verdes, CA 90274; \$49.95, disk), is a comprehensive two-disk program created and extensively field-tested by professional educators. It provides five levels of difficulty for each area: subtraction, addition, decimals, multiplication and division. You must select one of four options available to you.

Do you want to start with Look and Learn, which shows you a problem and the answers? Or do you want Build Your Skill, wherein you give the answer. Challenge Yourself gives you only part of the problem, and you supply the missing part. (Plenty of reinforcement is provided, with such messages as

"Way to Go!" and "Congratulations!" given in response to correct answers.)

Then there's the circus-like Math Blaster. I showed this game to a group of second- and third-graders, and they loved it!

You're given a problem, and four different answers are displayed in boxes on the top of the screen. Using either the keyboard or your joystick, you move your man under the right answer and quickly press the Z key—your man is propelled through a cannon to the answer! (And of course you'll gain points for that.) A seal bouncing a ball on his nose keeps time and you must move your man before the balloon bursts, signifying that your time has run out.

Seven-year-old Jamie didn't want to quit. "Just one more game," he assured me repeatedly, until his teacher came over, stood next to him and gave him a "look." Sigh, then detachment from the keyboard.

I highly recommend Math Blaster. When you answer incorrectly, you're merely told, "Try again." No raspberry

noises, no Armageddon on the screen.

The manual is well-documented, explaining every phase of the program thoroughly. I liked, too, its feature that allows you to add in your own math problems later, using the detailed instructions provided in the manual.

The only negative aspect of Math Blaster is its price, which is a little steep, but if you can afford Math Blaster, I strongly recommend it.

Piece of Cake

Piece of Cake, from Counterpoint Software (4005 W 65th St., Minneapolis, MN 55435; \$29.95, disk), is a colorful and creative approach to learning and reinforcing math skills. It's composed of five games that are centered around the theme of bakers and cakes. The picture menu rotates continuously, and you press any key to start the game you've chosen.

Second-grader Jessica most enjoyed The Bakery, a game in which you're

Circle 63 on Reader Service card.

DI-SECTOR Version 2.0

**EVERYTHING YOU EVER WANTED IN A DISK UTILITY... AND MORE!!
FOR THE COMMODORE 64***

- ★ Fully automatic back-up of almost any protected disk.
- ★ Copy files [PRG, SEQ, RND] with full screen editing.
- ★ Three minute back-up of standard disks [even many protected disks].
- ★ Format a disk in ten seconds.
- ★ View and alter sector headers.
- ★ Remove errors from any track/sector.
- ★ Edit sectors in HEX, ASCII — even assembler.
- ★ Create errors on any track/sector [20, 21, 22, 23, 27, 29] instantly.
- ★ Drive/64 MON, even lets you write programs inside your 1541.
- ★ All features are fully documented and easy to use.
- ★ None of our copy routines ever makes the drive head "kick."

Yes, you get all of this on one disk for this low price!

\$39.95

VISA or
MASTERCARD
add \$3 for C.O.D.

... WRITE OR PHONE ...
STARPOINT SOFTWARE
Star Route 10 Gazelle, CA 96034 [916] 435-2371

*Commodore 64 is a registered trademark of Commodore Business Machines

APROSOFT™ SOFTWARE

TYPE FOR YOUR LIFE™

With more challenge than an arcade game, learn to type 75 or more words per minute. Speed is User Selectable, but NO FOOLING AROUND allowed! Text is WIDELY VARIED since it comes from the program tape. Action color graphics with sound fix your eyes on the screen and away from your fingers. Your man rows his boat across the screen as fast as you can type. Maintain speed and he can destroy the sea monster, but if you slow down, ZAP! Runs on unexpanded VIC or C-64.

WORDPLAY™

WORDPLAY is a collection of programs which allows the user to make original stories, write a form of Japanese poetry, play the fun game of "Animal" (which children love!) and create jargon. A bonus secret message (cypher) program is also included. In a word, WORDPLAY is a "BARGAIN"! Requires 16k RAM or more. (VIC-20 or C-64).

DR. FLOYD™

Psychoanalysis by computer? Well, not quite, but Dr. Floyd will carry on a conversation with you using psychoanalytical techniques that give the appearance of artificial intelligence. The next time someone asks you "Show me what this computer of yours can do," you can really amaze them with DR. FLOYD. Great for parties - even nice for just having someone to talk to. Requires 16k RAM or more. (VIC-20 or C-64).

Cassette \$14.95 Disc \$19.95

Note: VIC-20 versions on Cassette ONLY.
C-64 versions on Cassette OR Disc.

Apupos Technology is proud to offer these fine educational and entertaining programs for your computer. Each program comes fully tested. Replacement, if necessary, is guaranteed to original purchaser. Prices shown include shipping charges.

PARALLEL PRINTER INTERFACE for VIC-20 or C-64

So easy to use - simply plug-in and print. Includes all cables & connectors to a Centronics Type Parallel Printer. Includes all Commodore Graphics

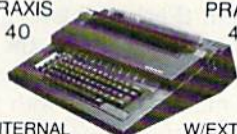
Cardprint + G \$59.95

Cardprint B \$39.95
(without Graphics)

What is better than
Letter Quality?

A Commercial Duty Olivetti
Typewriter/Printer!

PRAXIS
40



PRAXIS
41

W/INTERNAL
INTERFACE
\$639.95

\$8.00 shipping
(Cont. U.S.A.)

W/EXTERNAL
INTERFACE
\$689.95

Perfect for typing short notes or printing a complete manuscript. Choose from many daisy wheel type styles. Use carbon or nylon ribbon. Standard Parallel or RS-232 serial input allow connection to almost all computers. All for a price lower than a good typewriter. Call or write for complete details.

APROSPAND-64

for C-64

Gives your Commodore-64 full expandability! Four independently switchable cartridge slots are compatible with ANY Cartridge for the '64.



ONLY \$39.95

Shown with case removed

GORILLA BANANA
or GX-100 Printer . . . \$149.95

ADD: \$8.00 shipping (cont. USA), \$35.00 (Canada, HI, AK)

Seiksha GP-250X PRINTER
with Commodore or Atari or TI
interface only \$299.95

ADD: \$8.00 shipping (cont. USA), \$35.00 (Canada, HI, AK)

Have you ever thought that printers should be seen, not heard?

Introducing the Olivetti PR2300 - The world's first low cost dry ink jet printer. A real technological breakthrough allows you to use this printer in ways that others only dream of. With the PR2300 you can choose normal, compressed, double height and/or double width, bold and single/double/dotted underlining. You can use single sheets, roll or fan-fold paper while printing at a blazing 110 cps and make virtually no noise while doing so. Call or write for details and a print sample.

ONLY \$349.95

W/CENTRONICS
INTERFACE

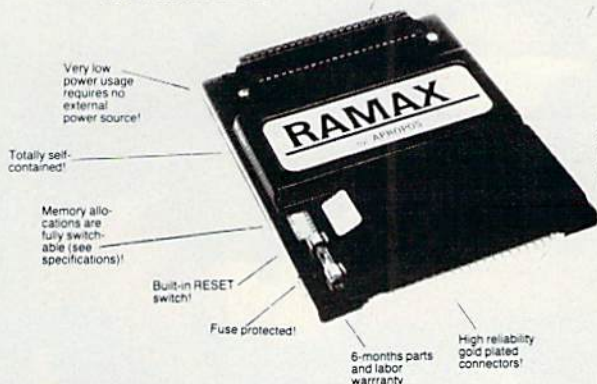
Add \$8.00 shipping

The ONE VIC-20® Memory Expansion Board that DOES IT ALL!

Maximum Memory allows you to use more powerful programs for:

- EDUCATION • ENTERTAINMENT • MAIL LISTS
- BUSINESS APPLICATIONS • FINANCIAL RECORDS

APROPOS TECHNOLOGY
RAMAX™



To equal the total memory of RAMAX™ you would have to buy a 16k Memory Expansion, PLUS an 8k Expansion, PLUS 3k Expansion, THEN you would need a "mother board." With RAMAX™ you buy just ONE piece . . . at ABOUT HALF THE PRICE!

RAMAX™ Features and Specifications:

- Adds up to a full 27k bytes of additional RAM to the standard VIC-20's internal RAM of 5k.
- Built-in switch allows User selection of any combination of 5 areas of RAM memory.*
- BLK 1 (8k - Adr: 8192-16383)
- BLK 2 (8k - Adr: 16384-24775)
- BLK 3 (8k - Adr: 24776-32767)
- BLK 4 (8k - Adr: 32768-40759)
- BLK 5 (Adr: 40760-49151, allows/disallows 8k ROM games)
- RAM (3k - Adr: 1024-4095)
- RESET (Resets computer without power off/on)
- Built-in electrical Fuse to protect equipment.
- Totally self-contained. No external power supply needed.
- Two (2) extension connectors allow ANY additional cartridges and/or devices designed for the VIC expansion port.
- Very low power consumption (.175 amp usual).
- High reliability gold-plated connectors are designed for long life.
- Complete Operating Manual.
- 6 month parts and labor warranty to original purchaser.
- Factory service.

Sug. List \$149.95

A perfect investment to give your family and yourself more enjoyment and use from your home computer! The ease of operation, the neat appearance, and the real POWER it adds to your VIC at this low price makes it a MUST for every VIC home!

SPECIAL LOW PRICE!
Only \$89.95!

ADD: \$3.00 Shipping (Cont. U.S.)
\$6.00 CAN, HI, AK.

10 DAY MONEY-BACK GUARANTEE
If not satisfied, simply return in original condition for your money back.

RAMAX KIT
Contains all but RAM

Only \$24.95

ADD: \$3.00 Shipping (Cont. U.S.)
\$6.00 CAN, HI, AK.

TO ORDER:

Send Check or Money Order For the Total
Calif. residents add 6% tax.

WE SERVICE WHAT WE SELL

VIC-20 & Commodore-64 are registered trademarks of Commodore International. Atari is a trademark of Atari Inc.

TECHNICAL INFO. (805) 482-3604



All Prices U.S. Dollars



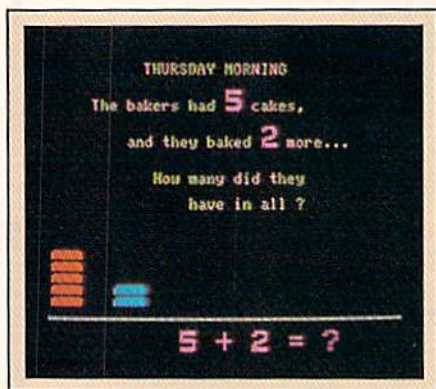
CASH PRICES
CHARGE CARDS ADD 3%

APROPOS TECHNOLOGY
1071-A Avenida Acaso
Camarillo, CA 93010

FOR ORDERS AND CATALOG REQUESTS ONLY,
CALL TOLL FREE:
1-800/962-5800 USA
1-800/962-3800 CALIF. ONLY

APROPOS TECHNOLOGY

www.Commodore.ca
May Not Reprint Without Permission



This game's a Piece of Cake, from Counterpoint Software.

given a little story problem with pictures. For example: "On Monday the bakers had 3 cakes, and they baked 3 more. How many did they have in all?" If you type in 6, the blue cakes on the right slide (to the accompaniment of music) on top of the green ones, which then also turn blue. If you answer incorrectly, then the program gives you a few hints—it wiggles the three cakes, shows you the problem numerically ($3 + 3 =$) and so on. And if you still can't respond correctly, you'll be given the right answer.

In the game Catch-a-Cake, the cake is falling and you must quickly answer a problem before it self-destructs. Answer correctly and the computer displays "Good, you caught it!" Answer incorrectly and the cake goes splat, and you receive an "Oops, too bad" message.

Catch-a-Cake can be played by up to four players, each striving to build up points—good for the old competitive spirit. But you can get negative points, too, and the eight-year-olds to whom I showed the program were confused, not having learned the concept of negative numbers.

I liked the positive reinforcement of sound and messages in this package. Also, you may select your level of difficulty, from beginner to super math. (Here's a super-math problem: 67×68 .)

Piece of Cake is a good value.

Space Math

This math program from Entech (10733 Chiquita, Studio City, CA 91604; \$39.95, disk) gives you reinforcement galore—the computer actually *talks* to you, you get written messages ("You Did It!"), music, graphics and a blastoff into outer space!

After selecting what you want to work on (adding, subtracting and so on), your skill level (from 1-3) and your speed (from 1-6), you're ready to begin. You'll see either a skating chicken, a little hat with feet or a cute elfin-gremlin creature.

Answer the displayed problem correctly, and the chicken skates, the hat moves and so on. Every other right answer earns you an out-loud "Hey hey, that's right!" or "I'm Super-Chicken!" and so on. (Each skill level has its own message.) Yes, I mean it, the computer actually talks to you, not in a scary robot-like monotone, but with the enthusiastic voice of a kid! (I really liked that, and so did my children.)

Then, if you make it in time to the right side of the screen with all the right answers (while the counter on the screen displays the remaining time), you're rewarded with another verbal message. I liked "Who says chickens can't fly!" and "Let's party!"

After that, your chicken blasts off and skates and dances to a disco melody in three-part harmony, amidst a beautiful otherworldly graphic. (The hat and elf have their own different songs and scenes.)

If you answer the problem incorrectly, the computer tells you you're wrong. Answer incorrectly again, and the computer says, for instance, "Try 10," or

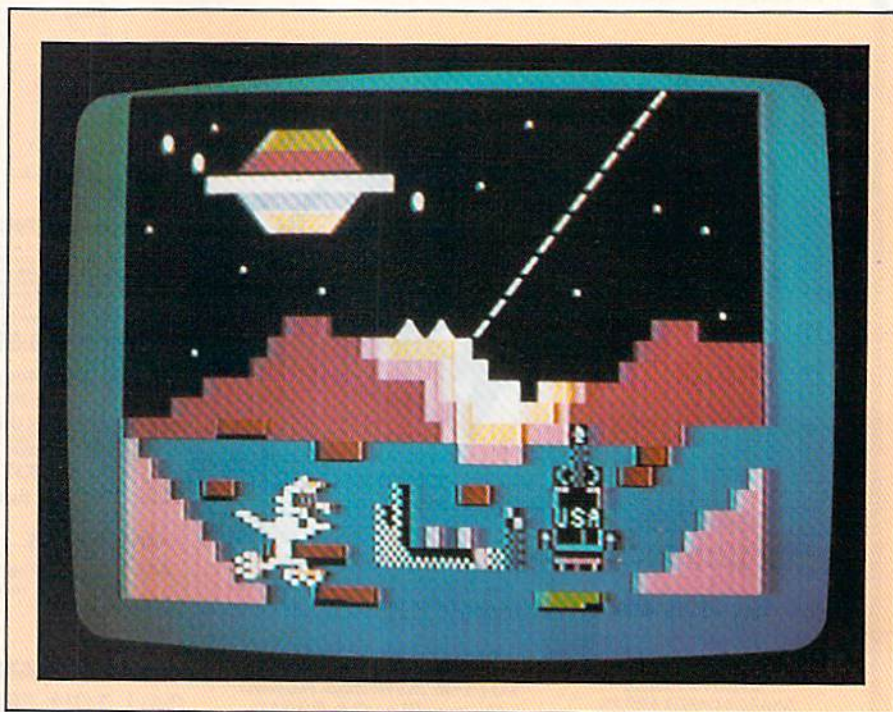
whatever the answer is.

One caution: If you're an adult adding say, $27 + 9$, you might tend to type in 36 with the 3 first and the 6 second. But a child enters the answer from right to left and would type in 6 first and then 3. Knowing this, the creators of Space Math have programmed the numbers in such problems to go from right to left.

This program is highly entertaining and a good learning experience. It would be useful for your children at home as well as for kids in the classroom.

When it comes to math, is "no pain, no gain" still the bottom line? Not anymore. Our kids can learn their basic math concepts using these outstanding computer math games and have a great time doing it. Sure, you don't *need* the color, music and fanfare to learn how to add and subtract, but wouldn't *you* have preferred it? I would have! ®

Christine Adamec (1921 Ohio St. NE, Palm Bay, FL 32907) is a professional writer, with articles in McCall's, Graduating Engineer, In Business and RUN to her credit. As the mother of two children, ages five and six—who frequently serve as her guinea pigs for testing—she has become particularly intrigued with the subject of children's software. She eagerly invites readers to send in their comments on this column's content.



Super-Chicken is a helpful instructor in this Space Math program from Entech.

Save 44% off the newsstand price!

RUN

THESE COULD BE THE KEYS TO YOUR FUTURE

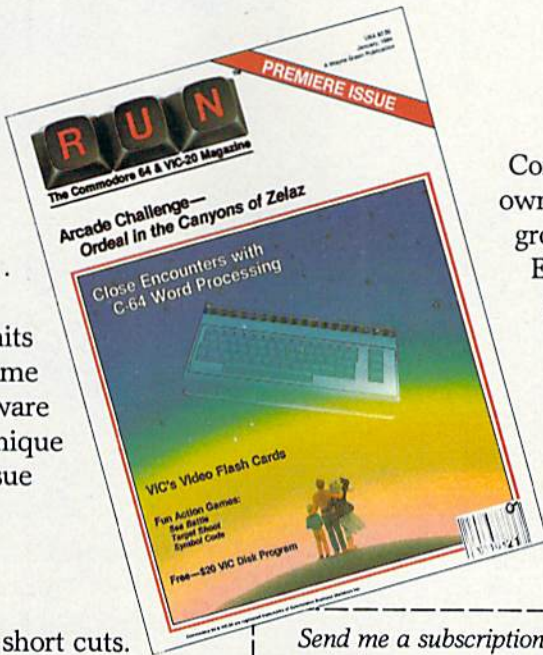
Unlock *all* the potential of your Commodore 64 and VIC-20* with RUN.

Explore... Experiment... Enjoy... Beginner and expert alike will be taken beyond the manual to the limits of their abilities. Enter your own game programs. Construct a simple hardware add-on. Broaden your scope with unique applications... And... get a 13th issue FREE!

Enjoy key features like these:

- Games for fun & strategy.
- Programming tips help you learn short cuts.
- Candid reviews help you make money-saving decisions.
- Programs to add to your library.
- Instructions & tutorials to increase your skills.
- Hardware & software modifications help your machine work smart.
- Unique applications broaden your scope.

Here's a system-specific magazine written with you in mind. Written by and for the reader to give time-saving, money-saving hints. You'll get instructions and tutorials to increase your skills, and candid reviews to help you make the right decisions. Most of all though, you'll have fun.



Commodore 64 and VIC-20 owners are one of the largest groups of computerists today. Enjoy the benefits of this with your own magazine. Be in control like never before. Order RUN today and get a 13th issue free with your prepaid order (check or credit card) of only \$19.97. Send in the coupon or call toll free 1-800-258-5473. In N.H. call 1-924-9471.

Send me a subscription to RUN for the regular subscription price of only \$19.97 per year. I understand that with payment enclosed or credit card order I will receive a FREE issue making a total of 13 issues for \$19.97.

Check/MO MC AE VISA Bill me \$19.97 for 12 issues

card # _____ exp. date _____

signature _____

name _____

address _____

city _____ state _____ zip _____

Canada & Mexico \$22.97; Foreign Surface \$39.97, 1 year only, US funds drawn on US bank. Foreign airmail, please inquire. Please allow 6 to 8 weeks for delivery.

RUN • Box 954 • Farmingdale, NY 11737

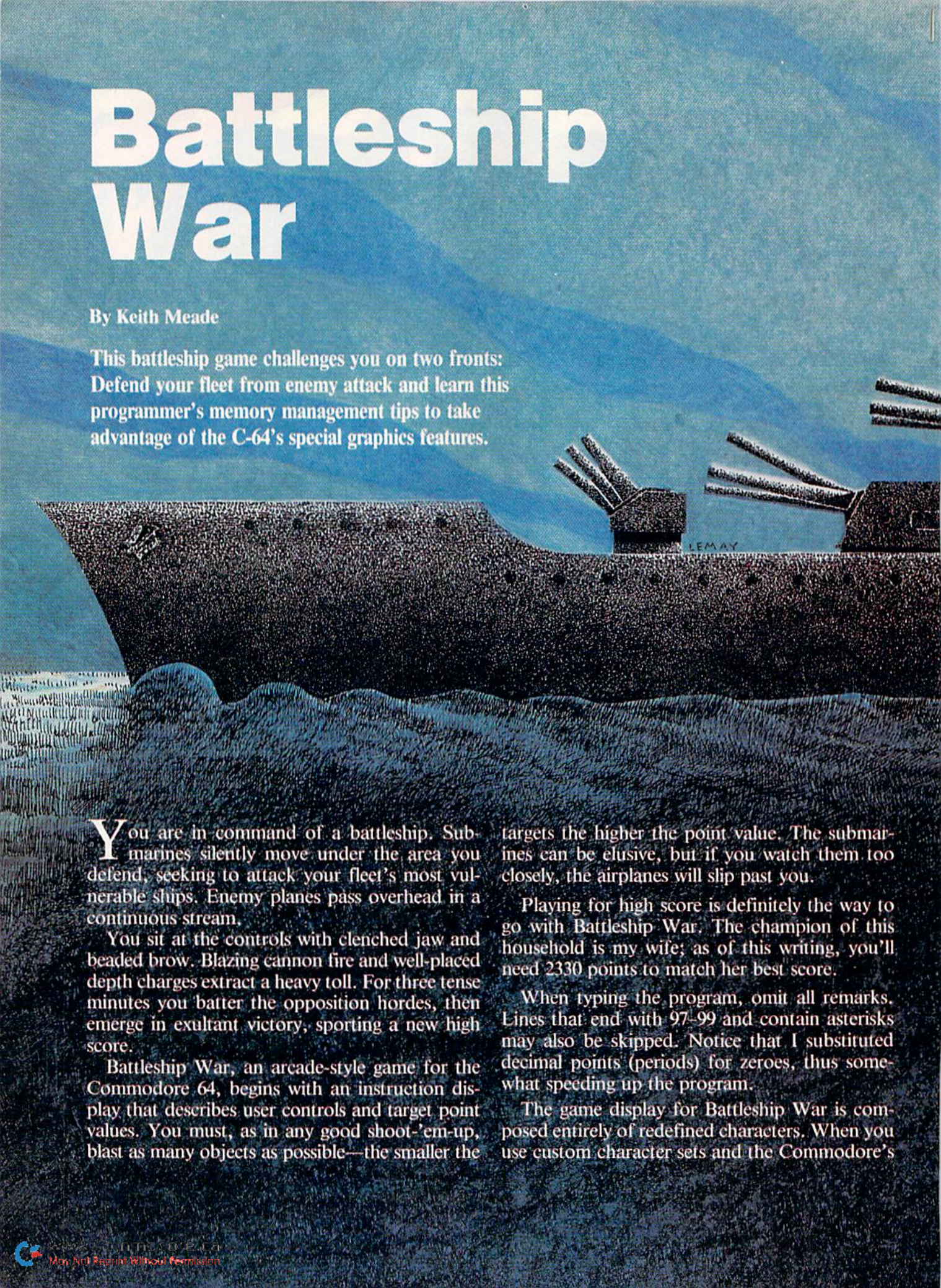
348F3

*Commodore 64 and VIC-20 are registered trademarks of Commodore Business Machines, Inc.
www.commodore.ca
May Not Reprint Without Permission

Battleship War

By Keith Meade

This battleship game challenges you on two fronts: Defend your fleet from enemy attack and learn this programmer's memory management tips to take advantage of the C-64's special graphics features.



You are in command of a battleship. Submarines silently move under the area you defend, seeking to attack your fleet's most vulnerable ships. Enemy planes pass overhead in a continuous stream.

You sit at the controls with clenched jaw and beaded brow. Blazing cannon fire and well-placed depth charges extract a heavy toll. For three tense minutes you batter the opposition hordes, then emerge in exultant victory, sporting a new high score.

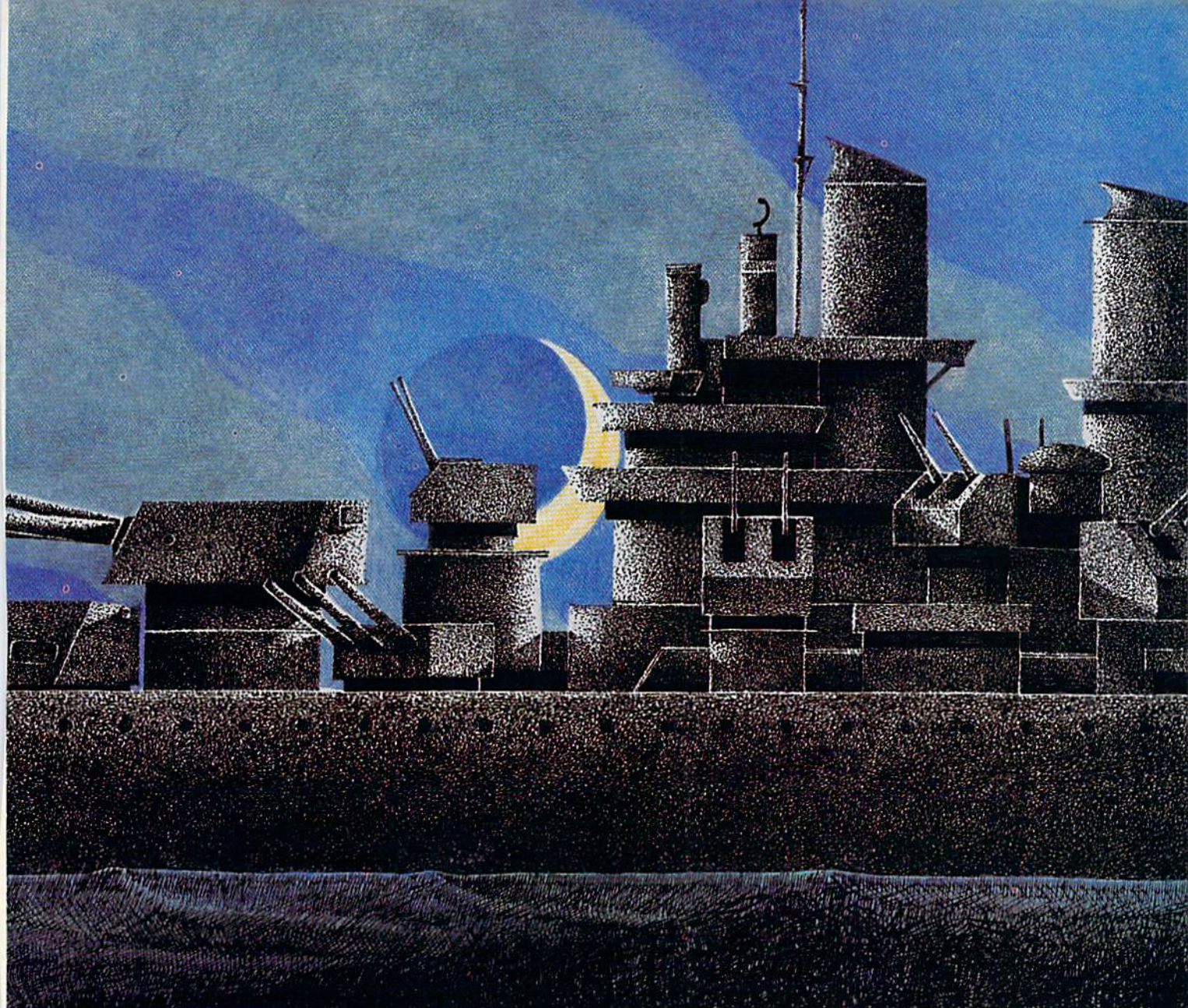
Battleship War, an arcade-style game for the Commodore 64, begins with an instruction display that describes user controls and target point values. You must, as in any good shoot-'em-up, blast as many objects as possible—the smaller the

targets the higher the point value. The submarines can be elusive, but if you watch them too closely, the airplanes will slip past you.

Playing for high score is definitely the way to go with Battleship War. The champion of this household is my wife; as of this writing, you'll need 2330 points to match her best score.

When typing the program, omit all remarks. Lines that end with 97-99 and contain asterisks may also be skipped. Notice that I substituted decimal points (periods) for zeroes, thus somewhat speeding up the program.

The game display for Battleship War is composed entirely of redefined characters. When you use custom character sets and the Commodore's



other graphics features, memory management becomes a problem. Understanding where to store graphics data and getting the 64 to use it can be difficult. I'll discuss this problem and how I dealt with it in *Battleship War*.

I will conclude with a simple routine that lets you easily move screen RAM and open up a large area of free memory for sprites, character sets, high resolution displays and other features.

Defining the Problem

You should keep in mind that the C-64 features two separate systems sharing memory space—the video chip (VIC) and the Basic language. The VIC chip (not to be confused with the VIC computer) handles all data and operations

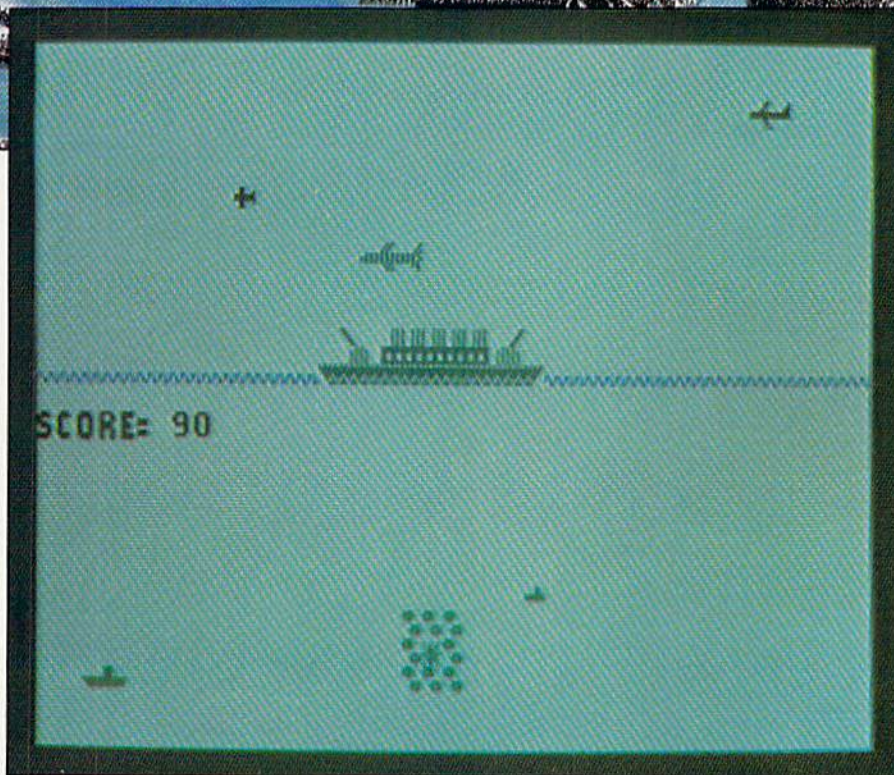
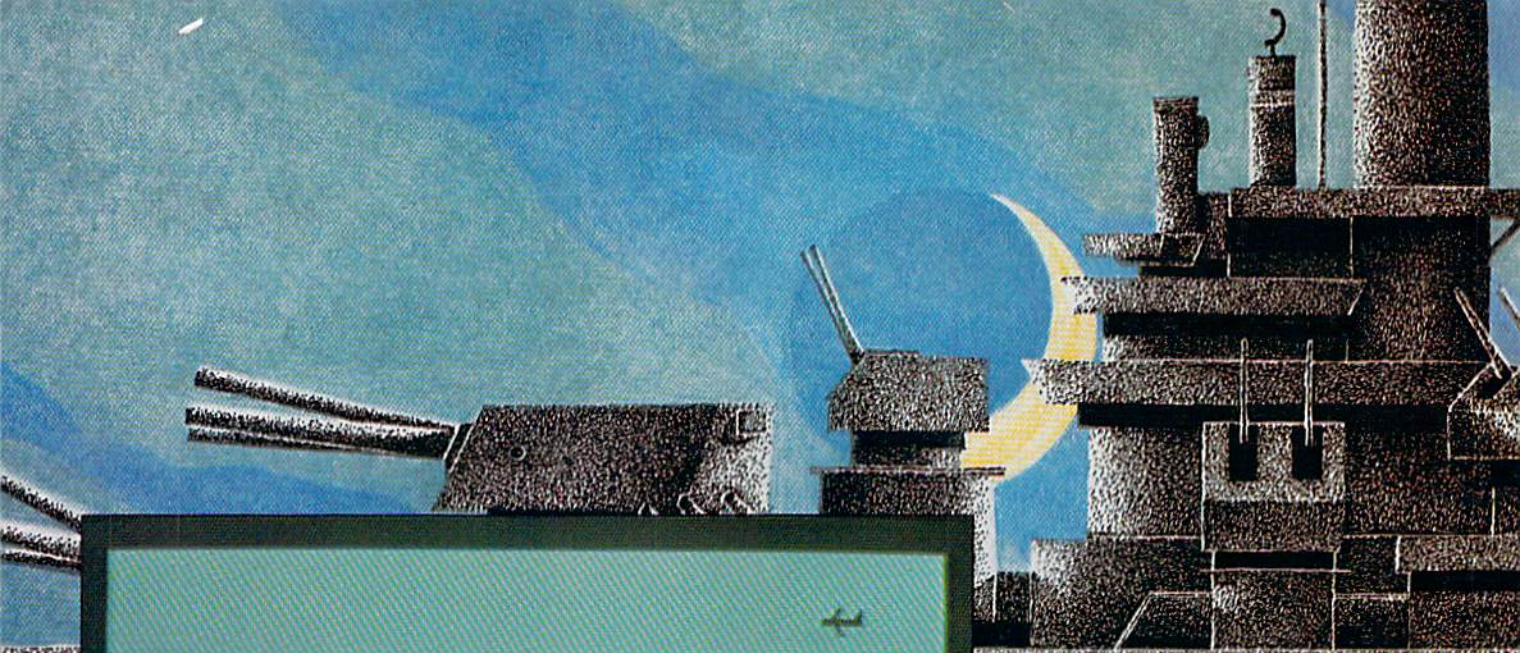
that relate in any way to the video display. The VIC, however, has a limitation for which you must allow—the chip can access only 16K of memory. I will refer to this memory as the VIC video bank.

Within this bank all data related to the video display must reside. Within the VIC video bank is an area I call screen memory, 1K of RAM that contains data for the standard text display. You will often see screen memory referred to as the video matrix or character pointer memory.

(Be sure at this point that you understand the concept of the 16K VIC video bank. Do not confuse it with the screen memory, which is only a portion of the video bank.)

With 64K of total memory, there are poten-

Address all author correspondence to Keith Meade, 3111 15th Ave. NW, Rochester, MN 55901.



Listing of Battleship War program for the C-64.

```

10 POKE55,0:POKE56,128:CLR:REM{2 SPACES}MOVE TOP OF MEM
   ORY DOWN TO 32768
20 GOTO5000
97 *
98 *{5 SPACES}MAIN GAME LOOP
99 *
100 TI$="000000"
110 GETIN$:IFIN$=""GOTO150
120 IFIN$="{CRSR DN}"THENGOSUB2200
130 IFIN$="{CRSR RT}"THENGOSUB2400
140 IFIN$=" "THENDC=1
150 R=FNE(.):ONRGOSUB1000,1100,1200,1300,1400,1500,1000
   ,1300:IFDCTHENGOSUB2000
160 IFTI<TLIMGOTO110
170 GOTO7000
997 *
998 *{4 SPACES}SMALL SUB
999 *
1000 POKEHOM+X(1)+SW*Y(1),BL:X(1)=X(1)+FND(.):IFX(1)<SW
   GOTO1020
1010 X(1)=1:Y(1)=FNB(.):IFY(1)=Y(2)ORY(1)=Y(3)GOTO1010
1020 POKEHOM+X(1)+SW*Y(1),34:RETURN

```



tially four VIC banks. Normally, the VIC chip is accessing the first bank. It sees the memory from addresses 0 to 16384. A look at a memory map reveals that this is a busy area. The only large chunk of free memory is within the space used by Basic, but unless you really know what's going on, only use Basic memory for a Basic program.

So, the major memory management problem is this: There is not sufficient available space to allow use of the 64's special graphics features. In the first VIC video bank, the bulk of unused memory is reserved by the Basic system for Basic programs. As it turns out, both Basic and the VIC chip are willing to compromise. The Basic space can be trimmed on either end. The VIC chip can look at any of the four 16K video-bank locations.

The simplest solution would seem to be moving back the beginning of Basic's program area. Basic programs normally start at address 2048. The following sequence would free up 4K bytes.

```
POKE 6144,0:POKE 44,24:NEW
```

Basic requires that the first byte in its program area be zero, so zero is the first Poke. The second Poke sets back the beginning-of-Basic pointer. The New command causes the program area to be straightened out within its new boundaries.

I've seen this method successfully used many times, but there's an obvious drawback. A program can't reserve memory for itself; there must be a separate

RUN It Right

Commodore 64

New! RS232 Adapter for VIC-20 and Commodore 64

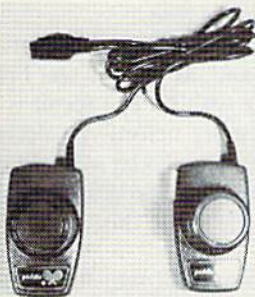


The JE232CM allows connection of standard RS232 printers, modems, etc. to your C-64. A 4-pole switch allows the inversion of the 4 control lines. Complete installation and operation instructions included.

• Plugs into User Port • Provides Standard RS232 signal levels • Uses 6 signals (Transmit, Receive, Clear to Send, Request to Send, Data Terminal Ready, Data Set Ready).

JE232CM..... \$39.95
For VIC-20 and Commodore 64

GAME PADDLES



JSP Atari Paddle..... \$2.95

CSP Commodore Paddles..... \$4.95

(Atari Paddles modified for VIC20 & C-64)

Circle 179 on Reader Service card.

QUALITY COMPUTER PRODUCTS FOR APPLE AND COMMODORE
Jameco's 10th Anniversary 1984 Catalog is Now Available

JE520 Series VOICE SYNTHESIZER FOR APPLE AND COMMODORE

Add speech capability to your Apple II, II+, IIe*, Commodore 64 or VIC-20 computer with JAMECO's JE520 Series Voice Synthesizer. Speech — the most effective means of communication available to man — is now immediately available for your computer.

Applications

- Education • Entertainment • Instrumentation
- Games • Telecommunications • Handicap Aids

JE520 Features

- More than 250 basic words, prefixes and suffixes, which allow the formation of well over 500 total words.
- Allows music graphics and speech simultaneously.
- Programs in BASIC and/or assembler.
- Very understandable & realistic male voice.
- Built-in amplifier, speaker, volume control and audio jack.
- Plug-in user-ready with complete documentation & sample software.

The JE520 will plug right into your computer and be talking in minutes. It produces a very clear, natural male voice. The outstanding speech quality is produced using National Semiconductor's Digitaltalker™ speech processor IC with 4 custom memory chips.



JE520CM JE520AP

Case Size:
7 1/4" L x 3 1/4" W x 1 3/4" H

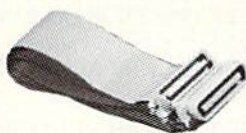
JE520CM For Commodore..... \$114.95
JE520AP For Apple..... \$149.95

CABLES



RS232 Type

Part No.	Style	Length	Price
CDB25P-4-P	J	4'	\$13.95
CDB25P-10-P	J	10'	16.49
CDB25P-4-S	L	4'	13.29
CDB25P-10-S	L	10'	15.49



"Centronics" Type

Part No.	Style	Length	Price
CEN36M-5-M	J	5'	\$19.95
CEN36M-15-M	J	15'	26.95
CEN36M-5-F	L	5'	22.95
CEN36M-15-F	L	15'	28.95

IBM PC Parallel Printer Adapter Type

(CDB25 Male to Centronics Male)

Part No.	Length	Price
CDB25P-5-CEN36M	5'	\$17.95
CDB25P-15-CEN36M	15'	22.95

Style J Male to Male
Style L Male to Female

We stock over 200 different cables. If you don't see what you need, please call.

5 1/4" Diskettes

SSDD = Single Sided Double Density
DSDD = Double Sided Double Density

ULTRA MAGNETICS

Part No.	Description	Boxed	Price
UM51401	SSDD with Hub Ring	10	\$24.95
UM52401	DSDD with Hub Ring	10	32.95

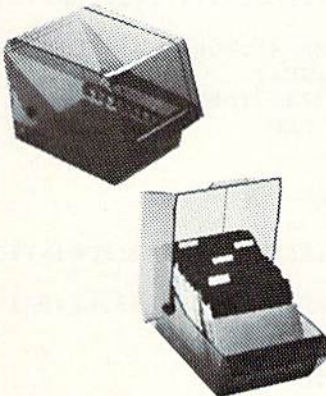
SK (ESKEI)

Part No.	Description	Boxed	Price
SK1D	SSDD with Hub Ring	10	\$20.95
SK2D	DSDD with Hub Ring	10	26.95

All diskettes are soft-sectored and have hub rings. Bulk prices available on request.

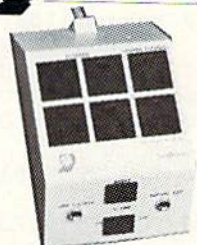
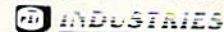
For: Apple II, II+ and IIe* Use SSDD
Atari SSDD
Commodore 64, VIC-20 SSDD
IBM PC, PC Jr. DSDD

DISKETTE ACCESSORIES DISK MINDER



- Attractive, functional disk storage system
 - 50 (8") or 75 (5 1/4") disk storage capacity
 - Easy filing and retrieving • Protects disk from dust contamination • Molded from durable smoked plastic with front carrying handle
 - Size: 7"W x 6 1/2"H x 9 1/4"D • Wt. 2 lbs.
- | Part No. | Description | Price |
|----------|--------------------|-------------|
| DM75 | Stores 75 (5 1/4") | \$19.95 ea. |
| DM50 | Stores 50 (8") | \$29.95 ea. |

Protect Yourself... DATASHIELD® Surge Protector



• Eliminates voltage spikes and EMI-RFI noise before it can damage your equipment or cause data loss • 6 mo. warranty • Power dissipation (100 microseconds): 1,000,000 watts

Model 100..... \$69.95

DATASHIELD® Back-Up Power Source

ALSO AVAILABLE. Provides up to 30 minutes of continuous 120VAC 60Hz power to your computer system (load dependent) when you have a black out or voltage sag. Also eliminates voltage surges and unwanted noise.

PC200..... \$349.95

\$10.00 Min. Order - U.S. Funds Only
Calif. Residents Add 6 1/2% Sales Tax
Shipping: Add 5% plus \$1.50 Ins.
Send S.A.S.E. for Monthly Sales Flyer!

Send \$1.00 Postage for your
FREE 1984 JAMECO CATALOG
Prices Subject to Change
Will Call Service 8AM to 5PM



Jameco ELECTRONICS
1355 SHOREWAY ROAD
BELMONT, CALIFORNIA 94002
Phone Orders Welcome (415) 592-8097
8/84 Telex No. 176043

Dealer inquiries invited. For Technical Information, call (415) 595-3994

*APPLE and APPLE IIe are registered trademarks of APPLE Computers.
**VisiCalc is a registered trademark of Visi Corp. Inc.

Listing continued.

```
1097 *
1098 *{3 SPACES}MED SUB
1099 *
1100 A=HOM+X(2)+SW*Y(2):POKEA,BL:POKEA-1,BL:X(2)=X(2)+F
NA(.):IFX(2)<SWGOTO1120
1110 X(2)=2:Y(2)=FNB(.):IFY(2)=Y(1)ORY(2)=Y(3)GOTO1110
1120 A=HOM+X(2)+SW*Y(2):POKEA,36:POKEA-1,35:RETURN
1197 *
1198 *{3 SPACES}LARGE SUB
1199 *
1200 A=HOM+X(3)+SW*Y(3):FORI=A-2TOA:POKEI,BL:NEXT
1210 X(3)=X(3)+FNA(.):IFX(3)<SWGOTO1230
1220 X(3)=3:Y(3)=FNB(.):IFY(3)=Y(1)ORY(3)=Y(2)GOTO1220
1230 A=HOM+X(3)+SW*Y(3):POKEA,39:POKEA-1,38:POKEA-2,37:
RETURN
1297 *
1298 *{3 SPACES}SMALL PLANE
1299 *
1300 POKEHOM+X(4)+SW*Y(4),BL:X(4)=X(4)-FNA(.):IFX(4)>.G
OTO1320
1310 X(4)=SW:Y(4)=FNC(.):IFY(4)=Y(5)ORY(4)=Y(6)GOTO1310
1320 POKEHOM+X(4)+SW*Y(4),22:RETURN
1397 *
1398 *{3 SPACES}MED PLANE
1399 *
1400 A=HOM+X(5)+SW*Y(5):POKEA,BL:POKEA+1,BL:X(5)=X(5)-F
ND(.):IFX(5)>.GOTO1420
1410 X(5)=39:Y(5)=FNC(.):IFY(5)=Y(4)ORY(5)=Y(6)GOTO1410
1420 A=HOM+X(5)+SW*Y(5):POKEA,23:POKEA+1,24:RETURN
1497 *
1498 *{3 SPACES}LARGE PLANE
1499 *
1500 A=HOM+X(6)+SW*Y(6):FORI=ATO+2:POKEI,BL:NEXT
1510 X(6)=X(6)-FNA(.):IFX(6)>.GOTO1530
1520 X(6)=38:Y(6)=FNC(.):IFY(6)=Y(4)ORY(6)=Y(5)GOTO1520
1530 A=HOM+X(6)+SW*Y(6):POKEA,25:POKEA+1,26:POKEA+2,27:
RETURN
1997 *
1998 *{3 SPACES}DEPTH CHARGE
1999 *
2000 POKEFQ,38:POKEWV,TRI:PK%=PEEK(D):IFPK%<>BLANDPK%<>
63GOTO2030
2010 POKED,BL:D=D+SW:IFD>33767GOTO2040
2020 PK%=PEEK(D):IFPK%=BLTHENPOKED,63:POKEWV,,:RETURN
2030 C=D:GOSUB3000
2040 D=33266:DC=.:POKEWV,,:RETURN
2197 *
2198 *{3 SPACES}LEFT GUN
2199 *
2200 POKEFQ,10:POKEWV,NOI:POKE33141,42:FORI=1TO10:NEXT:C
=.:POKEWV,
2210 FORI=33100TO32813STEP-41:POKEI+41,BL:PK%=PEEK(I):I
FPK%=BLTHENPOKEI,40:NEXT
2220 IFPK%<>BLTHENC=I:I=32772:NEXT
2230 IFCTHENGOSUB3000:RETURN
2240 POKE32813,BL:RETURN
2397 *
2398 *{3 SPACES}RIGHT GUN
2399 *
2400 POKEFQ,9:POKEWV,NOI:POKE33151,42:FORI=1TO10:NEXT:C
=.:POKEWV,
2410 FORI=33112TO32839STEP-39:POKEI+39,BL:PK%=PEEK(I):I
FPK%=BLTHENPOKEI,41:NEXT
2420 IFPK%<>BLTHENC=I:I=32800:NEXT
2430 IFCTHENGOSUB3000:RETURN
2440 POKE32839,BL:RETURN
2997 *
2998 *{3 SPACES}PLANE OR SUB HIT
2999 *
3000 T=PK%:EX=62+(T<28):GOSUB3500:TG=6:IFT=23ORT=24THEN
TG=5:GOTO3050
```

(continued on p. 44)

set-up program or you must manually type in the configuration sequence. As long as there are alternatives, this technique should be unacceptable.

The beginning of the Basic program area actually contains the first lines of the Basic program itself. It's certainly understandable that we can't cut off that chunk of memory without destroying our program. So what about the other end of the Basic area?

The very top of Basic memory is used to store the values of variables (specifically, string variables). Stealing from here is going to zap the variables, but notice that the program itself will survive.

POKE 55,0:POKE 56,128:CLR

The Poke commands set the top-of-Basic pointer down 8K bytes. The CLR command forces Basic to rebuild its variable system at the new, lower location. After execution of this command, all string variables are null and all numerics are equal to zero.

Clearly, the drawback to this method is manageable and, as you will see, I recommend going with it. The secret is to reserve the memory before you declare or use any variables. To be safe, devote the first line of your programs to the function of clearing this space, if needed.

The Basic command sequence in the last paragraph sets the top limit of Basic at address 32768. Remember the VIC video banks? Well, the third bank begins at address 32768. Perfect!

POKE 56576,5

Believe it or not, this instructs the VIC chip to take all data from the third video bank. So, while you've lost 8K of Basic RAM (I've never written a program anywhere near 30K bytes long), you've gained free and clear memory for use of custom graphics.

You Can Bank on It

Unfortunately, the actual structure of the new video bank is complicated, but bear with me. You don't need to understand it at all if you're willing to abide by the rules and address boundaries I'm presenting.

From address 32768 to 36863 is a 4K chunk that can be used normally in any way you see fit.

Addresses 36864 to 40959 are the VIC chip's 4K "blind spot" in this video bank. The VIC ignores the RAM in this range and, instead, sees the character set ROM, which contains the definitions for the two standard Commodore character sets. Peeks and Pokes in the Basic program will see the RAM. You

ATTENTION SMALL BUSINESS OWNERS

Introducing
THE INVOICER

By
MICCA SOFT

Don't pay \$200 or more for a comparable package. THE INVOICER is designed for the small business that is on its way up. It is for the business person who wants a faster and easier way of invoicing orders at a reasonable cost. It is so easy to use that anyone can print an invoice.

THE INVOICER uses preprinted invoices. It includes features such as optional letterhead formatting, auto-feeding, automatic tax calculation, automatic totaling and summary totals.

THE INVOICER is available for the Commodore, ATARI, PC and PC Jr. The program requires 48K and a Disk Drive.

\$39.95

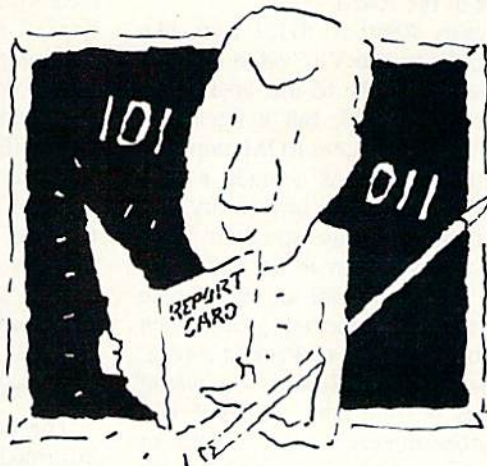
Dealer Inquiries Welcome
VISA, MC, Check or Money Order
Please specify type of computer.



MICCA SOFT



406 Windsor
New Braunfels, TX 78130
(512) 629-4341



**The Visible Computer.
The machine language
teacher that gets
good grades.**

Users and experts alike are giving The Visible Computer straight A's for making machine language understandable.

InCider magazine: "TVC is excellent".
Learning Computing: "Best Educational Software of 1983." *Peelings* magazine: "AA rating ... The explanations are truly excellent, being that rare combination: correct and intelligible." Basic Programmer, Rockford, Illinois: "Wow!"

With The Visible Computer's graphic 6502 simulator, thirty sample programs, and 160 page tutorial-style manual, you'll find that the only mystery about machine language is why no one ever taught it this way before.

Circle 192 on Reader Service card.

For the Commodore 64

**PUT YOUR MESSAGES
HERE IN MINUTES**

Reduction of an actual sign

THE BANNER MACHINE™

Menu-driven program works like a word processor. Great for businesses, schools, or organizations. Produces large signs up to 13" tall by any length. Make borders of widths up to 3/4". Eight sizes of letters from 3/4" to 8" high. Proportional spacing, automatic centering, right and left justification. Use with Gemini 10 or 10X; Epson MX with Graftrax, or the RX or FX; Commodore 1525E or MPS 801; and the Banana. Four extra fonts available (\$19.95 each). Tape or disk \$49.95

Menu Driven Disk Operating System
Execute disk commands by reading the menu and pressing just one key: LOAD, SAVE, initialize disk, validate, scratch, rename, COPY, auto list, renumber, search, replace, and more! Disk \$29.95

Flex File 2.1 By Michael Riley. Save up to 1500 typical records on a 1541 disk drive. Print information on labels or in report format. Select records 9 ways. Sort on up to 3 keys. Calculate report columns. 1541-4040-2031 Disk \$59.95

CTRL-64 Permits listing of C-64 programs on non-Commodore printers. Lists control symbols in readable form. Disk \$24.95

ScreenDump Print a copy of the C-64 screen simply by pressing just two keys. This machine-language program is compatible with most software. \$19.95

Chessmate 64 Analyze your own games, master games, book games, and openings. Save, print, and watch your games in a unique "chess movie." Memorize any board position and recall it after you have played through variations. Disk \$29.95

CP/M Term Download CP/M programs! Full-featured terminal program requires a Commodore CP/M adaptor. Supports C-1600, Hess, 1650 auto dial, 212 modems & RS-232 adaptor. Direct back-to-back computers (requires null modem cable). RS-232 modem with RS-232 adaptor allows transfer from other CP/M computers. Disk \$39.95

Order Toll Free: 800-762-5645
Information: 703-491-6502
HOURS: 10 a.m. to 4 p.m. Mon-Sat

Cardinal Software

13646 Jeff Davis Hwy.
Woodbridge, VA 22191
Catalogs available.
Specify: Educational,
Games/Simulations,
Business/Utilities, or
CP/M Public Domain.



Commodore 64 is a registered trademark of Commodore Electronics Ltd.

The Visible Computer: 6502

Send me The Visible Computer: 6502 for Commodore 64 (requires disk drive). I've enclosed \$39.95 plus \$2.50 postage and handling.

Check or Money Order Visa Mastercard

Name _____

Address _____

City/State/Zip _____

Credit Card No. _____ Exp. _____



Software Masters™

3330 Hillcroft, Suite BB
Houston, Texas 77057
(713) 266-5771

RUN

could use this to store data or machine language in the RAM.

Addresses 40960 to 49151 look like 8K of RAM to the VIC video chip. A Basic program Poke to this area stores values in that RAM, but a Peek sees data in the Basic system ROM chip! It's confusing, but this is actually a very large and useful stretch of memory.

Just remember that you can Poke data in, but you can never Peek that data. (It's probably not an appropriate region for screen memory, but when would you ever need to Peek at a redefined character set?) Sprites, too, would oftentimes be fine here. Machine language programmers would be able to examine this memory by switching out the Basic ROM, but that's not possible in a Basic routine.

Screen memory, as you recall, is the 1K containing the text screen data. You may define screen memory as being any one of the 16-1K areas within the video bank. A character set is 2K in length, and any of the 8-2K regions of the video bank may be designated as containing the character set.

In Battleship War, I used variables to hold these location values. SCRAM

could have a value of 0-15. SCRAM=0 means that screen memory resides in the first 1K of the VIC video bank (thus, beginning at 32768). CHSET (value equals 0-14, even) specifies which 2K area holds the character set. Odd values of CHSET simply have the same effect as the next even number below.

The VIC chip contains a single register that sets the locations of screen memory and the character set. The following command will work for all meaningful values of SCRAM and CHSET.

```
POKE 53272,16*SCRAM+CHSET
```

The Basic system must be separately informed of the location of screen memory so that it can properly handle screen input and output. The following command will perform this.

```
POKE 648,128+4*SCRAM
```

Graphics Routines

Investigation of other graphics features should reveal how they fit into this memory configuration. Observe in the program Battleship War how the system has been specifically implemented.

Below are the routines from Battle-

ship War that could be used in any program to relocate the video bank and open up space for your special graphics data.

```
10 POKE 55,0:POKE 56,128:CLR
```

(Remember, it is best to have this be the first program line.)

```
10000 IF SCRAM<0 OR SCRAM>15 THEN  
PRINT"SCREEN RAM ERROR":STOP
```

```
10010 IF CHSET<0 OR CHSET>15 THEN  
CHSET=4
```

```
10020 POKE 56576,5
```

```
10030 POKE 53272,16*SCRAM+CHSET
```

```
10040 POKE 648,128+4*SCRAM
```

```
10050 RETURN
```

```
10100 POKE 56576,7
```

```
10110 POKE 53272,20
```

```
10120 POKE 648,4
```

```
10130 RETURN
```

Save these program lines and use them. They'll make your life a lot easier, believe me.

To rearrange the video, set SCRAM equal to 0-15, CHSET equal to 0-14 (even) and GOSUB 10000. The new location of screen memory will be $32768 + 1024 * SCRAM$. The VIC chip will expect to see the character set at $32768 + 1024 * CHSET$. CHSET=4 will point the VIC to the standard character set (6 for upper/lowercase).

Sprites or other graphics features may easily be used by keeping the previously described VIC memory bank structure in mind. Remember, in particular, that the sprite image pointers are part of the screen memory and move with it.

To restore the usual configuration, enter GOSUB 10100. The default screen memory area at location 1024 is not disturbed by any of this activity. Toggling between the two subroutines offers a simple method of page flipping, with which you might wish to experiment.

I'll conclude this discussion with a little demo program to get you thinking. Type in these lines along with the above routines (don't forget line 10).

Before you run the program, notice that the Print statements are only executed once.

```
100 PRINT "(clear screen)"
```

```
110 PRINT "THIS IS THE OLD SCREEN."
```

```
120 SCRAM=0:CHSET=4:GOSUB 10000
```

```
130 PRINT "(clear screen)"
```

```
140 PRINT "HERE IS THE NEW SCREEN!"
```

```
150 FOR D=1 TO 1000:NEXT
```


```
160 GOSUB 10100
```

```
170 FOR D=1 TO 1000:NEXT
```

```
180 GOSUB 10000
```

```
190 GET AS:IF AS=" " GOTO 150
```

```
200 GOSUB 10100:END
```

Press any key to end the program. I hope you can put these routines to good use. Don't forget to try Battleship War. 

Circle 96 on Reader Service card.

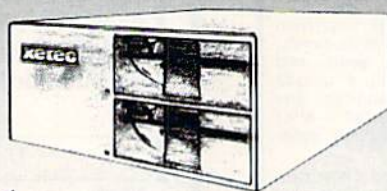
EXPAND Your Software Horizon

RUN APPLE® SOFTWARE ON YOUR C-64

INTRODUCING THE XETEC AC/2 DUAL DISC DRIVE

Including:

- APPLE DOS® 3.3 and
APPLE SOFT® BASIC
- APPLE® expansion slots
- Complete documentation



Call 1-800-255-0511
for price and delivery

C-64 is a TM of Commodore Business Machines, Inc.

XETEC, Inc.
3010 Arnold Rd.
Salina, KS 67401



Circle 122 on Reader Service card.

**CALC RESULT
ADVANCED**
by Handic

Retail..... \$99.95
SPECIAL \$87.95



Calc Result Advanced is the Commodore 64 32-page spread sheet. Thirty two pages, graphics, and the ability to view up to four pages (spread-sheets) at one time make Calc Result Advanced the most powerful planning and forecasting tool available for the Commodore 64. Available for the Commodore 64 with disk drive.

CALC-RESULT EASY
by Handic

Retail..... \$49.95
SPECIAL \$39.95

Calc-Result Easy is a sophisticated but simple one-page spreadsheet for the Commodore 64. Flexible printing, graphics, and timesaving full-function editing make Calc Result Easy a powerful planning and forecasting tool. It's easy to learn and simple to use. Available for the Commodore 64 with cassette or disk drive.

DATABASE MANAGER
by Mirage

Retail..... \$89.95
SPECIAL \$79.95

Mirage Database Manager is a comprehensive electronic filing system that makes it easy to organize, maintain, and more effectively use all the information you must handle in your home, school, or business. It can store, search, sort, retrieve, display, calculate, print reports, lists, and even produce mailing labels. Available for Commodore 64 with disk drive.

**Personal Word
Processor**
by Mirage

Retail..... \$89.95
SPECIAL \$79.95



The Word Processor-Personal Version makes writing easier than ever before. It will enable you to put your ideas into printed form faster and better than you ever thought possible. For new owners and those with basic needs, this program is the perfect solution. It features cursor movement, delete, insert, block operations, screen control, file operations, line formatting, printing, page control and editor.

**MusiCalc 1
MusiCalc 2**
by Waveform

MusiCalc 1... \$39.95
MusiCalc 2... \$29.95

MusiCalc is an entirely new way to make Music with your Commodore. MusiCalc 1 a three-voice synthesizer and fully interactive step sequencer. Play along with a song or write your own. MusiCalc 2 is a ScoreWriter that works along with MusiCalc 1 to change your musical improvisations into musical notation. With the use of an optional printer you can turn your own original compositions into sheet music.

The Home Accountant
by Continental Software

Retail..... \$69.95
SPECIAL \$54.95

The Home Accountant is the program for the home and small businessman providing the ideal solution for keeping track of your income and expenses. It handles cash, checkbooks, credit cards, and other liabilities and expenses. Provides a balance sheet, net worth statement, checks, and fast bank reconciliation. Keeps track of up to five checkbooks. It supports almost all printers and floppy and hard disks.

THE LAST ONE
by Computer Marketing

Retail..... \$99.95
SPECIAL \$79.95



The Last One is the program that writes programs. Programs are totally stand-alone. Each program can access 13 data files. It is simple enough for first-time users, sophisticated enough for programmers. This program generator produces ready-to-use. Basic programs that are customized to your needs without having to write a single word of code.

WORD WRITER
by Time Works

Retail..... \$49.95
SPECIAL \$34.95

Word Writer includes a full screen format (up to 80 characters) which amplifies your text entry and editing by letting you view your entire document before you print it. It has two plastic keyboard overlays which place the word processing command directly onto the keyboard. The manual is written in easy-to-understand, people-friendly English.

HOME CALC
by Sim

Retail..... \$29.95
SPECIAL \$24.95



Home Calc is the lowest priced spreadsheet. Its popular features are sum, replicate, recalculate, add, subtract, multiply, divide use of the exponential format and labels. Load, save, and print spreadsheets. Available for Commodore with Disk Drive.

**Computer
Tutor™**



VIDEO INSTRUCTION TAPES
VHS OR BETA FORMAT

MULTIPLAN
by Microsoft

Retail..... \$99.95
SPECIAL \$79.95



Multipan is an electronic worksheet a large grid of entries, each of which can be words, numbers or formulas. You can set up the Multipan worksheet with titles and numbers. It can perform the calculations for you. Your worksheet is 225 rows long and 63 columns wide for words, numbers and formulas.

**TRACTOR FEED
COMPUTER PAPER**
Convenient E-Z To Use Mini-Packs

PLAIN WHITE SHEETS	
9 1/2" x 11" 1 Copy	ONLY \$14.95
9 1/2" x 11" 2 Copy	ONLY \$19.95
9 1/2" x 11" 3 Copy	ONLY \$19.95
GREEN BAR SHEETS	
14 1/2" x 11" 1 Copy	ONLY \$19.95
14 1/2" x 11" 2 Copy	ONLY \$24.95
14 1/2" x 11" 3 Copy	ONLY \$24.95
8 1/2" x 11" 1 Copy	ONLY \$14.95
8 1/2" x 11" 2 Copy	ONLY \$19.95
8 1/2" x 11" 3 Copy	ONLY \$19.95

ADD \$3.75 PER BOX SHIPPING

CAT #	TOPIC	APPROX RUN TIME	
BP-3	LEARNING C-64 BASIC	2 HR	\$49.95
BP-4	LEARNING VIC 20 BASIC	2 HR	\$49.95
DIO-1	COMMODORE 64 DISK I/O	1 HR 45 MIN	\$49.95
DIO-2	VIC 20 DISK I/O	1 HR 45 MIN	\$49.95
EW-9	MULTIPLAN C-64	1 HR 50 MIN	\$39.95
EW-3	CALC-RESULT ADVANCED	1 HR 30 MIN	\$39.95
EW-4	CALC-RESULT EASY	1 HR 15 MIN	\$29.95
EW-5	PRACTICALC C-64	1 HR 15 MIN	\$29.95



C.O.D. Orders Add \$3.00
\$3.00 Shipping Per Order
Illinois Add 7% Sales Tax



**VERBATIM
DISKETTES**
\$25.00

10 MINIDISKETTES (MD525-01 SS/DD)
in a Hard Plastic Box



Specify Either VHS or BETA Tape Format

DEALER INQUIRIES INVITED

LYNN COMPUTER SERVICE

6831 West 157th Street Tinley Park, Illinois 60477 (312) 429-1915

VIC 20 AND COMMODORE 64 ARE TRADEMARKS OF COMMODORE BUSINESS MACHINES, INC. CALC-RESULT IS A TRADEMARK OF HANDIC. PRACTICALC IS A TRADEMARK OF COMPUTER SOFTWARE ASSOCIATES. DATABASE AND PERSONAL WORD PROCESSOR ARE TRADEMARKS OF MIRAGE. MUSICALC IS A TRADEMARK OF WAVEFORM. THE HOME ACCOUNTANT IS A TRADEMARK OF CONTINENTAL SOFTWARE. WORD WRITER IS A TRADEMARK OF TIME WORKS. MULTIPLAN IS A TRADEMARK OF MICROSOFT. HOME CALC IS A TRADEMARK OF SIM. THE LAST ONE IS A TRADEMARK OF COMPUTER MARKETING.

(from p. 40)

```

3010 IFT>36ANDT<40THENTG=3:GOTO3050
3020 IFT=35ORT=36THENTG=2:GOTO3050
3030 IFT=22THENTG=4
3040 IFT=34THENTG=1
3050 TPT=TPT+PT(TG):PRINT"(CRSR UP)";SL$;TPT;"(5 SPACES
)" :X(TG)=-SW*(TG<4):RETURN
3497 *
3498 *(3 SPACES)EXPLOSION
3499 *
3500 POKEV,SAW:IFEX=62THENPOKEV,TRI
3510 FORI=C-2TOC+2:POKEI,BL:NEXT:POKEC,42
3520 FORI=C-SWTOC+SWSTEPSW:FORI2=-1TO1:A=I+I2:IFPEEK(A)
=BLTHENPOKEA,EX
3530 POKEFQ,20-10*I2:NEXTI2,I:POKEWV,
3540 FORI=C-SWTOC+SWSTEPSW:FORI2=-1TO1:A=I+I2:IFPEEK(A)
=EXTHENPOKEA,BL
3550 NEXTI2,I:POKEC,BL:RETURN
4997 *
4998 *(3 SPACES)INITIALIZE
4999 *
5000 PRINT "{SHFT CLR}{2 CRSR DNs}INITIALIZING....."
5010 POKE 53280,11:POKE 53281,1:REM(2 SPACES)SET SCREEN
COLORS
5015 REM(2 SPACES)SET SOUND VOICE #1
5020 POKE 54296,15:REM(2 SPACES)VOLUME
5030 POKE 54277,0:REM(2 SPACES)ATTACK-DECAY
5040 POKE 54278,240:REM(2 SPACES)SUSTAIN RELEASE
5050 POKE 54272,100:REM(2 SPACES)LO FREQ.
5060 FQ=54273:REM(2 SPACES)HI FREQ. REGISTER
5070 WV=54276:REM(2 SPACES)WAVE FORM REGISTER
5080 NOI=129:SAW=33:TRI=17:REM(2 SPACES)WAVE FORM VALUE
S
5090 HOM=32727:D=33266:REM(2 SPACES)SCREEN LOCATIONS
5100 TLM=10800:REM(2 SPACES)TIME LIMIT (JIFFIES)
5110 BL=32:SW=40:REM(2 SPACES)VALUE TO POKE BLANK, SCRE
EN WIDTH
5115 REM(2 SPACES)SET RANDOM VALUE FUNCTIONS
5120 DEF FN A(R)=INT(RND(R)*3+1)
5130 DEF FN B(R)=INT(RND(R)*9+15)
5140 DEF FN C(R)=INT(RND(R)*6+3)
5150 DEF FN D(R)=INT(RND(R)*2+1)
5160 DEF FN E(R)=INT(RND(R)*8+1)
5170 ST$="" :FORI=1TO11:READA:ST$=ST$+CHR$(A):NEXT:REM(2
SPACES)TOP OF SHIP
5180 DATA 32,66,69,70,73,74,77,78,81,82,32
5190 SB$="" :FORI=1TO11:READA:SB$=SB$+CHR$(A):NEXT:REM(2
SPACES)BOTTEM OF SHIP
5200 DATA 67,68,71,72,75,76,79,80,83,84,85
5210 SL$="" :FORI=43TO47:SL$=SL$+CHR$(I):NEXT:REM(2 SPAC
Es)SCORE DISPLAY LINE

```

```

5220 FORI=1TO6:READPT(I):NEXT:REM(2 SPACES)POINT VALUES
5230 DATA 150,40,25,75,20,15
5240 GOSUB 8000:REM(2 SPACES)READ, POKE CUSTOM CHARACTE
R SET
5250 GOTO 6000
5997 *
5998 *(3 SPACES)BEGIN GAME
5999 *
6000 X=RND(-TI):PRINT "{SHFT CLR}{COMD 4}{CTRL 9}{3 SPA
CES}- BATTLESHIP WAR - BY KEITH MEADE(4 SPACES}"
6010 PRINT "{3 SPACES}YOU ARE IN COMMAND OF A BATTLESHI
P."
6020 PRINT "{2 SPACES}YOU HAVE 3 MINUTES TO DESTROY AS
MANY"
6030 PRINT "{3 SPACES}ENEMY SUBS AND PLANES AS POSSIBLE."
6040 PRINT "{2 CRSR DNs} POINT VALUES:"
6050 PRINT "{CRSR DN} SMALL SUB = {CTRL 9}150{CTRL 0}{6
SPACES}SMALL PLANE = 75"
6060 PRINT "{MED SUB(3 SPACES)= 40(7 SPACES)MED PLANE(3
SPACES)= 20"
6070 PRINT "{LARGE SUB = 25(7 SPACES)LARGE PLANE = 15(2
CRSR DNs}"
6080 PRINT "{CRSR DN}{5 SPACES}CURSOR KEYS FIRE THE CAN
ONS."
6090 PRINT "{CRSR DN}{3 SPACES}SPACE BAR RELEASES A DEP
TH CHARGE.{3 CRSR DNs}"
6100 FOR X=1 TO 40:NEXT
6110 PRINT "{CRSR UP}{6 SPACES}PRESS ANY KEY TO BEGIN P
LAY"
6120 FOR X=1 TO 40:NEXT
6130 PRINT "{CRSR UP}{6 SPACES}{CTRL 9}PRESS ANY KEY TO
BEGIN PLAY"
6140 GET IN$:IF IN$="" GOTO 6100
6150 PRINT "{SHFT CLR}"
6160 SCRAM=0:CHSET=2:REM(2 SPACES)SCREEN RAM, CHAR SET
LOCATION VALUES
6170 GOSUB 1000:REM(2 SPACES)MOVE VIDEO BLOCK, ETC.
6175 REM(2 SPACES)DRAW GAME DISPLAY
6180 POKE 53281,5:PRINT "{SHFT CLR}{10 CRSR DNs}":POKE
53281,1:REM(2 SPACES)CLEAR, SET COLOR RAM
6190 FORI=55296TO55695:POKEI,11:NEXT:REM(2 SPACES)CHANG
E SOME COLOR RAM
6200 PRINT "(COMD 7)":FORI=1TO40:PRINTCHR$(65):NEXT:R
EM(2 SPACES)WATER LINE
6210 PRINT "{2 CRSR Ups}{COMD 5}";SPC(13);ST$:REM(2 SPA
CES)SHIP TOP
6220 PRINT SPC(13);SB$:REM(2 SPACES)SHIP BOTTEM
6230 PRINT "(COMD 4)";SL$;TPT:REM(2 SPACES)SCORE LINE
6240 FOR I=1 TO 3:X(I)=39:X(I+3)=0:NEXT:REM(2 SPACES)RE
SET TARGET POSITIONS
6250 GOTO 100

```

More →

isting continued.

```

6997 *      *
6998 *      *
6999 *      *
7000 POKE 53281,7:REM(2 SPACES)CHANGE SCREEN COLOR
7010 FOR I=1 TO 200:NEXT:REM(2 SPACES)WAIT
7020 POKE 53281,1:REM(2 SPACES)RESTORE SCREEN COLOR
7030 PRINT "{SHIFT CLR}"
7040 GOSUB 10100:REM(2 SPACES)RESTORE VIDEO LOCATION
7050 POKE 53272,(PEEK(53272) AND 240)+5:REM(2 SPACES)RE
STORE STANDARD CHARACTER SET
7060 PRINT "{SHIFT CLR}{4 CRSR DNs}TIME'S UP!!"
7070 IF TPT>HIGAME THEN HIGAME=TPT
7080 PRINT "{CRSR DN}YOUR SCORE =" ;TPT
7090 PRINT "{CRSR DN}HIGH SCORE =" ;HIGAME
7100 PRINT "{CRSR DN}ANOTHER GAME? (Y OR N)"
7110 GET IN$:IF IN$="Y" THEN TPT=0:GOTO 6000
7120 IF IN$<>"N" GOTO 7110
7130 END
7997 *
7998 *{4 SPACES}POKE CUSTOM CHAR DATA
7999 *
8000 M=34816
8010 FOR LIN=8040 TO 8350:STEP 10:TT=0:FOR I=1 TO 16:READ A:POKE
M,A:M=M+1:TT=TT+A:NEXT
8020 READ A:IF TT<>"ATHENPRINT"ERROR IN LINE";LIN:STOP
8030 NEXT:RETURN
8040 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
8050 DATA 192,96,48,24,12,2,10,10,0,0,170,255,127,59,21
,14,1040
8060 DATA 10,10,170,255,255,187,85,238,0,0,0,0,128,16
0,160,1658
8070 DATA 10,10,10,10,10,10,255,255,204,160,170,255,25
5,187,85,238,2274
8080 DATA 204,255,170,255,255,187,85,238,138,138,13
8,138,255,255,204,3053
8090 DATA 138,138,138,138,138,255,255,204,204,255,170,2
55,255,187,85,238,3053
8100 DATA 204,255,170,255,255,187,85,238,138,138,13
8,138,255,255,204,3053
8110 DATA 138,138,138,138,138,255,255,204,204,255,170,2
55,255,187,85,238,3053
8120 DATA 204,255,170,255,255,187,85,238,128,128,12
8,128,193,197,197,2876
8130 DATA 3,6,12,24,48,80,84,197,197,170,255,255,187
,85,238,1925
8140 DATA 84,84,170,255,255,187,85,238,0,0,170,254,252,
184,80,224,2522
8150 DATA 0,48,49,255,255,49,48,0,3,6,12,255,255,6,3,1,
1245
8160 DATA 1,3,7,255,255,0,0,128,0,0,0,42,170,170,0,0,10
31

```

```

8170 DATA 40,80,160,170,170,170,80,40,1,2,5,170,169,170
,10,2,1439
8180 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
8190 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
8200 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
8210 DATA 0,12,12,255,255,0,0,0,0,0,0,0,255,127,63,0,97
9
8220 DATA 0,224,224,224,255,255,254,0,0,0,170,170,4
2,10,1828
8230 DATA 2,2,2,2,170,170,170,128,128,128,168,1
70,170,168,1876
8240 DATA 128,64,32,16,8,4,2,1,2,4,8,16,32,64,128,510
8250 DATA 0,146,84,56,214,56,84,146,112,249,193,241,121
,25,249,240,2216
8260 DATA 225,243,131,131,131,243,225,227,243,51,51
,51,51,243,227,2604
8270 DATA 227,51,51,227,227,51,51,51,224,224,15,207,192
,15,239,224,2276
8280 DATA 60,102,102,102,102,60,0,24,24,24,24,24,24
,24,0,798
8290 DATA 124,6,6,12,48,96,126,0,124,6,6,28,6,6,124,0,7
18
8300 DATA 102,102,127,6,6,6,6,126,96,96,124,6,6,124
,0,1029
8310 DATA 60,96,96,124,102,102,60,0,126,6,12,24,24,24,2
4,0,880
8320 DATA 60,102,102,60,102,102,60,0,60,102,102,62,6,6,
60,0,986
8330 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
8340 DATA 0,0,0,0,0,0,0,0,192,6,48,0,3,192,12,0,453
8350 DATA 112,216,112,0,14,27,14,0,0,0,0,60,126,60,0,0,
741
9995 *
9996 *{2 SPACES}MOVE VIDEO BLOCK TO #3
9997 *{4 SPACES}SET SCREEN RAM AND
9998 *{4 SPACES}CHAR SET LOCATIONS
9999 *
10000 IF SCRAM<0 OR SCRAM>15 THEN PRINT "{CTRL 9} SCREE
N RAM LOCATION ERROR ":STOP
10010 IF CHSET<0 OR CHSET>15 THEN CHSET=4
10020 POKE 56576,5:REM(2 SPACES)VIDEO BLOCK LOCATION
10030 POKE 53272,16*SCRAM+CHSET:REM(2 SPACES)SCREEN RAM
,CHAR SET LOCATION
10040 POKE 648,128+4*SCRAM:REM(2 SPACES)NOTIFY BASIC
10050 RETURN
10097 *
10098 * RESTORE VIDEO TO NORMAL
10099 *
10100 POKE 56576,7:REM(2 SPACES)VIDEO BLOCK
10110 POKE 53272,20:REM(2 SPACES)SCREEN RAM, CHAR SET
10120 POKE 648,4:REM(2 SPACES)BASIC'S SCREEN LOCATION
10130 RETURN

```


SUPER DISK II Features and Specifications

COMPATIBILITY .. Commodore 64,™ VIC-20,™
PET® CBM

BUFFER MEMORY
CAPACITY 6K

COMPLETE Less than 2 minutes. (Compare
DUPLICATION to 30-40 minutes with two
TIME: Format, Copy 1541s).
& Verify a Full Disk.

TIME TO 17 seconds. (Compare to 1
FORMAT min/20 sec. with 1541).

SERIAL BUS YES, 2 connectors.

PARALLEL BUS .. YES, for enhanced speed, IEEE for
Commodore compatibility.

DAISYCHAIN Up to 4 drives

OPERATIONAL SUPPORT • Power-on diagnostics to ensure
proper disk drive operation.
• LED status lights display where
error is occurring.
• Easy to understand instruction
manual.

OVERHEAT TIME . NONE. Tested for weeks of con-
tinual operation.

WARRANTY • 6 MONTHS. (Compare to 3
months for 1541).
• 48 hour factory repair service.
• Local service centers.

WHEN YOU ARE READY TO GET DOWN TO SERIOUS COMPUTING

RELIABLE SINGLE DRIVE READILY AVAILABLE

MSD Systems also offers COMMODORE OWNERS the reliable and efficient SUPER DISK I, a single disk drive which is compatible with the COMMODORE 64, VIC-20, and PET computers. Like the dual drive, MSD's SUPER DISK I never overheats ... its internal state-of-the-art design provides exceptional durability and longer life even in continuous run cycles, with more speed and power for internal operations.

A greater 4K double capacity buffer memory allows users to open more files at any one time. The drive accomplishes many internal operations in less time than other single disk drives require. The SUPER DISK I can format disks in 17 seconds, and execute utility commands in a minimum amount of time.

The SUPER DISK I has both serial and parallel buses. Up to three times the serial communication's speed can be achieved by adding the MSD IEEE 488 interface (CIE) and IEEE/PET cable.

The unique vertical load architecture of MSD's SUPER DISKS reduces desktop space normally required. The durable sheet metal casing minimizes heat retention and contributes to the reliability and long life of the SUPER DISKS. MSD confidently offers an exceptional 6 month warranty to support SUPER DISK users.

MSD SUPER DISK DRIVE TECHNICAL SPECIFICATIONS

STORAGE*

Total Capacity	.....	174848 bytes per diskette
Sequential	.....	168656 bytes per diskette
Relative	.....	167132 bytes per diskette
		65535 records per file
Directory Entries	...	144 per diskette
Blocks	.....	683 total per diskette
		664 available per diskette
Tracks	.....	35 per diskette
Sectors	.....	17 to 21 per track
Bytes	.....	256 per sector
Diskettes	.....	Standard 5¼", single sided single density

*NOTE: The SD-2 contains two disk drive mechanisms and can therefore handle two times the above capacities (one for each diskette).

SOFTWARE

16K Bytes Operating System
4K RAM buffer area (6K for the SD-2)
Microprocessor based disk controller (6511Q)
Commodore Compatible Serial Bus Interface
Commodore Compatible IEEE Parallel Bus
Interface

PHYSICAL DIMENSIONS

	SD-1	SD-2
Height	6.2" (157 mm)	6.2" (157 mm)
Width	4.2" (107 mm)	5.9" (150 mm)
Depth	13.3" (338 mm)	13.3" (338 mm)

INTERFACE

Dual Commodore compatible Serial Bus
Commodore compatible IEEE Parallel Bus
Jumpers for selecting device number 8, 9, 10
or 11.

ELECTRICAL REQUIREMENTS

Voltage	.....	110 or optional 220 VAC
Frequency	.....	50 or 60 Hertz
Power	.....	50 Watts

IT'S YOUR TIME AND BOTTOM LINE!

COMMODORE OWNERS now have an alternative to the frustrating LOAD ... wait ... UNLOAD ... wait ... RELOAD ... wait procedure. The NEW MSD DUAL DISK DRIVE ... SUPER DISK II will eliminate those hours wasted during task performance and time lags that inflate expensive labor costs and deflate your bottom line.

One SUPER DISK II will copy, format, and verify in less than two minutes ... a procedure that normally takes 30 to 40 minutes using 2 single drives. Yes, SUPER DISK II is TWENTY TIMES FASTER!

MSD provides quality craftsmanship that is backed by an exceptional six month warranty. The SUPER DISK II workhorse drive never overheats, so why be aggravated by the loss of time and money?

Invest today in SUPER DISK II, the SMART disk drive which contains its own micro-processor and memory enabling the computer to command the drive and then continue. SUPER DISK II does the work quickly so that you can get on with your program.

As for the money you will save in unproductive labor costs ... perhaps you will invest it in a daisychain of SUPER DISKS. These workhorse drives will allow you to connect up to four drives for maximum speed and reliable, continued performance.



SUPER DISK II DESIGN ASSETS

- Sturdy sheet metal casing and heat sink
- Vertical load for ergonomic space efficiency
- Key latch secures disk position
- Smart disk contains microprocessor and memory in each drive
- Status lights to display which drive is in use
- Three steel bands for repeated accuracy of alignment
- Flexible use of serial or parallel communication
- Access flexibility configured as drive 0 or drive 1

MSD

SYSTEMS, INC.

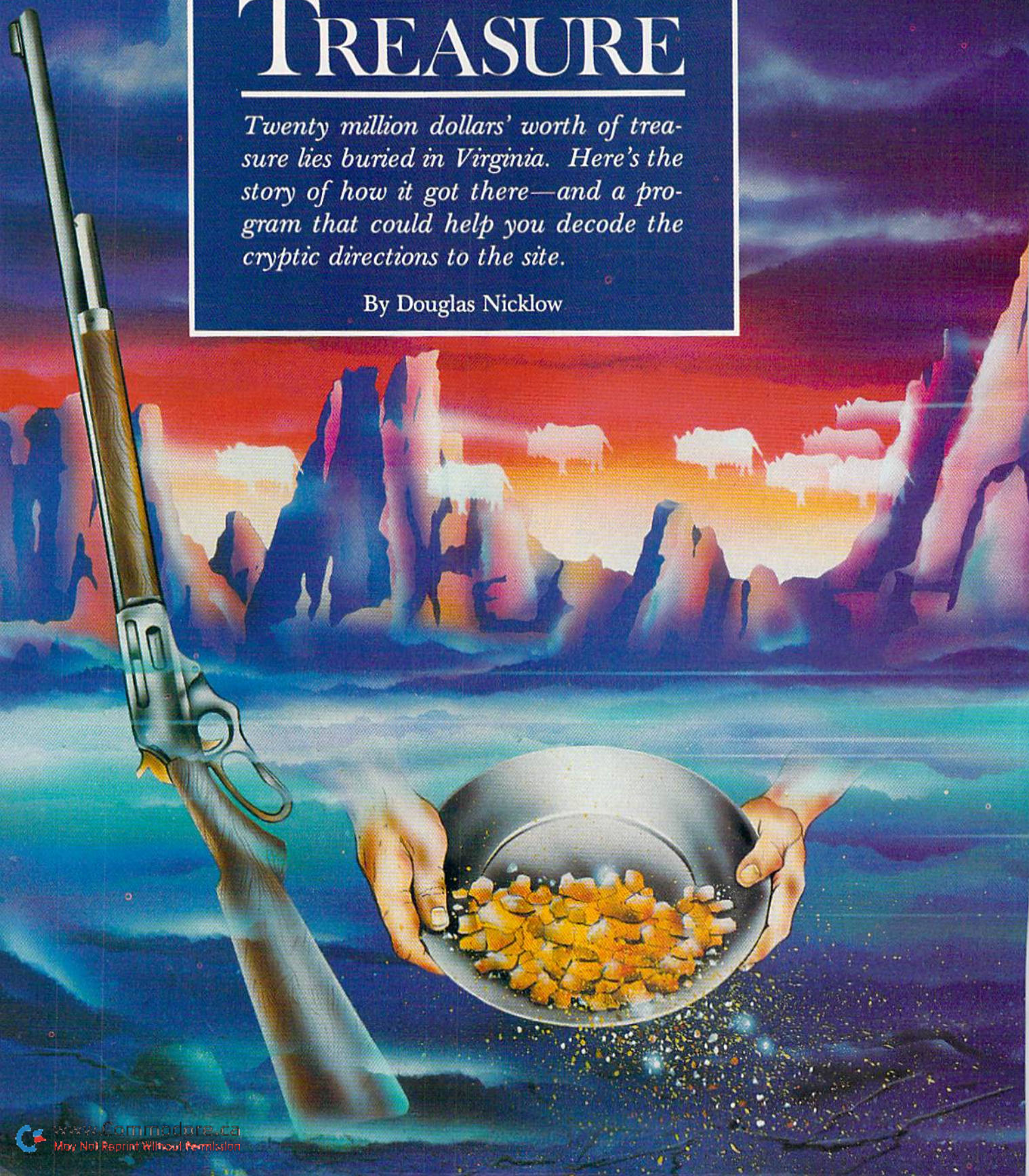
Dealer and distributor inquiries invited.

Circle 253 on Reader Service card

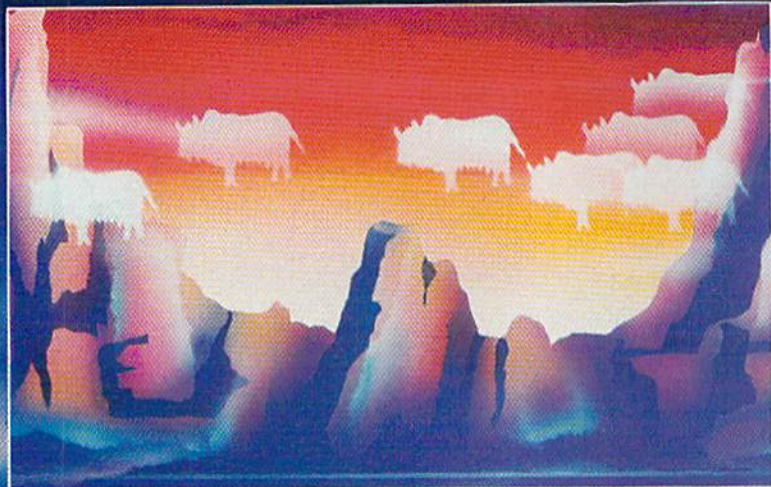
BEALE'S BURIED TREASURE

Twenty million dollars' worth of treasure lies buried in Virginia. Here's the story of how it got there—and a program that could help you decode the cryptic directions to the site.

By Douglas Nicklow







*We determined
to visit the
Western plains
to hunt buffalo.*

How many times have you dreamed of finding buried treasure? Surely the thought of uncovering untold wealth has crossed your mind, only to be dismissed as a passing fancy, a dream that could never be realized because of the time and money involved.

True enough, most large treasure-finds, such as gold-laden shipwrecked Spanish galleons, are the result of systematic approaches that require the seekers to devote months or years and in most cases huge investments of money. There is, however, one treasure that can be sought starting out from your own home. You'd probably think it definitely worth the effort, since the treasure consists of over \$20 million in gold, silver and precious jewels.

Details about this treasure are well-known, including the general location, exactly what is buried, how it is buried and how it got there in the first place. The only, and most critical, thing not known is the *exact* burial spot. But even that information is available to treasure hunters in the form of a code. All you need do is crack the code, and the treasure is yours.

The treasure I'm referring to is known as the Beale Treasure. Its story begins in 1817, when Thomas Jefferson Beale, in the company of some 30 men, left Virginia on a hunting expedition to the West. The hunt succeeded beyond their wildest dreams, as you shall see.

In the winter of 1819, Thomas Beale appeared in Lynchburg, Virginia, at the inn owned and run by one Robert Mor-

riss, a man with a wide reputation for exceptional integrity. Beale remained at the inn for some three months, getting to know Morriss and his family well, and in the process confirming for himself that the innkeeper's reputation was well deserved.

Beale then departed again for the West. After two more years, he reappeared at the inn in Lynchburg, this time for only a brief stay. Upon his departure after this second visit, Beale entrusted to Morriss a locked metal box, earnestly requesting that the innkeeper safeguard it with all care until Beale should return or until further instructions should arrive. This Morriss agreed to do.

The story behind the box and its contents is best revealed by Beale's own words in the following correspondence to Robert Morriss.

St. Louis, Missouri
May 9, 1822

Robt. Morriss, Esq.,

My esteemed friend:

Ever since leaving my comfortable quarters at your house, I have been journeying to this place, and only succeeded in reaching it yesterday. I have had, altogether, a pleasant time, the weather being fine and the atmosphere bracing. I shall remain here a week or ten days longer, then "ho" for the plains, to hunt buffalo and encounter the savage grizzlies. How long I may be absent I cannot now determine, certainly not less than two years, perhaps longer.

With regard to the box left in your charge, I have a few words to say, and, if you will permit me, some instructions

to give you concerning it. It contains papers vitally affecting the fortunes of myself and many others engaged in business with me, and in the event of my death its loss might be irreparable. You will, therefore, see the necessity of guarding it with vigilance and care to prevent so great a catastrophe. It also contains some letters addressed to yourself and which will be necessary to enlighten you concerning the business in which we are engaged.

Should none of us ever return, you will please preserve the box carefully for a period of ten years from the date of this letter, and if neither I, nor anyone with authority from me, demands its restoration during that time, you will open it by forcing the lock.

You will find, in addition to the papers addressed to you, other papers which will be unintelligible without the aid of a key to assist you. Such a key I have left in the hands of a friend in this place, sealed, addressed to yourself and endorsed "Not to be delivered until June, 1832." By means of this key, you will understand fully all you will be required to do.

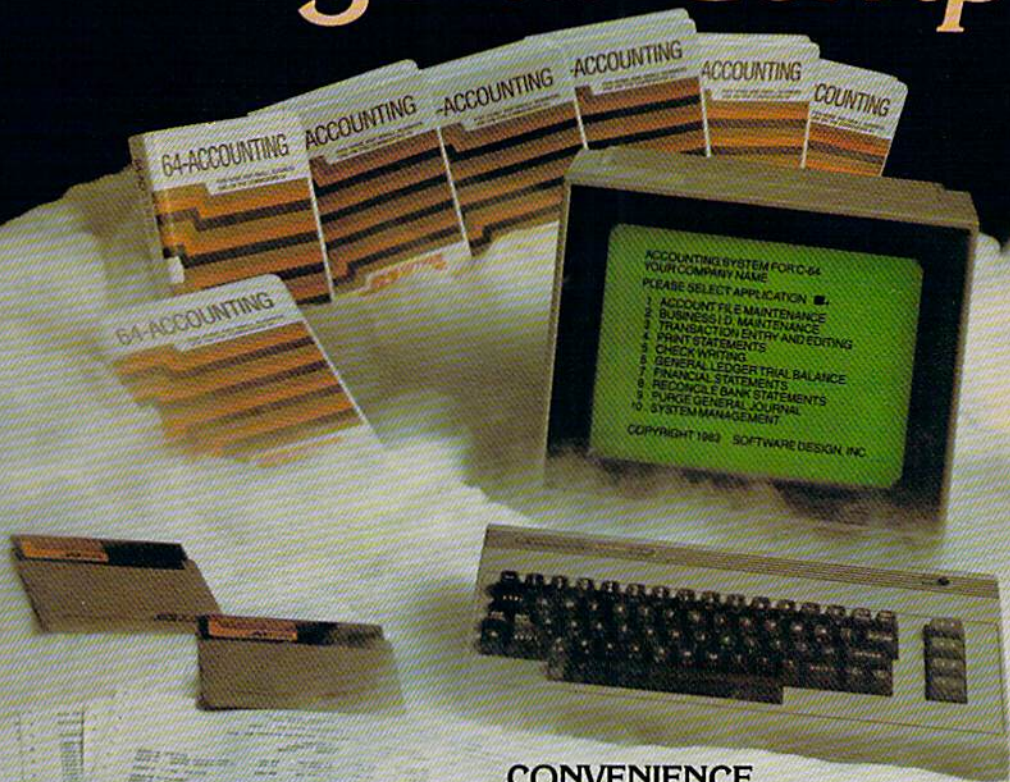
I know you will cheerfully comply with this request, thus adding to the many obligations under which you have already placed me. In the meantime, should death or sickness happen to you, to which all are liable, please select from among your friends someone worthy, and to him hand this letter, and to him delegate your authority.

I have been thus particular in my instructions in consequence of the somewhat perilous enterprise in which my associates and I are engaged, but trust you and I shall meet long ere the time expires, and so save you this trouble. Be

*Address all author correspondence to
Douglas A. Nicklow, Three Governor's
Drive, Leesburg, VA 22075.*

64 Software

Beyond Compare



Introducing The New 64-ACCOUNTING SYSTEM.

If you can't put your finger on your total financial picture, we've got the answer. Software Design, Inc. has a personal software accounting package designed for your Commodore 64®.

Even if you're all thumbs, we offer a support line and an easy-to-follow manual written in plain English. Created for home and small business demands, the 64-ACCOUNTING SYSTEM puts financial management at your fingertips.

FLEXIBILITY

Design your own financial statement with no rigid account number system, and with flexible subtotal possibilities. Take the guesswork out of checkbook balancing. Distribute checks and receipts to 20 separate accounts. Establish monthly, quarterly, or yearly accounting periods. 64-ACCOUNTING expands with your financial management needs.

For use with Commodore 64® and disk drive.
Copyright 1983 — Software Design, Inc.

www.commodore.ca
Commodore 64 is a registered trademark of Commodore Business Machines, Inc.
May Not Reprint Without Permission

CONVENIENCE

Organizing your tax return has never been easier. 64-ACCOUNTING offers up to 10 checking ledgers for those special home and business accounts. Teams with your printer to write checks, print statements, profit and loss and trial balance sheets. Even offers mini accounts receivable and accounts payable ledgers.

PRACTICAL BUDGETING

Control your expenses with the 64-ACCOUNTING SYSTEM'S budgeting ledgers. Monitor your past expenses against projected costs. It's so versatile you can select year-to-date totals or any span of months for comparison budgeting.

Plan your financial future around the 64-ACCOUNTING SYSTEM. There may never be a better time than now. **\$69.95.** To order call 1-800-553-0002. In Iowa call 1-800-772-5771.

Dealer and distributor inquiries welcome

**SOFTWARE
DESIGN, INC.**

P.O. Box 570, Waterloo, Iowa 50704

Circle 48 on Reader Service card.

the result what it may, however, the game is worth the candle, and we will play it to the end.

With kindest wishes for your most excellent wife, compliments to the ladies, a good word to enquiring friends, if any there be, and assurances of my highest esteem for yourself, I remain, as ever,

Your sincere friend,
Thos. Jeffn. Beale.

Ten years then passed, and Morriss had not heard from Beale. When the letter Beale had told him to expect in 1832 did not arrive, Morriss took no action, but instead held fast to the locked box and its contents. It was not until 1845 that Morriss opened the box to find three messages coded into numbers, as well as the following letters:

Lynchburg, Virginia
January 4, 1822

My dear friend Morriss:

You will, doubtless, be surprised when you discover, from a perusal of this letter, the importance of the trust confided to you, and the confidence reposed in your honor, by parties whom you have never seen and whose names you have never heard. The reasons are simple and easily told. It was imperative upon us that someone here should be selected to carry out our wishes in case of accident to ourselves, and your repu-

tation as a man of integrity, unblemished honor and business sagacity influenced us to select you in place of others better known, but, perhaps, not so reliable as yourself.

It was with this design that I first visited your house, two years since, that I might judge by personal observation if your reputation was merited. To enable me the better to do so, I remained with you more than three months, until I was fully satisfied as to your character. This visit was made at the request of my associates, and you can judge from their actions whether my report was a favorable one.

I will now give you some idea of the enterprise in which we are engaged, and the duties which will be required of you in connection therewith; first assuring you, however, that your compensation for the trouble will be ample, for you have unanimously been made one of our association, and as such are entitled to share equally with the others.

It is nearly five years since I, in connection with several friends, who, like myself, were fond of adventure, and if mixed with a little danger all the more acceptable, determined to visit the great Western plains to hunt buffalo, grizzly bears and such other game as the country would afford. This, at that time, was our sole object, and we at once proceeded to put it in execution.

On account of Indians and other

dangers incident to such an undertaking, we determined to raise a party of not less than thirty individuals, of good character and standing, who would be pleasant companions and financially able to encounter the expense. With this object in view, each one of us approached several friends and acquaintances, and in a few weeks the requisite number had signed the conditions and were admitted as members of the party. Some few refused to join us, doubtless deterred by the dangers; but such men we did not want, and were glad of their refusal.

The company being formed, we forthwith commenced our preparations, and, early in April, 1817, left old Virginia for St. Louis, Missouri, where we expected to purchase the necessary outfits, procure a guide and two or three servants, and obtain such information and advice as might be beneficial hereafter. All was done as intended, and we left St. Louis the 19th of May. We intended to be absent two years, our objective point being Santa Fe, which we intended to reach in the ensuing fall, and there establish ourselves in winter quarters.

After leaving St. Louis, we were advised by our guide to form a regular military organization, with a captain, to be selected by the members, to whom should be given sole authority to manage our affairs, and, in case of necessity, to ensure united action. This was

Lynchburg, Va,
January 4th, 1822

My dear friend Morriss:

You will doubtless, be surprised when you discover, from a perusal of this letter, the importance of the trust confided in you and the confidence reposed in your honor, by parties whom you have never seen and whose names you have never heard. The reasons are simple and easily told. It was imperative upon us that someone

agreed to, and each member of the party bound himself by a solemn obligation to obey, at all times, the orders of the captain, or, in event of refusal, to leave the company at once.

This arrangement was to remain in force for two years, or for the period of our expected absence. Tyranny, partiality, incompetence, or other improper conduct on the part of the captain was to be punished by deposing him from his office if a majority of the company desired his dismissal. All this being arranged, and a set of laws framed, by which the conduct of the members was to be regulated, the election was held, and resulted in choosing me as the leader.

It is not my purpose now to give you details of our wanderings, or of the pleasures or dangers encountered. All this I will reserve until we meet again, when it will be a pleasure to recall incidents that will always be fresh in my memory.

About the first of December we reached our destination, Santa Fe, and prepared for a long and welcome rest from the fatigues of our journey. Nothing of interest occurred during the winter, and of this little Mexican town we soon became heartily tired. We longed for the advent of weather that would enable us to resume our wanderings and our exhilarating pursuits.

Early in March, some of the party, to vary the monotony of their lives, determined upon a short excursion, for the purpose of hunting and examining the country around us. They expected to be only a few days absent, but days passed into weeks, and weeks into a month or more, before we had any tidings of the party.

We had become exceedingly uneasy and were preparing to send out scouts to trace them, if possible, when two of the party arrived and gave an explanation of their absence. It appears that when they left Santa Fe, they pursued a northerly course for some days, being successful in finding an abundance of game, which they secured, and were on the eve of returning when they discovered an immense herd of buffalo heading for a valley just perceptible in the distance. They determined to follow them and secure as many as possible. Keeping well together, they followed the trail for two weeks or more, securing many and stampeding the rest.

One day, while following the buffalo, the party encamped in a small ravine, some 250 or 300 miles to the north of Santa Fe, and, with their horses tethered, were preparing their evening meal



One of the men found something in the rocks that looked like gold.

when one of the men discovered in a cleft of the rocks something that had the appearance of gold. Upon close examination by the others, it was pronounced to be gold, and much excitement was the natural consequence. Messengers were at once dispatched to inform me of the facts and request my presence with the rest of the party and supplies for an indefinite time.

All the pleasures and temptations which had lured them to the plains were now forgotten, and visions of boundless wealth and future grandeur were the only ideas entertained.

Upon reaching the locality, I found all as it had been represented, and the excitement intense. Everyone was diligently at work with such tools and appliances as they had improvised, and quite a little pile had already accumulated. Though all were at work, there was nothing of order or method in their plans, and my first efforts were to systematize our operations.

With this object in view, an agreement was entered into to work in common, as joint partners, the accumulations of each one to be placed in a common receptacle, and each to be entitled to an equal share of the whole whenever he chose to withdraw it; the whole to remain under my charge until some other disposition of it was agreed upon.

Under this arrangement, the work progressed favorably for eighteen months or more, and a great deal of gold had ac-

cumulated in my hands, as well as silver, which we had likewise found. Everything necessary for our purposes and for the prosecution of the work had been obtained from Santa Fe, and no trouble was experienced in procuring assistance from the Indians in our labors.

Matters went on thus until the summer of 1819, when the question of transferring our wealth to some secure place was frequently discussed. It was not considered advisable to retain so large an amount in so wild a locality, where its very possession might endanger our lives; and to conceal it there would avail nothing, as we might at any time be forced to reveal its hiding place.

We were in a dilemma. Some advised one plan, some another. One recommended Santa Fe as the safest place to deposit it, while others objected and advocated its shipment at once to the States, where it was ultimately to go, and where alone it would be safe. The idea seemed to prevail, and it was doubtless correct, that when outside parties ascertained, as they would do, that we kept nothing on hand to tempt their cupidity, our lives would be more secure than at present.

It was finally decided that it would be best to send the treasure to Virginia, under my charge, and there to securely bury it in a cave near Buford's Tavern, in the county of Bedford, that all of us had visited and all considered a perfectly safe depository. This was acceptable

to all, and I at once made preparations for my departure. The whole party was to accompany me for the first five hundred miles, when all but ten would return, these latter to remain with me to the end of the journey. All was carried out as arranged, and I arrived safely with my charge.

Stopping at Buford's Tavern, where we remained for a month, under the pretense of hunting, we visited the cave but found it unfit for our purpose. It was too frequently visited by neighboring farmers, who used it as a receptacle for their sweet potatoes and other vegetables. We soon selected a better place, and to this the treasure was safely transferred.

Before my departure for the East, my associates suggested that, in case of an accident to ourselves, the treasure so concealed would be lost to our relatives without some provision against such an occurrence. I was, therefore, instructed to select some perfectly reliable person, if such an one could be found, who should be confided in to carry out our wishes in regard to our respective shares, and upon my return report whether I had found such a person. It was in accordance with these instructions that I visited you, made your acquaintance, was satisfied that you would suit us, and so reported.

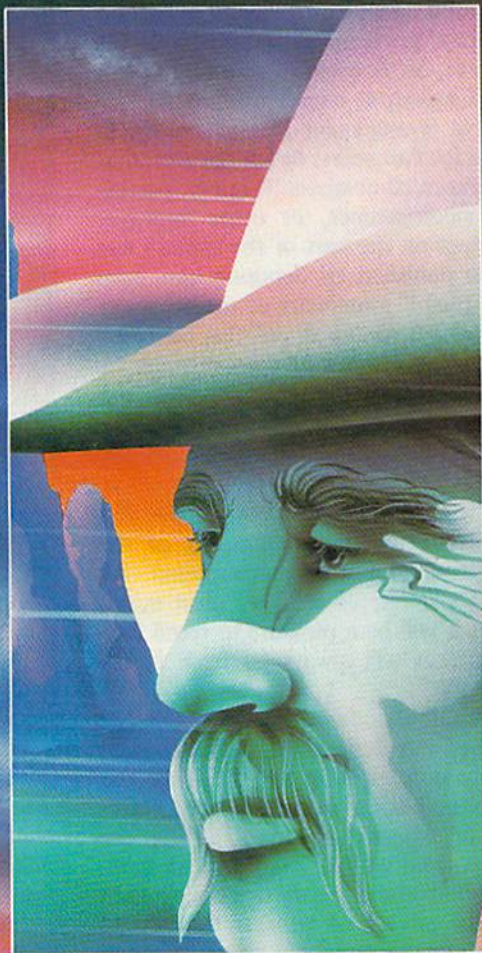
On my return I found the work still progressing favorably, and, by making large accessions to our force of laborers, I was ready to return last fall with an increased supply of metal, which came through safely and was deposited with the other. It was at this time I handed you the box, not disclosing the nature of its contents but asking you to keep it safely until called for. I intend writing you, however, from St. Louis, to impress upon you its importance still more forcibly.

The three coded papers enclosed herewith will be unintelligible without the key, which will reach you in due time. They will be found merely to state the contents of our depository, with its exact location, and a list of the names of our party, with their places of residence.

I thought, at first, to give you their names in this letter, but reflecting that someone may read the letter and thus be enabled to impose upon you by personating some member of the party, I have decided the present plan is best.

You will be aware from what I have written that we are engaged in a perilous enterprise, one which promises glorious results if successful; but dangers intervene, and of the end no one can tell. We can only hope for the best, and persevere

I will reserve the details of our wanderings until we meet again.



until our work is accomplished and the sum secured for which we are striving.

As ten years must elapse before you see this letter, you may well conclude by that time that the worst has happened, and that none of us is to be numbered with the living. In such an event you will please visit the place of deposit and secure its contents, which you will divide into thirty-one equal parts. One of these parts you are to retain as your own, freely given for your services. The other shares are to be distributed to the parties named in the accompanying paper. These legacies, so unexpectedly received, will at least serve to recall names that may still be cherished, though partially forgotten.

In conclusion, my dear friend, I beg that you will not allow any false or idle punctillio to prevent your receiving and appropriating the portion assigned to yourself. It is a gift, not from myself alone, but from each member of our party, and will not be out of proportion to the services required of you.

I trust, my dear Mr. Morriss, that we may meet many times in the future, but if the Fates forbid, with my last com-

munication I would assure you of the entire respect and confidence of

Your friend,
Thos. Jeffn. Beale

The second letter addressed to Morriss was:

Lynchburg, Virginia
January 5, 1822

Dear Mr. Morriss:

You will find, in one of the papers written in cipher, the names of all my associates, and opposite to the name of each one will be found the names and residences of relatives and others, to whom they devise their respective portions.

From this, you will be enabled to carry out the wishes of all by distributing the portion of each to the parties designated. This will not be difficult, as their residences are given, and they can easily be found.

T.J.B.

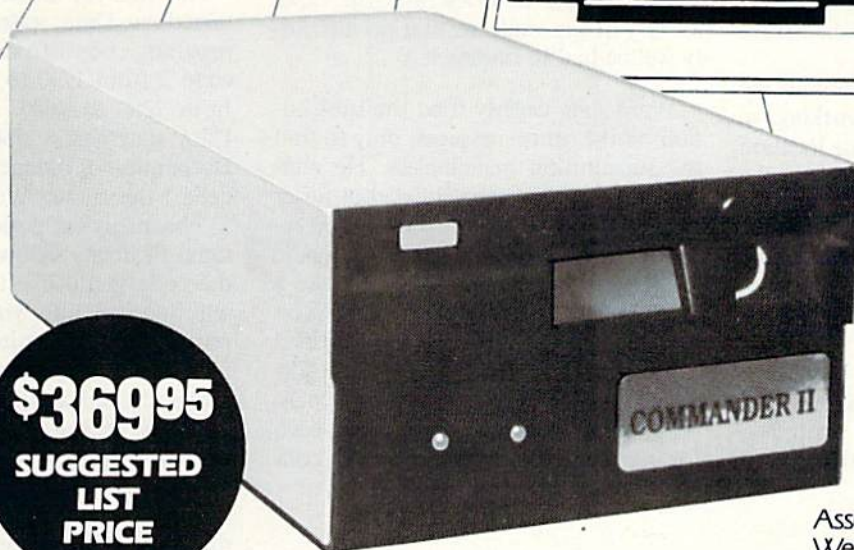
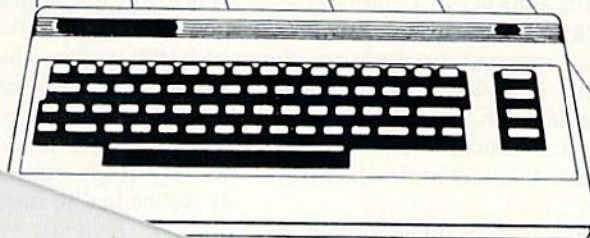
The Aftermath

After reading Beale's letters, Morriss realized that not far from him immense

NEW PRODUCT

NOW...

**We've got the Product
You've been waiting for!**



\$369⁹⁵
**SUGGESTED
LIST
PRICE**

Assembled in U.S.A.
Weight 5 lbs.

5 1/4 Floppy Disk Drive for Commodore 64 & Vic 20

- * Slim line construction (low profile) fully Commodore Compatible
- * Direct drive (DC) motor
- * Avg. MTBF rate of 8000 hours.
- * Power requirements AC 120 volts @.3 amp typical
Optional AC 220 volts @.3 amp typical
- * All metal vented case
- * Solid State power supply
- * Dual serial port (chaining option)
- * 5 1/4" Industry standard format

Distributor & Dealer Inquiries Welcome



COMMANDER ELECTRONIC SYSTEMS, INC.

**P.O. Box 15485 • Santa Ana, California 92705
(714) 953-6166 • Telex 181281 SNA**

Circle 16 on Reader Service card.

Commodore & Vic 20 are Trademarks of Commodore Business Machines, Inc.

wealth lay buried just a few feet underground. But try as he might, Morriss was unable to break Beale's code without the key in the letter that was never delivered.

A note that lends even more credibility to the entire fantastic story of the Beale Treasure is a discovery by J. Solario of the Brookings Institution. Solario discovered that the St. Louis Beacon of August 1832 printed a notice saying that the Post Office was holding a letter for Robert Morriss. Certainly this has to be more than a coincidence, considering the date the notice was published and the spelling of the name Morriss.

Morriss continued to work on the documents until 1862, when failing health caused him to turn the documents over to James Ward, a trusted and longtime friend. Morriss died three years later.

James Ward kept silent about the treasure for many years, working to solve the code and discover the location of the treasure. Finally Ward achieved a degree of success when he numbered the words of the Declaration of Independence and began substituting letters for numbers. Slowly the words contained in the second message formed:

"I have deposited in the County of Bedford, about four miles from Bedford's, in an excavation or vault six feet

below the surface of the ground, the following articles belonging jointly to the parties whose names are given in number three herewith. The first deposit consisted of ten hundred and fourteen pounds of gold and thirty-eight hundred and twelve pounds of silver, deposited Nov, eighteen-nineteen. The second deposit was made Dec, eighteen-twenty-one and consisted of nineteen hundred and seven pounds of gold and twelve hundred and eighty-eight of silver; also jewels obtained in St. Louis, in exchange to save transportation, and valued at thirteen thousand dollars. The above is securely packed in iron pots with iron covers. The vault is lined with stone, and the vessels rest on solid stone, and are covered with others. Paper number one describes the exact locality of the vault, so that no difficulty will be had in finding it."

Ward then eagerly tried the substitution on the other messages, only to find the substitution meaningless. He continued to work on the codes, but never succeeded in breaking either of the remaining two. Finally, in 1885 he made the story public, attempting to make a profit for the years he spent working on the code. Ward had a pamphlet, titled *The Beale Papers*, printed by the Virginia Job Print Company in Lynchburg, with the intention of selling each for fifty cents a copy. Bad luck con-

tinued to follow Ward, however, and he was never able to sell the pamphlets. A fire broke out in the printing company and most of them were destroyed. A few copies survived and these were given to friends.

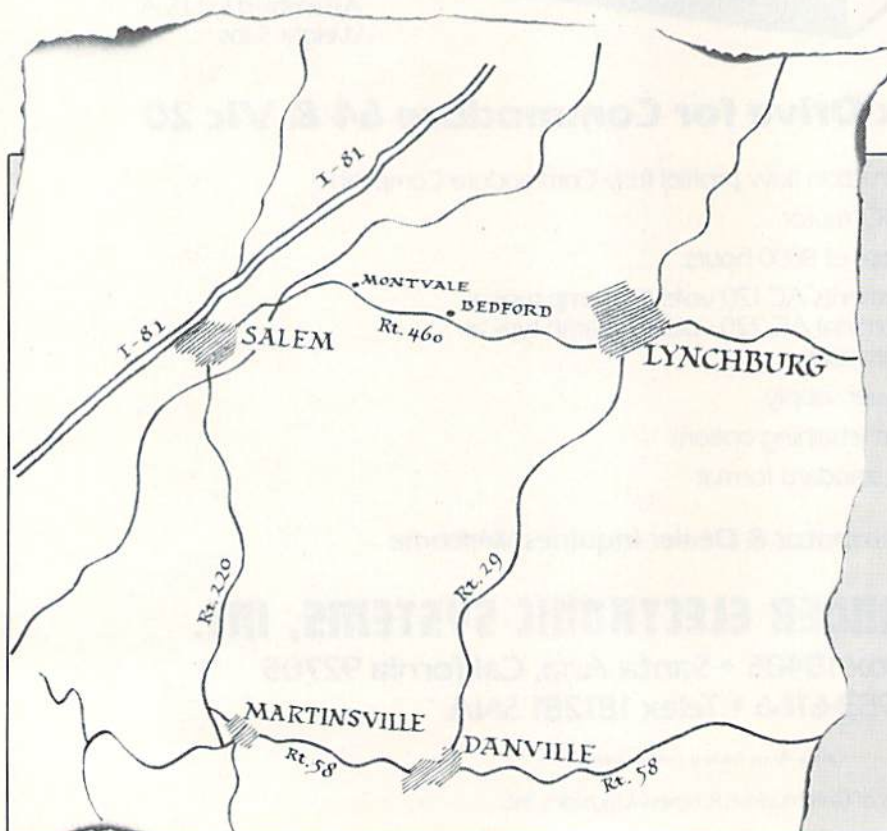
The Hunt

To date, the treasure remains safely buried where Beale and his men placed it. At least, no one has claimed to have found it.

If your interest has been piqued by the story (or should I say legend?) of the Beale Treasure, then perhaps you'd like to give the code a try. Your home computer is an excellent tool for this quest, as is the program that accompanies this article.

All three of Beale's codes are contained as Data statements within the program; code 1 from line 1200 to 1660; code 2 from 1730 to 2220; and code 3 from 2280 to 2680. Also included, in Data statements 2750 to 3930, is the Declaration of Independence, the key to code 1 that James Ward discovered.

The program is designed for maximum flexibility, allowing you to choose the code you'd like to work on. After selecting the code, you're given the opportunity to substitute the first letter of the Declaration of Independence. Fig. 1 shows the substitution for code 2, the contents of the treasure. Notice that county is misspelled, as is excavation. The reason for this is that neither Y nor X appears as the first letter of a word in the Declaration of Independence. However, the 822nd word, fundamentally,



It was finally decided to bury the treasure in a cave near Bedford's Tavern.

ends with Y and the 994th word, sexes, has an X that falls directly in the middle. Even without these clues, the values of these letters can be guessed from reading the rest of the message.

Figures 2 and 3 show the substitutions obtained for codes 1 and 3, respectively. Just as James Ward discovered, these substitutions make no sense. As a tool, though, the program allows you to make any letter substitutions you wish for code values. In this manner, you can attempt to use any document that comes to mind, or even rely to some degree on intuition.

At this point, I feel I must warn you that all types of documents have been tried, unsuccessfully, in attempts to break the code. Some treasure hunters, however, feel that only the Declaration of Independence was used in creating the codes—just in different ways for each.

If this is the case, then a home computer equipped with Basic and its string-handling abilities certainly is a useful tool. By altering the Print statement in line 560, it's possible to come up with thousands of possible combinations from the Declaration alone.

With Beale's letters to Robert Morris and the codes, you have the same information available to you that Morris and Ward had to them. Perhaps the letters themselves are the key. A straight substitution of the letters isn't. I know, for I've tried that much, myself.

One thing is certain; even if you're not successful in deciphering the code, you're sure to improve your Basic string-handling abilities in modifying the program. And if you are successful

I HAVE DEPOSITED IN THE COUNT OF BUFORD ABOUT FOUR MILES FROM BUFORD IN AN ESCAVATION OR VAULT SIX FEET BELOW THE SURFACE OF THE GROUND THE FOLLOWING ARTICLES BELONGING JOINTLY TO THE PARTIES WHOSE NAMES ARE GIVEN IN NUMBER THREE HEREWITH THE FIRST DEPOSIT CONSISTED OF TEN HUNDRED AND FORTY SEVEN POUNDS OF GOLD AND THIRTY EIGHT HUNDRED AND TWELVE POUNDS OF SILVER DEPOSITED NINE EIGHT EEN IN THE SECOND WAS MADE DECEMBER EIGHTEEN TWENTY ONE AND CONSISTED OF NINE HUNDRED AND SEVEN POUNDS OF GOLD AND TWELVE HUNDRED AND EIGHT EIGHT OF SILVER AND SEVEN SORTAINED IN ST. LOUISINE SINCE CHANGE TO SAVE TRANSPORTATION AND VALUE DA THIRTEEN THOUSAND DOLLARS THE ABOVE IS SECURELY PACKED IN IRON POTS WITH IRON COVERS THE VAULT IS ROUGHLY LINED WITH STONE AND THE VESSELS THEREIN ARE COVERED WITH OTHERS PAPER NUMBER ONE DESCRIBES THE SACTLOCALITY OF THE VAULTS THAT NO DIFFICULTY WILL BEHAD IN FINDING IT

Fig. 1. The contents of the treasure, decoded.

SCS-ETFA-GC DOTTUCWDTWTRAIWDBIIDTT-WTTARBBPLAARWCLTIFIFLKLFEARBPWCHOTAPPPMORAL
ANARABBCACDDEAOSDFANFTATPOCABCDDLBERIFEBTHIFOEHUUBTTTTIHPGARASATATOTMOPOR
AROPMJDFA--TSCBDBAACHNRRARBFDFGHIIJLMMHOPFAUTACMBSOESSORVISPFTROTBTBTHFOAO
GHNTENALCARASATPARTSLTANGFESAUWOLITAAHTTASOTTEAFRASCSTAIRFCRBTOTLAMDTHWTSTEARIE
GMBOWPTLATDCKARDBCSWTCGROCRMEWMTSFTBUTMUATTTOSSEDAETARTOSDTTDTWTITPHRLOTF
FRNTDWWSCJWBHERBGBTLGHTUETTWRALBITATWAGWMPGPTTGTITWTJFTTHCSWTLGERTSWATMOODRO
ORPTWDTBLOETRAITTPDAERARCTEITAJLSHECCTDMDTOTTTRDMDTWOOSHSTDRACRACMEOOCHWTFSLWWE
CRCMITAEITREHOSNETHRCTIIBWMPGOOONTOTALTAREOSTFATWHRJAB

Fig. 2. The first code message.


RICHREIARHTTSTIDRDLATAOCTTAWPSEEWDTTBOAFRMAHDHFOEBOTAREMPSOBTLAIATSBOEIIINRAN
ALTEEMTACOSITHEARRETHGEARBTTRACCTIDCGARATWTIDIFHREOFORASFOTDMMATNACCSITTEBAW
ATTTARAHRTTJBOLETCARSOTNODTNCETANBTIOOHEIAGISWRFAHUORWPTTHARTETISOLSWTCOHATT
EODEWAPPOLHLTRETANISBOHOCGRTEFEMFBSARRETCOCTARRENTAROTLSCOTSFOTONAEATTASNBSTUI
GMBOWPTLATDCKARDBCSWTCGROCRMEWMTSFTBUTMUATTTOSSEDAETARTOSDTTDTWTITPHRLOTF
FRNTDWWSCJWBHERBGBTLGHTUETTWRALBITATWAGWMPGPTTGTITWTJFTTHCSWTLGERTSWATMOODRO
ORPTWDTBLOETRAITTPDAERARCTEITAJLSHECCTDMDTOTTTRDMDTWOOSHSTDRACRACMEOOCHWTFSLWWE
CRCMITAEITREHOSNETHRCTIIBWMPGOOONTOTALTAREOSTFATWHRJAB

Fig. 3. The third code message.

in solving the code, the treasure at current market values would be worth in excess of 20 million dollars.

Should you happen on the key, a map of the area is provided. Buford is now known as Montvale. I strongly suggest that if you dig, you don't trespass—ask the property owner's permission.

If you'd like to pursue the computer search further, but want to take a little time, I'm willing to provide a copy of

the program, as well as Beale's letters as Data statements. Just send me \$5, a blank cassette tape or disk and a stamped, self-addressed mailer. Happy hunting! 

RUN It Right

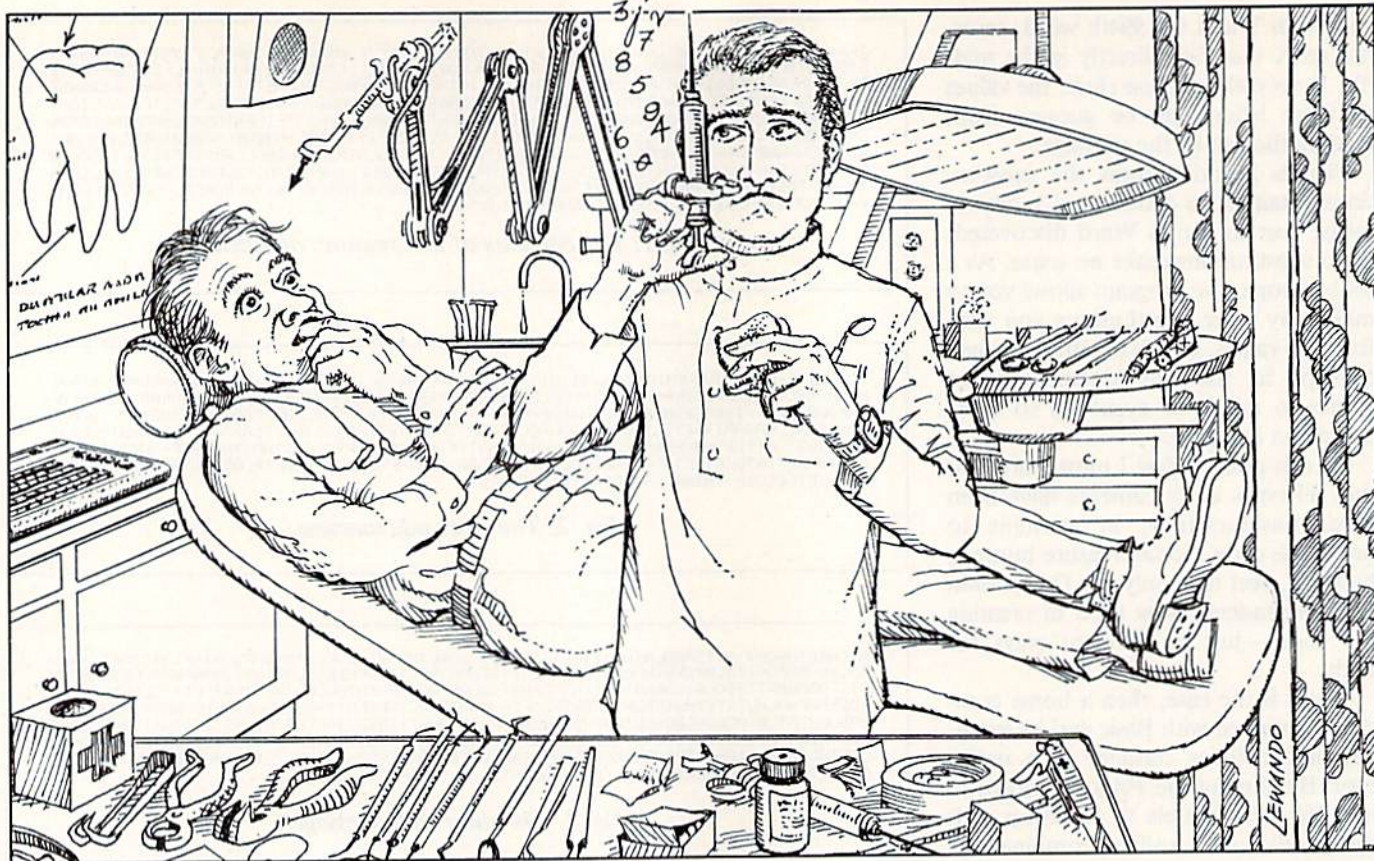
Commodore 64

Listing of Beale Treasure code.

```
100 REM(10 SPACES)BEALE CODE
110 :
120 REM(3 SPACES)TREASURE HUNTING AT HOME
130 :
140 REM(8 SPACES)BY D.A.NICKLOW
150 REM(8 SPACES)23 FEBRUARY 83
160 :
170 :
180 BS="(39 SPACES)"
190 DIM DC$(2906),C$(763),C(763)
200 PRINT CHR$(147)
210 PRINT:PRINT:PRINT "SELECT CODE TO WORK "
220 PRINT
230 PRINT "(2 SPACES)1 - TREASURE LOCATION "
240 PRINT "(2 SPACES)2 - TREASURE CONTENTS "
250 PRINT "(2 SPACES)3 - BEALE PARTY MEMBERS"
260 PRINT:PRINT
270 INPUT "(CRSR UP){2 SPACES}CHOICE ";QA
280 :
290 IF QA = 1 GOTO 340
300 IF QA = 2 GOTO 390
310 IF QA = 3 GOTO 440
320 GOTO 270
330 :
340 WL = 518
350 GOSUB 930:GOSUB 760
360 GOSUB 830:GOSUB 760
370 GOSUB 880:GOSUB 760
```

```
380 GOTO 480
390 WL = 763
400 GOSUB 780:GOSUB 760
410 GOSUB 980:GOSUB 760
420 GOSUB 880:GOSUB 760
430 GOTO 480
440 WL = 618
450 GOSUB 780:GOSUB 760
460 GOSUB 830:GOSUB 760
470 GOSUB 1030:GOSUB 760
480 GOSUB 1090
490 READ AS:IF AS<>"NNNNNNNNNN" THEN PRINT "READ ERROR "
":END
500 PRINT
510 INPUT "USE DECLARATION (Y/N) ";QA$
520 IF QA$ = "N" THEN 600
530 IF QA$ <>"Y" THEN 500
540 PRINT CHR$(147)
550 FOR X = 1 TO WL
560 :(3 SPACES)PRINT LEFT$(DC$(C(X)),1);
570 NEXT X
580 PRINT:PRINT:PRINT "PRESS ANY KEY TO EXIT"
590 GET AS:IF AS="" THEN 590:GOTO 200
600 PRINT CHR$(147)
610 PRINT "{HOME}"
620 FOR X = 1 TO WL
630 :(3 SPACES)PRINT C$(X);
640 NEXT X
650 PRINT:PRINTB$:PRINT
660 PRINT "INPUT CODE VALUE / LETTER ASSIGNMENT"
```

(continued on p. 108)



Pokes Without Pain

By Craig Howarth

Do you shudder at doing the calculations in figuring the Poke values for your custom-designed graphics characters? Well, quake no more—this program will ease and speed your work.

If you have ever designed a screen using all your Commodore keyboard graphics, you've probably spent many hours calculating the Poke values and locations of each character. The tedium involved in calculating these screen designs is only slightly relieved by the use of graph paper. There's a better way, and your computer, not you, does much of the work.

The Screen Graphics Designing Aid

RUN It Right

VIC-20 or C-64

Address author correspondence to
Craig Howarth, 1411 Aurora Hudson
Road, Aurora, OH 44202.

relieves you of calculating the value of each character on the screen, its location in screen memory, its color value and its location in color memory. This program is useful when you're going to Poke your design onto the screen in your own program.

There are two versions of the Screen Graphics Designing Aid, one for the VIC-20 (expanded or unexpanded) and one for the C-64. Since they are virtually identical, I'll be referring only to the 64, but the given information applies to the VIC-20 as well, unless otherwise noted.

After typing this program into your computer, save it before using it. The program uses many Pokes, so if you've made a mistake in typing it, you may lose the program when running it.

To use the Screen Graphics Designing Aid (SGDA) you must first load it into your 64, but *don't* immediately run it.

Once SGDA is loaded, clear the screen and begin creating your screen design. You may use any characters that are available from the keyboard (even reverse). The only limitation is that there be nothing in the first line.

When you have completed your screen design, move the cursor to the top of the screen, type RUN and press the return key. After the titles appear, you'll be prompted to make a choice between the output going to the screen or to the printer.

If you choose output to the screen, you'll need to use a joystick (in port two) to move the cursor, which should now be in the center of your screen. Five numbers will also appear at the top of your screen (four on the VIC-20). They are, in order:

- Screen location
- Offset value (not included on the VIC-20)

- Character code
- Color location
- Color code

The numbers represent the cursor's location and what was previously at that location. The screen location is the memory location where you would Poke a number to have its character representation appear on the screen at that spot.

The offset value is the number of spaces from the beginning of the screen to the current location.

The character code is the number representing the character that was previously at the cursor's location.

The color location is the memory location that holds the color value for that spot on the screen.

Finally, the color code is the color of that location before the cursor appeared.

The VIC-20 version will work with or without memory expansion and will provide the proper memory locations for both the screen location and the color location, depending on the amount of memory used.


You cause the numbers to change by moving the cursor. Also, the locations are restored to their original state when the cursor leaves a spot.

If you own a 1515, a 1525 or some other printer with a suitable interface (I use a Gemini 10X with a Cardco Card? +G interface), you may get a hardcopy printout of the information on the screen.

When you're asked by SGDA to choose the mode of output, type P, sit back and relax. The computer will supply information on each location, provided it does not contain a space. The printout will contain all the information given on the screen display, as well as the color value of the screen background and border.

If you do not own a printer, there's no need for you to type in the section of code devoted to the printer. So, eliminate lines 1000 and on, as well as lines 220-250.

I find that by using the Screen Graphics Designing Aid, I am able to do in half an hour what previously took me one or two hours. This program allows me to create my design directly on the screen, so I may visualize my ideas better than if they were on graph paper.

Also, SGDA eliminates having to look through books at all the charts required to do the same work. When the design is complete, the numbers required to reproduce the design are provided instantly. Let the computer do the dull work, while you do the creating. 

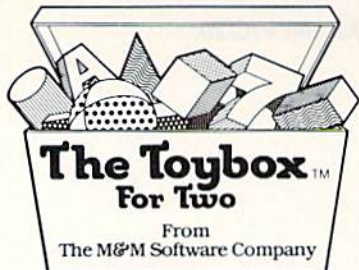
Listing 1. SGDA program for the VIC-20.

```

10 REM *****
15 REM
20 REM SCREEN GRAPHIC
30 REM DESIGNING AID
40 REM
45 REM VIC-20 VERSION
50 REM
55 REM BY
60 REM CRAIG HOWARTH
90 REM
95 REM *****
96 REM INITIALIZE
97 REM VARIABLES
98 REM *****
99 REM
100 IF PEEK(44)=18 THEN 105
103 SS=7680:CS=38400:GOTO 107
105 SS=4096:CS=37888
107 CD=CS-SS
110 SC=36879:JY=37137:JK=37154
120 TL=SS+22:BL=SS+505:PO=SS+252:PC=PO+CD
130 DIM JO(13)
140 FOR I=1TO13:READ JO(I):NEXT
150 DATA 21,-23,-1,,22,-22,,,,,1,-21,23
155 SP$=CHR$(19):FOR I=1TO22:SP$=SP$+CHR$(32):NEXT:SP$=
    SP$+CHR$(19)
200 REM
201 REM ****
202 REM TITLES
203 REM ****
204 REM
205 PRINT SP$
210 PRINT"{HOME}{3 SPACES}SCREEN GRAPHICS{3 SPACES}{HOME
    E}":FORT=1TO1000:NEXT
212 PRINT"{HOME}{4 SPACES}DESIGNING AID{4 SPACES}{HOME}
    ":FORT=1TO1000:NEXT
215 PRINT"{HOME}{2 SPACES}BY CRAIG HOWARTH{3 SPACES}{HO
    ME}":FORT=1TO1000:NEXT
220 PRINT"{HOME}OUTPUT: {CTRL 9}S{CTRL 0}CREEN {CTRL 9}
    P{CTRL 0}RINTER{HOME}"
230 A$="":GETA$:IFA$=""THEN230
240 IF A$="P" THEN 1000
245 IF A$="S" THEN 300
250 GOTO 230
300 REM
301 REM *****
302 REM OUTPUT TO
303 REM SCREEN
304 REM *****
305 REM
310 CN=PEEK(PO):CO=PEEK(PC)AND15
320 POKE PC,2:POKE PO,42
325 PRINT SP$
330 PRINT CHR$(19);PO;CN;PC;CO;CHR$(19)
340 POKE JK,127:JS=(PEEK(JY)AND28) OR (PEEK(JY+15)AND12
    8):POKE JK,255
342 JS=ABS(JS-100)/4-7
345 TP=PO+JO(JS)
350 IF TP<TL OR TP>BL OR JS=7 THEN 340
360 POKE PC,CO:POKE PO,CN
370 PO=TP:PC=PC+JO(JS)
380 GOTO 310
1000 REM
1001 REM *****
1002 REM OUTPUT TO
1003 REM PRINTER
1004 REM *****
1005 REM
1010 PRINTSP$
1020 OPEN4,4:CMD4

```

More →



The Toybox™ For Two

From
The M&M Software Company

TOYBOX is a versatile combination of easy to use toys and games for one or two players specially designed for young Commodore 64 users. Emphasizes cooperative play.

The Drawing Toy

Joystick or trackball draws color pictures. Fill in, erase, and save too. Pictures can be printed on Commodore 1525 (or compatible) Graphics Printer.

The Plotting Toy

Shoots straight lines between the two cursors. Cooperate to create designs...interchange with The Drawing Toy.

The Games

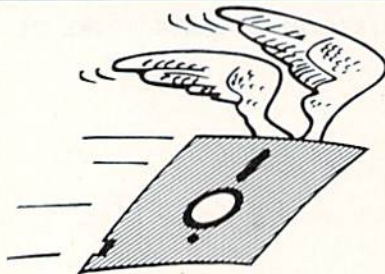
Match numbers, letters, and shapes to beat the clock. Match words to beat the clock. Two separate games.

Toybox Tag

Tag with the two cursors — simple, silly and fun.

\$34.95 including shipping and handling

Toybox with **Wico Track Ball** \$70.95



F A S T E S T Disk Copy Program Available for C64 Single Drive Systems.

Compact machine language program backs up complete disk*, sector for sector, with only **three disk swaps**. Audible signal alerts operator to switch disks.

*will not handle some copy protection schemes.

\$19.95 including shipping and handling

**The M&M
Software Company**
PALO ALTO, CALIFORNIA

Phone Orders (MC/VISA):

800-227-2400 Ext. 950
800-772-2666 Ext. 950

(within California)

Orders and information write to:
3790 El Camino Real, Suite 2003,
Palo Alto, CA 94306

Listing continued.

```

1030 PRINT CHR$(16)"25SCREEN GRAPHICS DESIGNING AID"
1040 PRINT CHR$(16)"32BY CRAIG HOWARTH"
1050 PRINT:PRINT
1060 PRINT "SCREEN & BORDER COLOR:";PEEK(SC)
1080 PRINT
1090 PRINT "SCREEN LOCATION";
1100 PRINT CHR$(16)"18OFFSET VALUE";
1110 PRINT CHR$(16)"33CHARACTER CODE";
1120 PRINT CHR$(16)"50COLOR LOCATION";
1130 PRINT CHR$(16)"67COLOR CODE"
1140 PR=TL
1150 CN=PEEK(PR):CO=PEEK(PR+CD)AND15
1153 POKE PR+CD,0:POKE PR,42
1155 IF CN=32 OR CN=96 THEN 1205
1160 PRINT CHR$(16)"05";PR;
1170 PRINT CHR$(16)"21";PR-SS;
1180 PRINT CHR$(16)"37";CN;
1190 PRINT CHR$(16)"53";PR+CD;
1200 PRINT CHR$(16)"70";CO
1205 POKE PR+CD,CO:POKE PR,CN
1210 PR=PR+1
1220 IF PR>BL THEN 1999
1230 GOTO 1150
1999 PRINT#4:CLOSE4
    
```

Listing 2. SGDA program for the C-64.

```

10 REM *****
20 REM *{28 SPACES}*
30 REM * SCREEN GRAPHICS DESIGNING{2 SPACES}*
40 REM *{12 SPACES}AID{13 SPACES}*
50 REM *{28 SPACES}*
60 REM *{8 SPACES}64 VERSION{10 SPACES}*
70 REM *{28 SPACES}*
75 REM *{5 SPACES}BY CRAIG HOWARTH{7 SPACES}*
78 REM *{28 SPACES}*
80 REM *****
90 REM *****
95 REM *****
96 REM INITIALIZE VARIABLES
97 REM *****
98 REM
100 SS=1024:CS=55296:CD=CS-SS
110 BC=53280:SC=53281:JY=56320
120 TL=1064:BL=2023:PO=SS+500:PC=PO+CD
130 DIM JO(10)
140 FOR I=1TO10:READ JO(I):NEXT
150 DATA -40,40,-1,-1,-41,39,1,-39,41
155 SP$=CHR$(19):FOR I=1TO40:SP$=SP$+CHR$(32):NEXT:SP$=
    SP$+CHR$(19)
200 REM
201 REM *****
202 REM TITLES
203 REM *****
204 REM
205 PRINT SP$
210 PRINT"HOME}{4 SPACES}SCREEN GRAPHICS DESIGNING AID
    {6 SPACES}{HOME}":FORT=1TO1000:NEXT
215 PRINT"HOME}{11 SPACES}BY CRAIG HOWARTH{11 SPACES}{
    HOME}":FORT=1TO1000:NEXT
220 PRINT"HOME}CHOOSE OUTPUT: {CTRL 9}S{CTRL 0} - SCRE
    EN{2 SPACES}{CTRL 9}P{CTRL 0} - PRINTER{HOME}"
230 AS$="":GETAS:IFAS$=""THEN230
    
```

More

WHEN THE GAME IS MONEY, GET THE RIGHT EQUIPMENT



Whether you're playing the stock market or the options game, the better equipped you are going in, the better off you'll be coming out.

That's why Basic Byte offers PORTFOLIO MANAGER, a series of two high-quality, low-priced software programs to help manage your finances. Both eliminate hours of paperwork, making it simple for you to handle your investments using your personal computer. All you do is follow the easy, step-by-step instructions.

STOCK MANAGEMENT VOL. I is for your personal stock portfolio. It lets you instantly update the current value of up to 70 individual stocks. Calculate long and short term capital gains and losses. Record dividends. Even determine the price per share after your broker's commission. It's available on tape or disk for Commodore 64, VIC 20 (16K RAM)



and Atari (disk only) for \$39.95, or for IBM PC for \$59.95.

OPTIONS MANAGEMENT VOL. II is for the speculative options trader. It incorporates the record-keeping features of Stock Management Vol. I for use with an options portfolio. And it also determines the fair market values of any stock option using the "Black-Scholes" model.

Tells you if a put or call is under- or over-priced. It even analyzes multiple stock or strike prices and ranks them by best value. It's available on tape or disk for Commodore 64 for \$39.95. Atari, IBM PC and Apple versions will be available soon.

Ask for PORTFOLIO MANAGER at your nearest dealer. Or call direct (313) 540-0655 or write P.O. Box 924, Southfield, MI 48037 and order yours today.

Commodore 64, VIC 20, Atari, IBM PC and Apple are registered trademarks of Commodore Business Machines, Inc., Atari, Inc., International Business Machines, Inc., and Apple Computer, Inc. respectively.

SOFTWARE MADE SIMPLE

Circle 103 on Reader Service card.

Listing continued.

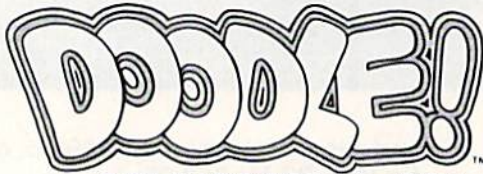
```

240 IF A$="P" THEN 1000
245 IF A$="S" THEN 300
250 GOTO 230
300 REM *****
301 REM *****
302 REM OUTPUT TO SCREEN
303 REM *****
304 REM *****
310 CN=PEEK(PO):CO=PEEK(PC)AND15
320 POKE PC,1:POKE PO,42
325 PRINT SP$
330 PRINT CHR$(19);PO;PO-SS;CN;PC;CO;CHR$(19)
340 JS=15-(PEEK(JY)AND15)
345 TP=PO+JO(JS)
350 IF TP<TL OR TP>BL OR JS=0 THEN 340
360 POKE PC,CO:POKE PO,CN
370 PO=TP:PC=PC+JO(JS)
380 GOTO 310
1000 REM *****
1001 REM *****
1002 REM OUTPUT TO PRINTER
1003 REM *****
1004 REM *****
1010 PRINTSP$
1020 OPEN 4,4:CMD4
1030 PRINT CHR$(16)"25SCREEN GRAPHICS DESIGNING AID"
1040 PRINT CHR$(16)"32BY CRAIG HOWARTH"
1050 PRINT:PRINT
1060 PRINT "BORDER COLOR:";PEEK(BC)AND15
1070 PRINT "SCREEN COLOR:";PEEK(SC)AND15
1080 PRINT "SCREEN LOCATION";
1090 PRINT CHR$(16)"18OFFSET VALUE";
1100 PRINT CHR$(16)"33CHARACTER CODE";
1110 PRINT CHR$(16)"50COLOR LOCATION";
1120 PRINT CHR$(16)"67COLOR CODE"
1130 PRINT PR=TL
1140 CN=PEEK(PR):CO=PEEK(PR+CD)AND15
1153 POKE PR,42
1155 IF CN=32 OR CN=96 THEN 1205
1160 PRINT CHR$(16)"05";PR;
1170 PRINT CHR$(16)"21";PR-SS;
1180 PRINT CHR$(16)"37";CN;
1190 PRINT CHR$(16)"53";PR+CD;
1200 PRINT CHR$(16)"70";CO
1205 POKE PR+CD,CO:POKE PR,CN
1210 PR=PR+1
1220 IF PR>BL THEN 1999
1230 GOTO 1150
1999 PRINT#4:CLOSE4

```

Circle 109 on Reader Service card.

Unlock your creativity with the most powerful, versatile graphics program ever created for a popular computer.



COMMODORE 64
COLOR SKETCH PAD

By Mark
R. Rubin

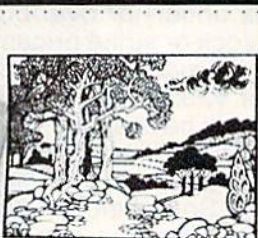
DOODLE is an exciting graphic program acclaimed by thousands of Commodore 64 users!

Regardless of your age or artistic skill, DOODLE turns your computer into a tool for unlimited design and artistic creativity! Create anything you can imagine... from sketches to houseplans, to fine art, to business forms or letterheads that you can run off on your printer! Precise trackball or joystick operation, high-resolution graphics, program flexibility, and super ease of use add up to the friendliest, most versatile graphics program ever created for the Commodore 64.

DOODLE will sketch, color, fill, zoom, line, box, circle, and more. Plus things no other software will do.

PRINT.

DOODLE makes printer copies at the touch of a key! Print designs, charts, forms, text, anything! Works with most popular printers.



STAMP.



Create up to 9 of your own repeatable graphics at one time — great for plan drawing or graphic design!

DOODLE! works great with Okidata's new Okimate 10^M color printer.

LETTER.



DOODLE lets you type in keyboard graphics, letters, and numbers in any size and any direction!

COPY.



Duplicate, squeeze, reduce, enlarge, stretch, rotate, or reposition your DOODLE (or any part of it) onscreen.

SAVE. Store your DOODLE on disk for later recall or revisions!



For information, or the name of your nearest dealer, call 1-800-558-1008. In Wisconsin, call collect 414-291-5125. Dealer and Distributor inquiries invited.

©1984 City Software Software ©1984 Mark R. Rubin & OMNI Unlimited

City Software

735 W. Wisconsin Ave., Milwaukee, WI 53233

Commodore 64 is a registered trademark of Commodore Electronics, Ltd.

Look at these Features

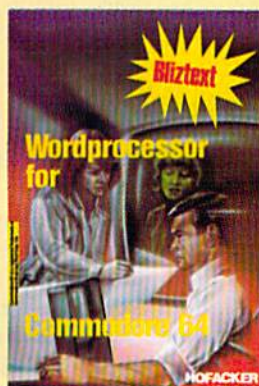
- Fully screen-oriented
- Horizontal and vertical scrolling
- Terminal mode – never seen before on a wordprocessor
- Supports Commodore disk and cassette handling
- Imbedded commands



BLIZTEXT is a trademark of ELCOMP PUBLISHING, INC.

BLIZTEXT WORDPROCESSOR FOR THE COMMODORE 64

Commodore-64 and VIC-20 are trademarks of Commodore Business Machines.



NEW
NEW
NEW
NEW
NEW
NEW
NEW
NEW
NEW
NEW



BLIZTEXT – SUPER WORDPROCESSOR for the Commodore-64

– ON SALE NOW! –

- Fully screen-oriented, up/down, left and right scrolling – Upper and lower case
- More than 70 commands
- Full I/O compatibility with Commodore peripherals Upper and lower case
- Works with practically every printer on the market, user definable printer control commands
- INCLUDE command allows handling large files on up to 4 diskettes or on cassette.
- Build in terminal software for electronic mail and networking. Telecommunications mode, upload and download, save on disk or cassette.
- Dynamic formatting, Imbedded commands
- Single keystroke for disk directory and error channel
- Program comes on disk or cassette
- Double line spacing, left and right margin justification, centering, page numbering, and practically everything one expects from a good wordprocessor.

AVAILABLE NOW!

Order # 4965 \$89.00
Manual only (62 pages) \$29.95

MACROFIRE Editor/Assembler for the Commodore-64 ON SALE NOW AVAILABLE IMMEDIATELY

One outstanding tool, consisting of 3 powerful elements combined into one efficient program!

- 1.) Fully screen-oriented Editor (more than 70 commands)
- 2.) Very fast assembler with macro capability
- 3.) Machine Language Monitor

Assembly can be started from the editor. Translates in 3 passes. More than 1,000 labels, screen oriented/no line numbers, scrolling, includes disk files. Practically everything the serious machine language programmer needs everyday!

Manual only \$19.95
Order # 4963 \$89.00

THE GREAT BOOK OF GAMES, VOL. I,

by Franz Ende

46 programs for the Commodore 64
Introduction to graphics and sound. How to program your own games. Walking pictures, animation, high resolution graphics, programming tips and tricks, hints and useful subroutines for the beginner and advanced programmer. This book is a MUST for every C-64 owner. Come and get it – It's yours for only \$9.95
Order # 182 128 pages \$9.95
Programs from the book on disk. \$19.95
Order # 4988

MORE ON THE SIXTYFOUR, by H.-C. Wagner

How to get the most out of your powerful Commodore 64. Very important subroutines, tricks and hints in machine language for your C-64. How to modify DOS. How to connect a parallel and serial printer. How to design your own terminal program for communication and networking. Dig into I/O for cassette and disk.
Order # 183 \$9.95

Programs from the book on disk \$19.95
Order # 4989

NEW PRODUCTS

Watch out for our new books, software and add-ons to come soon. ON SALE NOW! -- ORDER TODAY!

How to program in 6502 Machine Language on your C-64, by S. Roberts (Introduction)
Order # 184 \$12.95

Commodore-64 Tune-up, Vol. 1, by S. Roberts
How to expand and customize your C-64.
Order # 185 \$12.95

Small Business Programs for the Commodore-64 by S. Roberts

How to make money using your C-64. Mailing list, invoice writing, inventory, simple wordprocessing and much more.
Order # 186 \$12.95

Dealer and Distributor inquiries are invited.

Hardware Add-Ons:

Parallel printer interface KIT Order # 4990 \$ 19.95
Universal Experimenter Board Order # 4970 \$ 9.95
Expansion Board, space for four experimenter boards (board only) Order # 4992 \$ 29.95
Tricks for VICs, No. 176 \$9.95
Universal Experimenter board for VIC \$9.95



Book No. 184 \$12.95



Book No. 182 \$9.95



Book No. 183 \$9.95

NEW Products for the C-64

SUPERMAILING (D) Order No. 4962 \$49.
Superinventory (D) Order-No. 4961 \$ 49.-
BUSIPACK 1 (D) Order-No. 4963 \$99.-
SixtyFORTH (D) FigFORTH for C-64 Order-No. 4960 \$39.-

For your VIC-20
Tricks for VICs Order-No. 176 \$9.95
Universal Experimenter board Order-No. 4844 \$9.95

PAYMENT: check, money order, VISA, MASTER CARD, Eurocheck, ACCESS, Interbank
Prepaid orders add \$3.50 for shipping (USA)
\$5.00 handling for C.O.D.
All orders outside USA: add 15 % shipping, California residents add 6.5 % sales tax.

ELCOMP PUBLISHING, INC.
2174 W. Foothill Blvd., Unit #E
Upland, CA 91786
Phone: (714) 623-8314
Telex: 29 81 91



www.Commodore.ca
May Not Reprint Without Permission

Sprite Control

Get a firm grip on your sprites with this program that lets you manipulate them quickly and easily.

By M.J. Clifford

RUN It Right
Commodore 64

Address all author correspondence to M.J. Clifford, 2323 W. Bancroft St., Toledo, OH 43607.

There are many articles and programs for the Commodore 64 that deal with sprites. The purpose of most of these is to make it easy for you to design them. However, once you've designed the sprites, they still can be difficult to handle in Basic.

You must keep track of eight different pointer locations, eight y-coordinate registers and nine x-coordinate registers, as well as the various color and priority registers. The ninth x-coordinate register and the register that turns the sprites on and off require you to handle a single bit at a time. Bit manipulation requires that you know a little about binary numbering and the logical AND and OR operations. This can be a lot to handle even for the expert, never mind the novice.

Command Your Program

The program in Listing 1 adds to Basic four commands that take care of all these details. The commands turn sprites on or off, move them, automatically handle the problem of x being greater than 255 and put the pointers, colors, expansion and priority information into the proper registers.

The new commands are added to

Basic by means of the SYS command, which transfers control to a machine language routine. The ML routine then reads the required values from the Basic program. Once the variable SP is set equal to 40080, the following commands are available:

Define a sprite: SYSSP,D,n,l,m,(c1,c2),c3,xe,ye,p

Show a sprite: SYSSP,S,n

Hide a sprite: SYSSP,H,n

Move a sprite: SYSSP,M,n,x,y

Basic never sees the D, S, H and M subcommands, so you may use these letters elsewhere in the program. Of course, SP must not be changed from its value of 40080.

The lowercase letters, which may be constants, variables or expressions, represent the following.

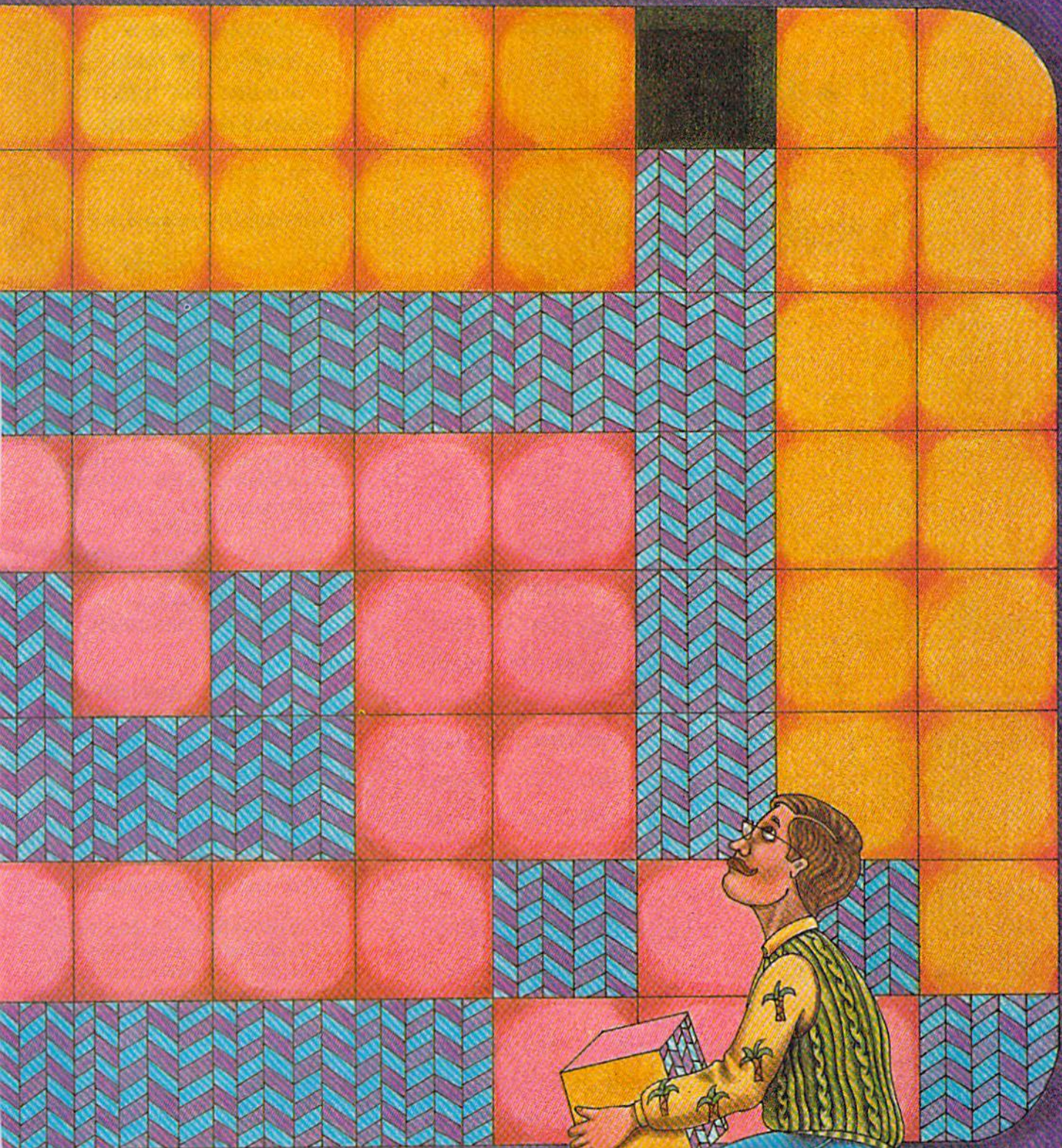
n—sprite number 0-7

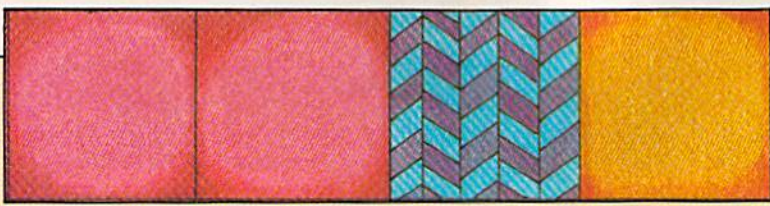
l—sprite data location 0-255 (13-15 are in the cassette buffer and 11 is unused memory below the screen). The actual memory address is 1*64

m—0=monochrome, 1=multicolor

c1,c2—the 01 and 11 colors shared by multicolor sprites (omit if m=0)

c3—sprite color (10 colors for multicolor)





```

5 REM SPRITE AID LOADER
6 REM M J CLIFFORD
7 REM 2323 W BANCROFT
8 REM TOLEDO OH 43607
10 POKE52,156:POKE56,156:CLR
20 PRINT"{SHFT CLR}{5 CRSR DNS}{11 CRSR RTs}{CTRL 9} ON
  E MOMENT PLEASE "
30 AD=40080
35 FORL=1TO19
40 FORX=0TO15:READB:C=C+B:POKEAD+X,B:NEXT
50 READK:IFC<>KTHENPRINT"ERROR IN DATA IN LINE";1000+L:
  END
60 C=0:AD=AD+16:NEXTL
100 PRINT"SPRITE AID PACKAGE IS LOADED"
110 PRINT"SAVING M.L. PROGRAM{CRSR DN}"
200 F$="SPRITECD"
210 POKE187,PEEK(71):POKE188,PEEK(72)
220 FA=PEEK(187)+256*PEEK(188)
230 POKE183,PEEK(FA)
240 POKE187,PEEK(FA+1):POKE188,PEEK(FA+2)
250 POKE251,144:POKE252,156
260 POKE186,8:POKE185,1
270 POKE780,251:POKE781,191:POKE782,157
280 SYS65496
300 PRINT"SPRITE AID PACKAGE IS SAVED AS "F$
310 PRINT"{CRSR DN}NEXT TIME JUST ENTER:"
320 PRINT"LOAD"CHR$(34)F$CHR$(34)",8,1{2 CRSR DNS}"
1000 REM *** SPRITE AID DATA ***
1001 DATA 32,115,0,201,77,240,30,201,83,240,82,201,72,2
  40,98,201,2113
1002 DATA 68,208,3,76,23,157,108,0,3,32,115,0,32,180,15
  7,152,1314
1003 DATA 41,7,133,253,96,32,169,156,32,180,157,132,251
  ,133,252,32,2056
1004 DATA 180,157,165,253,10,170,152,157,1,208,165,251,
  157,0,208,166,2400
1005 DATA 253,232,169,0,56,42,202,208,252,164,252,208,9
  ,73,255,45,2420
1006 DATA 16,208,141,16,208,96,13,16,208,141,16,208,96,
  32,169,156,1740
1007 DATA 166,253,169,0,232,56,42,202,208,252,13,21,208
  ,141,21,208,2192
1008 DATA 96,32,169,156,166,253,169,0,232,56,42,202,208
  ,252,73,255,2361
1009 DATA 45,21,208,141,21,208,96,32,169,156,32,180,157
  ,152,166,253,2037
1010 DATA 157,248,7,32,180,157,166,253,232,56,169,0,42,
  202,208,252,2361
1011 DATA 72,192;0,208,11,73,255,45,28,208,141,28,208,7
  6,88,157,1790
1012 DATA 13,28,208,141,28,208,32,180,157,152,41,15,141
  ,37,208,32,1621
1013 DATA 180,157,152,41,15,141,38,208,32,180,157,152,4
  1,15,166,253,1928
1014 DATA 157,39,208,104,133,253,32,180,157,152,240,10,
  165,253,13,29,2125
1015 DATA 208,141,29,208,208,10,165,253,73,255,45,29,20
  8,141,29,208,2210
1016 DATA 32,180,157,152,240,10,165,253,13,23,208,141,2
  3,208,208,10,2023
1017 DATA 165,253,73,255,45,23,208,141,23,208,32,180,15
  7,152,240,9,2164
1018 DATA 165,253,13,27,208,141,27,208,96,165,253,73,25
  5,45,27,208,2164
1019 DATA 141,27,208,96,32,253,174,32,158,173,76,170,17
  7,0,0,0,1717

```

Listing 1. Sprite Aid loader program.

Menu selection is done by means of a mouse that is much cuter than the one that rolls around on the table.

xe,ye—0=normal, 1=expand in x or y direction

p—priority 0=sprite over text; 1=text over sprite

x—x-coordinate 0-511 (24-343 are visible, others are all or partly off screen)

y—y-coordinate 0-255 (50-250 are visible).

The program in Listing 1 Pokes the machine language into memory and then saves it in a program file on disk.

Whenever you wish to use this program, you should load it by entering:

```
LOAD"SPRITECD",8,1(,1,1 for tape)
POKE 52,156:POKE 56,156:NEW
```

Any program using these commands should begin with the following lines.

```
10 POKE 52,156:POKE 56,156:CLR
20 IF PEEK(40080) < 32 THEN LOAD
  "SPRITE CD",8,1
30 SP = 40080
```

Listing 2 is a short demonstration of how you may use these commands. It also includes a method for menu selection by means of a mouse that is much cuter than the one that rolls around on the tabletop.

Description of Loader

10-30—Protect the machine language from Basic and set the beginning address.

35-60—Read the data from lines 1001-1019. The last number on each data line is a checksum. If you make a mistake in typing the data, the program will halt and report the line number of the data on which the error occurred.

100-110—report the successful loading of the package.

200-320—use the Kernal Save command to save the machine language in a program file that can be loaded directly with LOAD"SPRITECD",8,1(,1,1 for cassette—also change the 8 in line 260 to a 1).

Description of Demonstration

5-20—Protect ML from Basic, load the ML if necessary, and set SP=40080.

25—Puts data for a striped-box sprite in location 13.

RUN ANNOUNCES



ReRUN

—programs on cassette or disks that give you more time to enjoy your computer

ReRUN, Volume 1 is a collection of the best programs from the first six issues of RUN magazine. It's available on cassette or disk. You'll enjoy all the programs you've wanted to try... in just seconds... and without tedious typing.

Half the programs are for the Commodore 64. Half are for the VIC-20. These are the same programs you've read about in RUN magazine. You've seen the articles. You know what they'll do. Now you can get them up and running in less time than it takes to read this ad. You'll get:

- **exciting games** like Canyons of Zelaz and Baja 1000
- **helpful utilities** like Database Deluxe and Function Keys
- **educational programs** like Mad Bomber and Funky Monkey

Over a dozen-and-a-half programs. All ready to run, all are hits and all guaranteed.

How much is your free time worth?

Start enjoying your computer more. With ReRUN, you'll save yourself days of typing, and build yourself a valuable reference library to boot. ReRUN, Volume 1 is ready now. Order today while quantities last!

www.commodore.ca
In New Hampshire call 1-924-9471.

May Not Reprint Without Permission

Or, send in the coupon below. In either case, you can charge it to your Visa, Mastercard or AMEX.

We'll rush your copy of ReRUN as soon as we receive your order.

YES! I WANT TO BUILD A VALUABLE LIBRARY OF PROGRAMS.

Send me _____ copies of ReRUN on disk at \$21.47

Send me _____ copies of ReRUN on cassette at \$11.47

Price includes postage and handling.

Foreign air mail, please add \$.45. US funds on US banks only.

Please allow three to four weeks for delivery.

CHECK/MO

MC

AE

VISA

card # _____ exp. date _____

signature _____

name _____

address _____

city _____ state _____ zip _____

ReRUN • 80 Pine Street • Peterborough, NH 03458 8-84

Listing 2. Sprite Aid demonstration program.

```

1 REM SPRITE AID DEMO
2 REM M J CLIFFORD
3 REM 2323 W BANCROFT
4 REM TOLEDO OH 43607
5 POKE52,156:POKE56,156:CLR
6 PRINT"{SHFT CLR}{5 CRSR DNs}{CTRL 9}LOADING M L PROGR
AM {CTRL 0}"
10 IFPEEK(40080)<>32THENLOAD"SPRITECD",8,1
15 PRINT"{SHFT CLR}{5 CRSR DNs}{13 CRSR RTs}{CTRL 9} SP
RITE{2 SPACES}DEMO "
20 SP=40080
25 FORQ=0TO62:POKE13*64+Q,228:NEXT
27 FORQ=0TO62:READB:POKE14*64+Q,B:NEXT
30 PRINT"{SHFT CLR}{CMD 8}":POKE53281,11:POKE53280,12
32 REM ** MOVE MULTIPLE SPRITES
35 X=170:Y=140
40 FORZ=0TO7
50 SYSSP,D,Z,13,1,1,7,Z,0,0,0
55 SYSSP,M,Z,X,Y:SYSSP,S,Z
60 NEXT
70 FORZ=0TO140
80 SYSSP,M,0,X+Z,Y:SYSSP,M,1,X+Z,Y-Z
90 SYSSP,M,2,X,Y-Z:SYSSP,M,3,X-Z,Y-Z
100 SYSSP,M,4,X-Z,Y:SYSSP,M,5,X-Z,Y+Z
110 SYSSP,M,6,X,Y+Z:SYSSP,M,7,X+Z,Y+Z
120 NEXT
130 FORZ=0TO7:SYSSP,H,Z:NEXT
140 SYSSP,M,2,0,0:SYSSP,S,2
150 FOR Z=1TO200:SYSSP,M,2,Z,Z:NEXT
160 SYSSP,H,2
169 REM ** EXPANSION AND COLOR CHANGE

```

More →

27—Reads data from lines 1010-1025 for the mouse sprite and Pokes it to location 14.

30-120—Move 8 sprites at once.

40-60—Use a loop to define 8 sprites.

50—Defines sprite Z in location 13, multicolor, colors 1, 7 and Z, not expanded in either X or Y and having priority over text.

55—Moves sprite Z to position X,Y (170, 140) and shows sprite Z; only sprite 0 will be seen at first, since the other seven sprites are behind it.

70-120—Move all eight sprites away from the center, each in a different direction:

0 moves right as the X coordinate is increased by Z

1 moves right and up as X increases and Y decreases

2 moves up as Y decreases

3 moves left and up as both X and Y decrease

4 moves left as X decreases

5 moves left and down as X decreases and Y increases

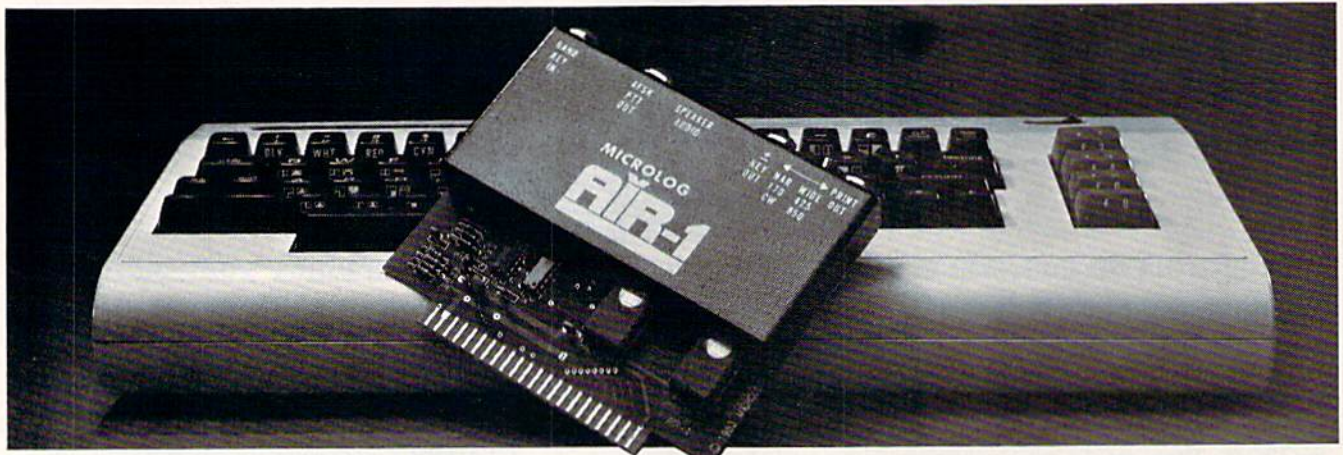
6 moves down as Y increases

7 moves right and down as both X and Y increase

130—Hides all 8 sprites.

Circle 91 on Reader Service card.

Make Your Commodore Radio Active



The MICROLOG AIR-1 cartridge will turn your VIC-20 or C-64 into a complete Radio Teletype and Morse code terminal. Connect a shortwave radio and you'll be watching text readout from weather stations, news services, ships and HAM radio operators all over the world. A whole new use for your home computer. The AIR-1 contains both program in ROM and radio interface circuit to copy Morse code and all speeds and shifts of radio teletype. Plus the on screen tuning indicators mean you never have to take your eyes off the video for perfect tuning.

For Ham radio use, the Air-1 will also send and receive RTTY/CW with AFSK/PTT & ± CW keying outputs.

The AIR-1 will even tell you what Morse speed you're copying and provide built-in send/receive code practice!

With keyword or manual printer control for permanent paper copy, you won't miss a single bit of the action.

If you've been looking for something to spice-up your computing, try the ultimate "peripheral" and connect your computer to the AIR-1.

The complete AIR-1 for the VIC-20 or "64" is \$199. (With 4 mode AMTOR, \$279.) See it at your local dealer or call Microlog Corporation, 18713 Mooney Drive, Gaithersburg, Maryland 20879.

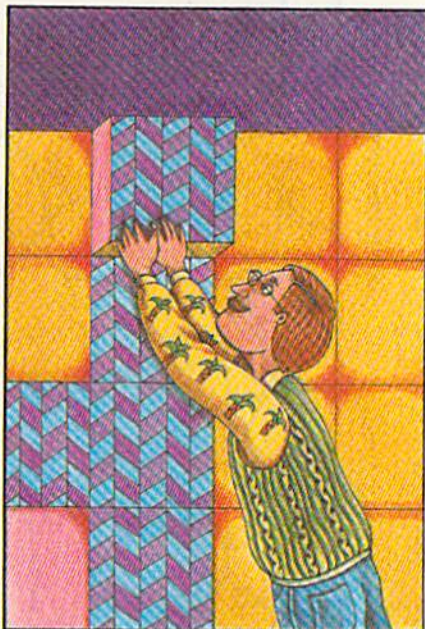
TEL: (301) 258-8400. Telex: 908153.

MICROLOG

INNOVATORS IN DIGITAL COMMUNICATION

140—Moves sprite 2 to the upper left corner and shows it.
 150—Moves sprite 2 diagonally across the screen from upper left to lower center.
 160—Hides sprite 2.
 170-230—Demonstrate expansion and color changes.

360—If f3 is pressed, increases C.
 365—If f1 is pressed, decreases C.
 370—If the return key is not pressed, goes to 345.
 385—If the return key is pressed, C is the value of the option chosen.
 1000—Time-delay subroutine. R



170—Puts sprite 6 into the center of the screen and shows it.
 180—Redefines sprite 6 in location 13 as monochrome with color Z and expanded width.
 190,210,225—Unexpanded.
 200—Expanded height.
 220—Expanded in both height and width.
 230—Does it again in three more colors, then hides it.
 300-385—Use a mouse to make selections from a menu.
 300—Defines sprite 0 as in location 14, monochrome, color 15, unexpanded and without priority over text.
 310-340—Print a menu.
 345—Sets Y coordinate of sprite according to the value of C.
 350—Moves sprite to location 24, Y.
 355—Waits for keypress.

Listing 2 continued.

```

170 SYSSP,M,6,170,140:SYSSP,S,6
175 FORZ=4TO7
180 SYSSP,D,6,13,0,2,1,0,0:GOSUB10000
190 SYSSP,D,6,13,0,2,0,0,0:GOSUB10000
200 SYSSP,D,6,13,0,2,0,1,0:GOSUB10000
210 SYSSP,D,6,13,0,2,0,0,0:GOSUB10000
220 SYSSP,D,6,13,0,2,1,1,0:GOSUB10000
225 SYSSP,D,6,13,0,2,0,0,0:GOSUB10000
230 NEXT:SYSSP,H,6

299 REM ** MENU SELECTION BY 'MOUSE'
300 SYSSP,D,0,14,0,15,0,0,1
310 POKE53281,11
320 PRINT"{SHFT CLR}{COMD 1}{CRSR DN}{17 CRSR RTs}{CTRL
9} MENU {CTRL 0}{2 CRSR DNs}"
330 FORP=1TO8:PRINT"{2 CRSR RTs}OPTION #\"P\"{CRSR DN}":N
EXT
340 PRINT"USE F1 AND F3 TO MOVE THE MOUSE TO YOUR CHOIC
E THEN HIT RETURN":C=1
345 Y=C*16+60
350 SYSSP,M,0,24,Y:SYSSP,S,0
355 GETA$:IFA$=""THEN355
360 IFA$="{FUNCT 3}"THENC=C+1:IFC>8THENC=8:GOTO345
365 IFA$="{FUNCT 1}"THENC=C-1:IFC<1THENC=1:GOTO345
370 FASC(A$)<>13THEN345
385 PRINT"{SHFT CLR}{5 CRSR DNs}YOU CHOSE OPTION";C:SYS
SP,H,0

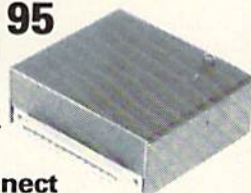
999 END
1000 FORD=1TO200:NEXT:RETURN
1005 REM DATA FOR MOUSE IN LOCATION 14
1010 DATA 30,0,120,63,0,252,127,129,254,127,129,254,127
,189,254,127
1015 DATA 255,254,63,255,252,31,187,248,3,187,192,1,255
,128,3,189
1020 DATA 192,1,231,128,1,255,0,0,255,254,0,127,248,0,2
54,0
1025 DATA 1,199,32,3,131,224,7,1,192,1,192,0,3,192,0,0

```

Circle 248 on Reader Service card

VIC-20/C-64 MODEM

MFJ-1237
\$49⁹⁵



Tiny 2¼x2¼x1 in.

**300 baud
 Direct Connect
 Originate/Answer • Full
 Duplex • Carrier detect LED**

World's lowest cost modem. High performance Texas Instrument single chip modem design. Works for both VIC-20 and Commodore 64. Plugs into user's port. Use with single or multi-line phones. Plugs into telephone base. 300 baud. Direct connect. Originate/answer. Full duplex. Carrier detect LED. Crystal controlled. Powered by computer. Aluminum enclosure. Includes Basic listing of Terminal Program. Terminal Program available on tape, \$4.95 and cartridge, \$19.95. Specify VIC-20 or C-64.

Save VIC-20 Cartridge Programs on tape

MFJ-1256
\$39⁹⁵



Adapter board lets you save VIC-20 cartridge programs on cassette tape and run them using 8K RAM board. Provides cartridge backup, eliminates plugging and unplugging cartridges and turning VIC-20 on and off.

Includes adapter board that plugs into expansion port and software to save and run cartridge programs on cassette tape. Requires 8K RAM board (not included).

RS-232 Interface for VIC-20/C-64

MFJ-1238
\$39⁹⁵



Provides RS-232 voltage conversion for VIC-20/C-64 serial port. Use RS-232 printers, modems, speech synthesizers and other RS-232 peripherals. Switch reverses transmit/receive lines for DTE or DCE operation. Use as null modem. Standard 25 pin RS-232 connector. Plugs into user's port. Powered by computer. 2¼x2¼ inches.

VIC-20 Capacitance Meter

Measure 100 pf to 100 Mfd. MFJ-1258
 Includes calibration capacitor, software on tape and hardware interface. **\$29⁹⁵**

Order from MFJ and try it. If not delighted, return within 30 days for refund (less shipping). One year unconditional guarantee. Order yours today. Call toll free 800-647-1800. Charge VISA, MC. Or mail check, money order. Add \$4.00 each for shipping and handling.

CALL TOLL FREE ... 800-647-1800

Call 601-323-5869 in MS, outside continental USA.

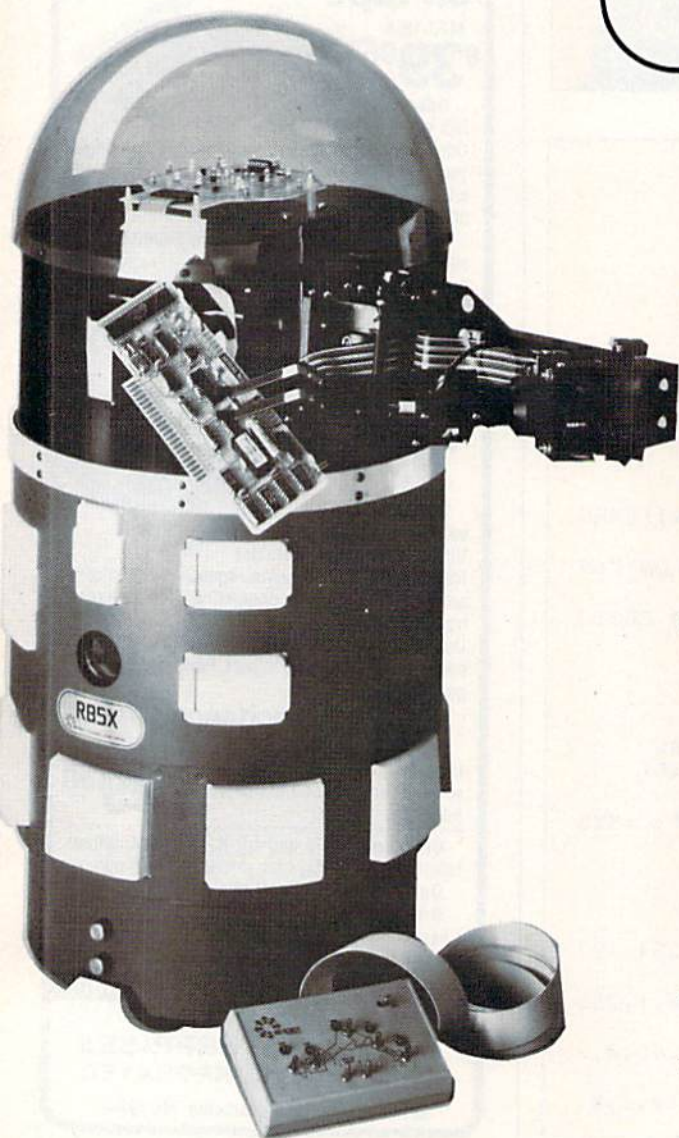
**MFJ ENTERPRISES
 INCORPORATED**

921 Louisville Road, Starkville, MS 39759

No need to become alarmed. Robots haven't taken over...yet. But the time is drawing near when personal robots may be as prevalent as, say, Commodore computers.

The ROBOTS Are Coming!

By Peggy Herrington



She heard the doorbell over the noise of the vacuum cleaner. Then that hum was replaced by a low whirring sound.

"Shall I see who's calling, Ma'am?" asked the robot as it wheeled into the room.

"Yes, do," she replied, not bothering to look up from her word processor.

The robot returned moments later. "It's Janie," it said, "asking if Pamela can play."

"Isn't it about time for her reading lesson?" she asked.

"Seventeen minutes until I am programmed to inquire about that," replied the robot.

"Ask Janie if she wants to join Pamela with your lesson when you're finished vacuuming."

"She will," the robot replied. "She always does."

"Very well."

The robot was whirring away when she called it back. "The Wilsons will be here this evening."

"For dinner or cocktails?" it asked.

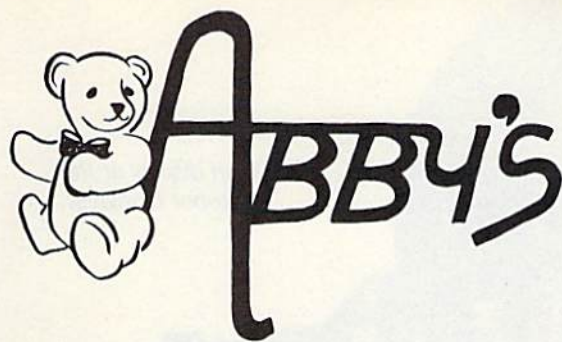
"Both," she said.

"Thank you. I will report the bar inventory within ten minutes," said the robot.

"Remind me to load in your new joke program before they arrive and delay house security until they leave."

"Yes, Ma'am. Will that be all?" it asked.

"For now," she said, turning back to her Commodore 64.



DISCOUNT SOFTWARE

SOFTWARE

HESWARE VIC 20

Aggressor (R)	\$ 19
Attack of Mutant Camels (R)	\$ 25
Face Maker (R)	\$ 25
Hes Writer (R)	\$ 25
Laser Zone (R)	\$ 25
Pharaoh's Curse (R)	\$ 25
Protector (R)	\$ 19
Robot Panic (R)	\$ 19
Shamus (R)	\$ 19
Story Machine (R)	\$ 25
Synthesound (R)	\$ 29
Torg (C)	\$ 17

ALSO FOR VIC 20

Close Encounter (R)	\$ 9
Crossfire (C)	\$ 17
Demon Attack (R)	\$ 9
Dot Gobbler (R)	\$ 13
Practicalc 20 (D) (C)	\$ 37

ACADEMY VIC 20/64

Typing Tutor (C)	\$ 19
Typing Tutor (D)	\$ 21

ATARISOFT VIC 20/64

Centipede (R)	\$ 29
Defender (R)	\$ 29
Dig Dug (R)	\$ 29
Donkey Kong (R)	\$ 29
Pac Man (R)	\$ 29
Robotron (R)	\$ 29

EPYX VIC 20/64

Crush Crumb Champ (C) (D)	\$ 24
Curse of RA (C) (D)	\$ 17
Dragonriders of Pern (D)	\$ 29
Fax (D)	\$ 29
Gateway to Aphasi (R)	\$ 29
Temple of Aphasi (C) (D)	\$ 31
Upper Reaches	
Aphasi (C) (D)	\$ 17
Jumpman (D) (R)	\$ 29
Jumpman Jr (D) (R)	\$ 29
Oil Baron (D)	\$ 41
Pitstop (R)	\$ 29
Sword of Fargoal (C) (D)	\$ 24
World Greatest Baseball (D)	\$ 35

TOTL VIC 20/64

Totl Label 2.6 (D) (C)	\$ 19
Totl Spell (D) (C)	\$ 27
Totl Text 2.6 (D) (C)	\$ 31
Totl Time Manager (D) (C)	\$ 31

CBS (Success With Math) C 64

Addition/Subtract (D) (C)	\$ 19
Multiplication/Divis (D) (C)	\$ 19
Linear Equations (D) (C)	\$ 19
Quadratic Equations (D) (C)	\$ 19

COMMODORE C 64

A Bee's C (D)	\$ 19
Accounts/Receivable (D)	\$ 44
Accounts/Payable (D)	\$ 44
Assembler (D)	\$ 17
Blueprint (R)	\$ 17
Clowns (R)	\$ 17
CP/M (R)	\$ 65
C 64 Bonus Pack (C)	\$ 13
Counting B (D)	\$ 19
Deadline (D)	\$ 39
Easy Mail (D)	\$ 13
Easy Spell (D)	\$ 17
Frogmaster (R)	\$ 17
General/Ledger (D)	\$ 44
Gorf (R)	\$ 17
Intro to Basic Part I (C)	\$ 21
Lazarian (R)	\$ 17
Lemans (R)	\$ 17
Logo (D)	\$ 59
Magic Desk (R)	\$ 55
Music Composer (R)	\$ 17
Music Machine (R)	\$ 17
Nevada Cobol (D)	\$ 65
Payroll (D)	\$ 44
Pet Emulator (D)	\$ 13
Pilot (D)	\$ 59
Pinball Spectacular (R)	\$ 17
Radar Rat Race (R)	\$ 17
Screen Editor (D)	\$ 17
Seawolf (R)	\$ 17
Simon's Basic (R)	\$ 49
Starcross (D)	\$ 29
Star Post (R)	\$ 17
Star Ranger (R)	\$ 17
Super Expander (R)	\$ 49
Suspended (D)	\$ 39
Tooth Invaders (R)	\$ 17
Type Right (D)	\$ 19
Wizard of Wor (R)	\$ 17
Word/Name Machine (D)	\$ 13
Zork I, II, III (D)	\$ 29
B/Graph (D)	CALL
Easycalc 264	CALL
Internat'l Soccer (R)	CALL
Micro Cookbook (D)	CALL
Micro Illustrator (D)	CALL
Micro School (D)	CALL
Superscript 265	CALL
Teli Graphics (D)	CALL
Videx (D)	CALL

DESIGNWARE C 64

Creative Creature (D)	\$ 25
Cryptocube (D)	\$ 25
Maze Math (D)	\$ 25
Spell A Kazam (D)	\$ 25
Spellgraph (D)	\$ 25
Spellicopter (D)	\$ 25

ELECTRONIC ARTS C 64

Archon (D)	\$ 35
Cut & Paste Word	

Processor (D)	\$ 43
D Bug (D)	\$ 31
Hard Hat Mack (D)	\$ 31
M.U.L.E. (D)	\$ 35
Music Construct Set (D)	\$ 35
Pinball Construct Set (D)	\$ 35
Worms? (D)	\$ 31

HESWARE C 64

Benji/Space Rescue (D)	\$ 29
Heswriter (R)	\$ 25
Multiplan (D)	\$ 79
Omni Calc (D)	\$ 39
Omni Writer/Speller (D)	\$ 57
Retro Ball (R)	\$ 19
64 Forth (R)	\$ 45
Turtle Graphics II (R)	\$ 45

INFO COM C 64

Enchanter (D)	\$ 39
Infidel (D)	\$ 39
Planet Fall (D)	\$ 39
Sea Stalker (D)	\$ 39
Sorcerer (D)	\$ 45
Witness (D)	\$ 39

KOALA C 64

Color Series L II (D)	\$ 24
Programmers Guide (D)	\$ 12
Spider Eater (D)	\$ 24
Koala Touch Pad (D) (R)	\$ 65

ON LINE C 64

Crossfire (D)	\$ 17
Frogger (C) (D)	\$ 17
Jawbreaker (D)	\$ 17
Jawbreaker II (R)	\$ 17

SPINNAKER C 64

Aerobics (D)	\$ 35
Alf (R)	\$ 27
Alphabet Zoo (R)	\$ 27
Bubbleburst (R)	\$ 29
Delta Drawing (R)	\$ 31
Face Maker (R)	\$ 27
Fraction Fever (R)	\$ 27
Kids on Keys (R)	\$ 27
Kinder Comp (R)	\$ 22
Snooper Troops I, II (D)	\$ 29
Story Machine (R)	\$ 29
Trains (D)	\$ 29
Up for Grabs (R)	\$ 29

TIMWORKS C 64

Data Manager (D) (C)	\$ 19
Data Manager 2 (D)	\$ 39
Dungeons & Algebra	
Dragons (D) (C)	\$ 19
Electronic Checkbook (D) (C)	\$ 19
Inventory Management (D)	\$ 55
Money Manager (D) (C)	\$ 19
President Campaign (D) (C)	\$ 19
Program Kits I, II (D) (C)	\$ 19
Sale Analysis (D)	\$ 55
Wall Street (D) (C)	\$ 19
Word Writer (D)	\$ 39

ALSO FOR C 64

Beach Head (D) (C)	\$ 27
Blue Max (D) (C)	\$ 27
Chess (Odestal) (D)	\$ 52
Codewriter (D)	\$ 69
C 64 Practicalc (D) (C)	\$ 47
Flex Draw (D)	\$ 135
Flight Simulator II (D)	\$ 37
Fort Apocalypse (D) (C)	\$ 27
Home Accountant (D)	\$ 55
Master Type (R)	\$ 31
Neutral Zone (D) (C)	\$ 27
Pharaoh's Curse (D) (C)	\$ 27
Sprite Master (D)	\$ 35

HARDWARE

COMMODORE

B-128 Business computer	CALL
264 Computer	CALL
364 Computer	CALL
1110 VIC 8K	\$ 40
DPS-1101 daisy wheel print	CALL
1526 dot matrix printer	\$ 279
MPS 801 dot matrix	\$ 229
MPS 802 dot matrix	CALL
MCS 801 color dot matrix	CALL
1541 Disk drive	\$ 249
1542 Disk drive	CALL
SFS 481 Disk drive	CALL
MSD Dual drive (C 64)	\$ 599
8050 Dual drive (B-128)	CALL
Magic Voice speech module	CALL
1600 VIC Modem	\$ 59
1650 Auto Modem	\$ 99
Super Expander VIC-20	\$ 44
Cardco 6 Expander Slot	
VIC-20	\$ 49
1011 RS 232 Interface	\$ 40
Programmers Aid VIC-20	\$ 29

PRINTERS

Star Power Type	\$ 389
Star Gemini 10X	\$ 279
Star Gemini 15X	\$ 359
Star Delta 10	\$ 499
Star Radix 10	\$ 629
NEC PC 8023	\$ 339
NEC 15 Letter quality	\$ 499

MONITORS

NEC 1201	\$ 139
NEC 1215	\$ 249
NEC 1205 amber/sound	\$ 159
Sakata SC 100	\$ 259
Amdek 300	\$ 139
Amdek 300A	\$ 159
Amdek Color 1+	\$ 319

DISKS

Nashua SSSD Box of 10	\$ 15
Elephant SSSD Box of 10	\$ 19
Elephant SSSD Box of 10	\$ 24

AD #4

(C) CASSETTE TAPE (D) DISK (R) ROM CARTRIDGE

AD #4

CALL TOLL FREE

Order Line 1-800-282-0333

M-F 10 a.m.-8 p.m. Eastern Time

Customer Service 1-513-879-9699

611 Cypress Drive, Fairborn, OH 45324

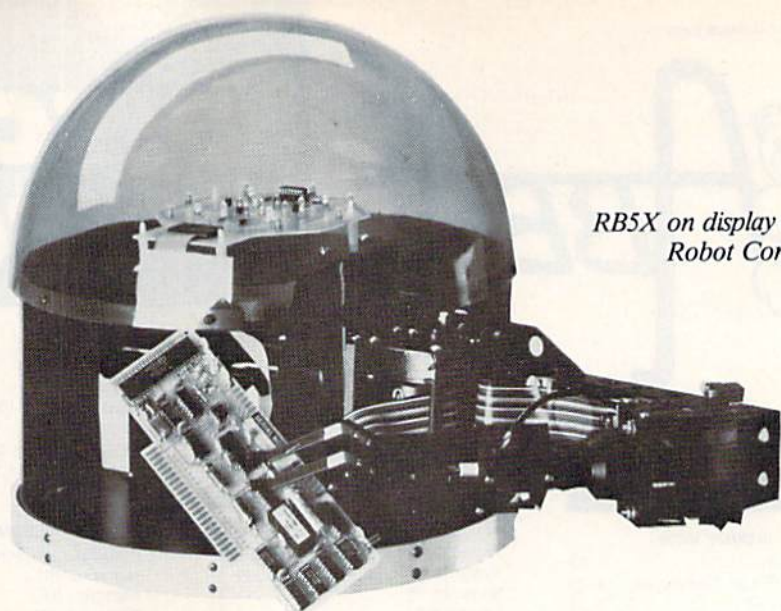
Prepaid orders over \$30 receive free shipping, UPS, continental US. No waiting period when paid by credit card, certified check, or money order. Add \$2 shipping and handling on orders under \$30. Add \$5 for COD orders. Hardware requires additional freight charges. Ohio residents add 5.5% sales tax. All items subject to availability and price change.

PLEASE CITE AD NUMBER WHEN ORDERING

MasterCard



Hero can be programmed on the Commodore 64 (Photo by Eddie Johnson)



RB5X on display at the Robot Congress.

A robot answering the door, teaching kids, checking supplies, telling jokes and remembering guests' preferences, vacuuming and doing guard duty? What is this, a scene from a science fiction novel?

It is neither fiction nor fantasy. Today's personal robots have all these talents, and if they seem to lack the finesse demonstrated by this robot, it's only a matter of polishing some rough edges. The technology is available now, and many of those rough edges can be smoothed with computer programming.

A Gathering of "Personalities"

Hero, RB5X, B.O.B., Topo and a host of other personal robots—not industrial arms or metallic suits housing humanoids—walked and talked and blinked and beeped their way into Albuquerque, New Mexico, last April, for the first International Personal Robot Congress (IPRC). They and their developers bought news to the 3000 people who attended what promises to become an annual affair.

The future of personal robots is likened to that of personal computers a year or two ago. Indeed, this industry is counting on a robotics revolution on the scale of that brought about recently by personal computers. And personal computers are more than simply a parallel market.

All of the leading robotics firms announced at IPRC that their robots can now be programmed on the Commodore 64. This is good news for Commodore aficionados, but (and I wonder if they realize it) it's even better news for the robotics firms—in order to bring off this robotic revolution, they're going to need some help.

Whether you see the computer as a part of the robot or the robot as a pe-

ripheral to the computer depends upon your point of view. In his keynote address via satellite, Dr. Isaac Asimov, prolific science and science fiction author who referred to himself as "grandfather of the robot," called them "mobile computers."

Robots in general have internal processors, which carry out instructions sometimes based on information their sensors gather. This is how they walk, talk, remember and listen, carry small objects, avoid running into furniture and interact with humans.

Personal robotic technology is coming out of its infancy and not all of today's robots have the full range of these talents—not to mention that some robots (like computers) do things better than others.

Brent DeWitt, robot developer and author of *The Programmer's Tool Box* (a programmer's aid for RB5X), compared robot designers to parents in his speech in an IPRC seminar. "What a robot can *do* hasn't been as important as the fact that it's yours," he said. This attitude is changing, but whatever a robot does now or in the future will be programmed by a computer.

This is done by changing the Commodore 64 (and, in some applications, the VIC-20) into a dumb terminal with software similar to a word processor (so it won't "compute") and writing a program in a language understood by the robot. The program is then sent to the robot through an RS-232 interface.

Limited software is available at this writing (like computer software, it is not interchangeable between brands) and the need for third-party programming is great. Nolan Bushnell, president of Androbot and developer of the electronic game and the formation of Atari, believes "somewhere there's a pro-

grammer out there now who will write the robotic version of VisiCalc."

RB5X

RB Robot Corporation, makers of the world's first mass-produced programmable robot, RB5X, will pay a 12% royalty for acceptable software for RB5X written in Tiny Basic, targeted toward adults or children. Of course, you'll need to get your hands on RB to write programs for it.

RB can be purchased at retail outlets around the country, and for "pre-selected, advanced program development" the company will make it available on loan. They mention other opportunities (for students, for example), so if you're interested, contact them for details.

RB is aimed at the top-of-the-market in robots with a retail price for the base unit of \$2295. It's shiny, with an overall futuristic appearance. A transparent dome lets you view indicator lights flashing and some of its components as it performs its repertoire.

The on-board microprocessor, an INS 8073, works in conjunction with software to permit RB to learn from its sensory experiences. In other words, RB can progress from simple, random responses to more complex, predictive actions—it will, for instance, eventually find its way out of a corner. RB stands about three feet tall and has eight tactile sensors around its mid-section. These bumpers signal contact with other objects or you can press them to actuate programs.

Rechargeable batteries provide power (it can seek out its recharger and automatically plug itself in when power gets low) and it comes with 8K memory, which can be upgraded with a 16K op-
www.Commodore.ca

May Not Reprint Without Permission

tion (\$195). RB sees by means of a built-in Polaroid range finder sonar system so that it can navigate around obstacles.

Other RB options include a voice that can be programmed to speak or sing (\$245). It's mobile, of course, by means of two independently driven wheels and a caster-support system that allow it to move and turn on its own radius on relatively smooth surfaces.

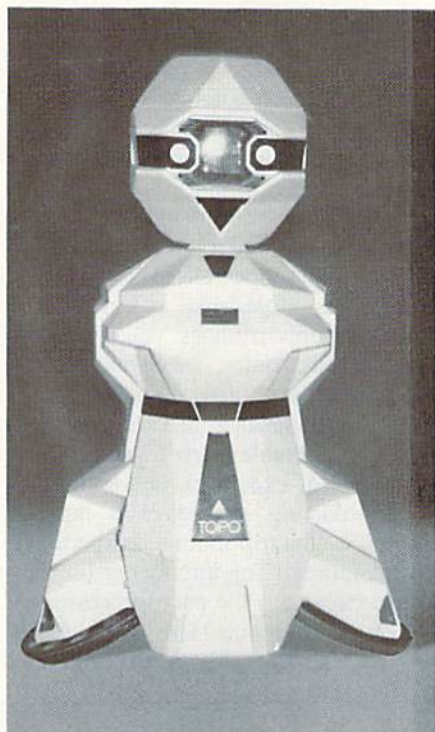
There's also an optional arm with gripper (\$1495), which can lift, carry and release an object up to one pound in weight.

RB Corporation has announced that this fall a vacuum cleaner attachment will be available for RB5X. Operating with its own motor and batteries, it will attach to the lower skirt of RB and be adjustable for varying floor surfaces and carpet textures.

RB Corporation makes a Robot Appreciation Kit for \$19.95. This is a three-ring notebook full of valuable information about robots in general (including reprints of magazine articles on the current technology), a paperback novel about robots by Isaac Asimov and a copy of the RB5X reference manual, less the technical appendices. If you're interested in finding out more about robots, this is a valuable resource. Should you end up buying RB5X, you can get full credit for this kit toward the purchase price. (RB Robot Corp., 14618 W. Sixth Ave., Suite 201, Golden, CO 80401; 303-279-5525.)

Hero I

If, however, you don't think you need the Cadillac of robots, for less



Topo is programmable with the Commodore 64. Kids seem to like its modernistic face. (Photo by Dale Rankin.)

Address all author correspondence to Peggy Herrington, 1032 Forrester Street NW, Albuquerque, NM 87102.

than the cost of RB5X's optional arm/gripper alone, and some work, you can have a robot called Hero.

The Heath Company, manufacturers of electronic kits, called Heathkits, offers Hero I, complete but unassembled (with arm and voice) for \$1200. Heath has a reputation for being innovative in the field of electronics; for instance, Heathkit computers were available long before home computers were popular.

Hero is an electronic hobbyist's delight. The documentation and instructions are extensive, and if you want to get to know a robot literally inside-and-out, this is the way to go. Hero is more utilitarian in appearance than RB5X, but this is more than offset by the hands-on opportunities you'll get for learning electronics, mechanics, computer theory and programming.

It takes somewhere between 40 to 80 hours to assemble Hero (depending on your level of expertise), and some previous soldering experience is helpful. There's even a top-mounted experimental breadboard for interfacing user-designed circuits to the microprocessor.

You can program Hero with a Commodore 64, but you don't need any

computer; Hero is completely self-sufficient, since it contains a 6808 microprocessor. On Hero's "head" is a hexadecimal keyboard for entering instructions, and programs can be saved and reloaded by means of an ordinary audio cassette recorder, which connects to Hero's rear-panel serial cassette port.

It's equipped with light, sound and motion-sensing systems, plus a sonar range finder, all of which make it possible for Hero to see, talk and hear. It is powered by rechargeable batteries and maneuvers on three wheels, with a 12-inch turning radius. A detachable teaching pendant lets you manually control all motor and arm movements, and an optional detached keyboard allows remote control of the robot as well as the teaching pendant.

Speaking at an IPRC seminar, robotics consultant Tom Carroll, from Long Beach, California, who has built over 100 robots since 1957, called Hero "the ultimate learning tool."

For the less adventurous among us, Hero I is available completely assembled from Heath for \$2200. (Heath Company, Benton Harbor, MI 49022; 616-982-3678.)

Androbot

B.O.B. and Topo are manufactured by Androbot, Inc. The company's name reflects its philosophy: a combination of android (which means an automaton with a human form) and, of course, robot. These robots look less like machines and more like people. They have heads with modernistic faces that seem to make them attractive to children. B.O.B. and Topo have the same off-white head and navigate by means of two angled-wheel assemblies, but differ vastly in most other respects.

B.O.B. (which means Brains On Board) is fully self-contained, with an 8088 microprocessor built in, capable of being expanded to a capacity of 640K. This provides it with a lot of artificial intelligence, programmable by the built-in keypad on its chest. As of this writing, it's compatible with IBM-PC and Apple computers only. (It may be able to run on the Commodore 64 at a later time.)

B.O.B. stands just under four feet tall and has ultrasonic and infrared sensors, which determine the range of objects around it. One of its best features is a Follow Me mode, which makes

Circle 23 on Reader Service card.

COMMODORE 64™

COMMODORE 64 COLLECTION #6
GAMES—Action Hockey ● Backgammon ● Civil War ● Dixie 64 ● Have a Nice Day ● Mission to Mars ● Ctopus 1 ● Race Saucer Invasion ● UTILITIES—64 Labels ● Alpha Index Dates ● Decision Maker ● December ● Event Calendar ● Find Nom. Int. ● Income Tax Adj. ● Investment F.V. Music Driver IN ● Music Driver PI ● Music Driver P2 Music Driver P3 ● Music Driver P4 ● Pareto ● Roman Numerals ● Seq. Appendix Form 64 ● Voice 3 Music EDUCATIONAL—A Failure ● Curve Fitter ● Finance Calc. ● Fool Inst. ● Fool Pract. ● Heat Solver ● Intergration Percent Drill ● Projectile ● Titrator 64 ● Weigh

COMMODORE 64 COLLECTION #7
GAMES—Alpha Base 64 ● Blackjack/21 ● Diffuser Ductor ● Las Vegas Slots ● Pet Bomber ● Pictures Randomizer ● Speed Racer ● UTILITIES—Astro-Diagnoser C/S Retirement ● Days Between Dates ● Disk Error ● Disk Utility ● Elect. Formula ● Home AC G. Input ● Home AC G. Sum ● Luster V64 ● Load Address ● Mortgage ● Ohms Law Quadratic Eqn. ● Sound Master EDUCATIONAL—AI Animals ● Capitals ● Factor Race Flash Words ● Histograms ● Matrix Equation ● Phoneme Words ● Population ● Reading Comp. ● States Quiz ● Statistics ● Triangle Solve

COMMODORE 64 COLLECTION #8
GAMES—Card Game ● Chain Reaction ● Hours ● Football Obstacle Course ● Pyramid ● Roulette ● Starwar ● Tiles UTILITIES—Astro-Biorthym ● Cross-Ref 64 ● Energy Saver Investment Calc. ● Marks-Disk ● Merger ● Metric Converter ● Sort Director ● Tiny Fourth 64 ● Tiny Fifth Inst Typewriter Disk ● Typewriter Tape ● Utility Menu EDUCATIONAL—African Caps ● Asian Caps ● Chemists Factors ● FN Machine ● Function Plotter ● History Quiz Multiplet ● Pizza ● Prime Numbers ● Signed Numbers Tax Collector ● Vector Solve

COLLECTION HS

COMMODORE 64—Air Inductor 64 ● DB Calc. 64 ● Duper 64 ● E. Big 64 ● Elect. Formula ● Ham Formula 64 ● Intermid ● J20 Mouse R/T ● L. Pass Filter 64 ● Ohms Law PI Network ● Desig. Quad Antenna 64 ● Reg'd Supply Res. Freq 64 ● Rhy-C64 Inst. ● Rhy-C64 Prog. ● T.V. Satellite ● Voltage Div. 64 ● Yag 64
VIC 20—Air Inductor ● Bob's Beam ● Call Search Code Practice ● Coverage Predict ● CW Keyboard Decibel Calc. ● Duke ● E-Big ● Electronics 1 ● Ham Contest Log ● Ham Formula ● J20 Hex. P. ● J20 Hex T. J20 Recv/Tms ● Lo Pass Filter ● OSO Directory ● OSO Vic Quad Antenna ● Reason, Freq. Form. ● Rhy-Vic 20 ● Rhy 16K Inst. ● Rhy-16K Prog. ● Sunrise/Sunset ● Voltage Div. Yag

COMMODORE

-USER WRITTEN SOFTWARE-

Supporting all COMMODORE computers

Written by users, for users

★ GAMES ★ UTILITIES ★ EDUCATIONAL ★

VIC 20™

Vic 20 collections #1, 2, 3, 4, 5, 6
over 70 programs per collection-Tape/Disk - \$10.00
Vic 20 collections #7, 8
over 50 programs per collection - Tape/Disk - \$10.00

COMMODORE 64™

64 collections #1, 2, 3, 4, 5, 6, 7
over 25 programs per collection - Tape/Disk - \$10.00

PET® / CBM®

22 collections - Tape/Disk - \$10.00 each

DINSET™: Reset Switch

Works on Vic 20 or Commodore 64 - \$5.00

SERIAL CABLES

10Ft.—\$10.00 15Ft.—\$15.00

LOC-LITE™

Operation Status Indicator
Works with your Vic 20 or Commodore 64
Assembled & Tested \$20.00
Kit W/Instructions \$15.00
Board W/Instructions \$7.50

All prices include shipping and handling.
CHECK, MONEY ORDERS,
VISA and MASTERCARD accepted.

For A Free Catalog Write:

'PUBLIC DOMAIN', INC.

5025 S. Rangeline Rd., West Milton, OH 45383
10.00 a.m.-5.00 p.m. EST—Mon. thru Fri.
Dept.
(513) 698-5638 or (513) 339-1725

VIC 20™, CBM® and Commodore 64™ are trademarks of Commodore International, Inc.
PET is a registered trademark of Commodore Business Machines, Inc.

VIC 20™

VIC 20 COLLECTION #7
Addition ● Alien Capture ● Alpha ● Alpha Bomber ● Alpha Match 2 ● Bank Program ● Bazaar Sales Log ● Binary Bloodcount ● C/S Retirement ● Call Search ● Cat & Mouse Compare Disk ● Destroyer ● Duplet Calc. ● Do List Envelope Address ● Football BK ● General ● Collision Graphic Art [SE] ● Investments ● Joystick Draw Kentucky Derby ● Lone Ranger Star ● Lotto Num Gen Menu Auto Prog ● Menu Inst. ● Menu Prog ● MI Memory Dump ● Newton's Room ● Non-Vic Lexicon ● Numberspan Die Insect Trail ● Op Art For SE ● Pitcher Story ● Print Right ● QSO Directory ● Reptiles ● Rhino ● Rounding Rhy ● Shoot Down ● Sim-L-Q/Mat-Inv. ● Song Program Star Wars ● Super Star Trak ● Trap 1 ● U.S. Tax Forms Utility Charts ● Vic Life ● Vic Mailing List ● Vicks ● Xmas Selector

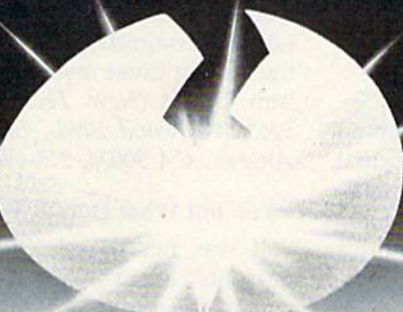
VIC 20 COLLECTION #8
40 Col [SE] ● Art Two-3K ● Base to Base ● Battleship-Inst Battleship-Prog ● Birdy ● Birthday Card ● Bomb Drop Bombardier ● Bowling ● Boxing ● Budget Inst ● Budget Prog ● Business Clients ● Cash Flow ● Code Practice Color Maze ● Crops ● Decision Maker ● Dentist Story Dak Sort & Print ● Eraser ● Exec 2 ● F/S Analysis ● Grungy Towers ● Guess & Cheat ● Gunners ● Hi Score ● IRA ● Just-Chuck Luck ● Leapfrog ● Letter Puzzle ● Life 2.5 ● Memory Quiz ● Moose Story ● Multiplication ● Music Producer Name ● Pay Calc. ● Payroll Calc. ● OSO Vic Quadratic Equat. ● Roman Numerals ● Safe Cracker ● Spec War Strange Dice ● The Bomb ● The Entertainer ● UFO Offense Utility Analysis ● Verboten ● Vic Label

VIC 20 COLLECTION #9
Address & Phones ● Alpha Attack ● Amphibians Backgammon ● Banner Screen ● Bargraph ● Bob's Beam BS Grinder ● Chuck A Luck PT1 ● Chuck A Luck P2 ● Code-breaker-Inst ● Codebreaker-Prog ● Death Race ● Depreciation Express Yes/No ● Forecasting ● Four in a row-2 ● Frustration Gambling Boxes ● Hi-Q ● Hitshot ● Indian Story ● Invader J/20 Hex P. ● J/20 Hex T. ● Keno ● Killer Komett ● Math Teacher ● Memory ● Midnight Clear ● Money Mad BK Mouse Hunt ● Multi Choice Quiz ● Name Game Music ● One Shot ● Prec. Division ● Rhy-16K-Inst. ● Rhy-16K-Inst. Russian Roulette ● S.E. RND(GPH) ● Sinners/Saints ● Space Prog ● Space Trekker ● Star Trek ● Super Slots ● The Hangman ● Type A Letter ● Vic Awan ● Word Search PT1 Word Search PT2 ● Xmas Story

GA Now Available For Vic Owners, Too

Now GA available for the Vic, Pet & 64 owners.
The original Cavern Adventure on GA, has been modified for those Vic 20 owners that are Disk Based and have 16K-memory.

A Star is Born.



TelStar 64™
by Eastern House

A Communications Cartridge
for the Commodore 64.

Upload/Download, Status Line, etc. Works with
your Commodore 1600 or 1650 Modem.
Auto-dialing, etc. when used with the new
CBM 1650 Modem.

Cartridge and Manual - \$49.95

Circle 50 on Reader Service card.

Eastern House

3239 Linda Dr.
Winston-Salem, N.C. 27106
(919) 924-2889 (919) 748-8446

Circle 187 on Reader Service card.

SAVE TIME AND MONEY!! CALL 1-800-441-9782 NOW!! DOOR TO DOOR SOFTWARE

WE HAVE THE SOFTWARE
YOU'VE BEEN LOOKING FOR!!

OVER 300 DIFFERENT PROGRAMS
IN STOCK READY TO SHIP!!

BUSINESS : GAMES : EDUCATIONAL
COMMUNICATIONS AND MUCH MUCH MORE!!

THIS MONTHS SOFTWARE SPECIALS!!

HOMEWOR	\$47.00	WORD PRO 3 W/SPELL	\$68.00
CUT & PASTE	\$36.00	PRE-SCHOOLER	\$33.00
SUPER COPY 64	\$28.00	HISTORY/GEOGRAPHY	\$33.00
LODE RUNNER	\$25.00	ENGLISH/SPANISH	\$33.00
DALLAS QUEST	\$23.00	DRAGON MIX MULTI/DIV	\$23.00
THE HEIST	\$26.00	DUNGEON OF ALGEBRA	
COMPUTER SAT	\$56.00	DRAGONS	\$17.00

THIS MONTHS HARDWARE SPECIALS!! CARDCO PRINT + G \$70.00 BMC BX-80 DOT MATRIX PRINTER \$299.00

PLEASE ADD \$2.00 TO ALL SOFTWARE ORDERS, C.O.D. ORDERS ADD
\$3.00. ALL HARDWARE ORDERS ADD 3% FOR SHIPPING AND HANDLING.
PERSONAL CHECKS REQUIRE THREE WEEKS TO CLEAR.

WE HONOR VISA AND MASTERCARD
TO PLACE AN ORDER JUST CALL OR WRITE US AT:

DOOR TO DOOR SOFTWARE
P.O. BOX 1496 DOVER, DE 19903
1-800-441-9782

DELAWARE RESIDENTS MUST MAIL ALL ORDERS.
FREE CATALOG WITH EACH ORDER
CATALOG REQUEST UNACCOMPANIED BY ORDER—SEND \$1.00
WE SHIP SO FAST YOUR ORDER MAY ALREADY BE ON ITS WAY!!

We've Got People Talking

REVIEWERS SAY:

"This is the best typing tutor
we have seen yet; ★★★★★"

INFO-64

"Computer aided instruction at
its best." Commander

"This is an excellent program
that makes typing practice an
enjoyable pastime instead of
boring drudgery."

DILITHIUM PRESS

Rated the BEST educational
program for the VIC 20

Creative Computing

CUSTOMERS SAY:

"... delighted with my son's
progress ... he is the only one in his second grade class
who touch types at the computer."

"Your Typing Tutor is an excellent program ... our 4
children literally wait in line to use it."

"Thoroughly satisfied, can't believe how fast I've learned to
type. I've never typed before."

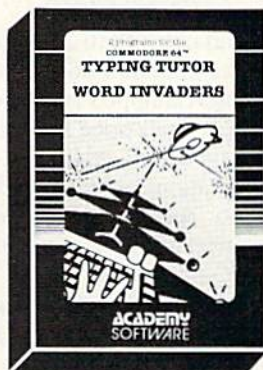
In daily use by schools across the USA.

TYPING TUTOR + WORD INVADERS

Commodore 64™ Tape \$21.95

Commodore 64™ Disk \$24.95

VIC 20™ (unexpanded) Tape \$21.95



REALISTIC AIRCRAFT RESPONSE

"Has a quality of realism which
sets it apart from others, even
those I've tested in flight school."

Compute's Gazette

"Great program!" INFO-64

"It is tremendous fun."

Compute's Gazette

"Flight tested by an air traffic
controller, two skilled pilots and
an elementary school class.
Highly recommended by all."

Midnite Gazette

"This is an unbelievably realistic
simulation of the difficulties
facing a pilot in instrument fly-
ing. I'm a 747 pilot and I think that this simulation could do
a lot to improve the reactions and instrument scan habits
of even very experienced pilots." 747 pilot

IFR (FLIGHT SIMULATOR)

Commodore 64™ Tape or Disk \$29.95

VIC 20™ (unexpanded) Cartridge \$39.95

JOYSTICK REQUIRED



Shipping and handling \$1.00 per
order. CA residents add 6% tax.



**ACADEMY
SOFTWARE**

P.O. Box 6277 San Rafael, CA 94903 (415) 499-0850

Programmers: Write to our New Program Manager concerning
any exceptional Commodore 64 program you have developed.

teaching it to follow a path very easy—you walk and it follows. It will remember the route and repeat it by itself on command. Like Topo, it'll tell you when its batteries need recharging.

B.O.B. doesn't have arms with grippers in the sense of RB5X and Hero. It has an optional lift (retail \$495) with a horseshoe-shaped "hand," which can raise and carry 18 to 24 pounds reliably. Its voice is quite understandable and it can sing. Equipped as I've described it, B.O.B.'s retail price is \$3995. There's a model of B.O.B. available—of the base configuration only (wheels and drive but no accessories), appropriate for "engineering-level robotics experiments"—for \$2495.

Topo is programmable on the Commodore 64 in Topo Basic (which comes with it) and will soon run on Logo. Androbot is in the midst of determining a structure for third-party software submissions. Contact the company if you're interested.

Topo is about three feet tall and can be taught to follow a path with a joystick. It has fold-down platforms for carrying small objects. With the optional AndroWagon (retail under \$100), a waterproof, attachable wheeled wagon, it can pull up to 33 pounds. It speaks and sings in both program and direct Text-To-Speech mode; it retails for \$1595.

An earlier version of Topo has been available for well over a year now. This original model enjoyed fewer of Topo's present capabilities, and Androbot is offering, upon return of the original robot and accessories in reasonable condition,

a credit for the full retail price (\$495) toward the purchase of the new Topo. Owners must supply proof-of-purchase and return Topo to an authorized Androbot dealer for exchange. (*Androbot, Inc., 101 E Daggett Drive, San Jose, CA; 408-BOB-TOPO.*)

Alternatives

Perhaps you're not ready to jump on the bandwagon of this developmental technology or you'd like to learn something about robotics without spending the family vacation fund. Several firms displayed robots at IPRC that were programmable on either the Commodore 64 or VIC-20.

Spectron Instrument Corp. demonstrated a line of educational and hobby robotic products, available in kits or assembled, ranging in price from \$25 to several hundred dollars. They have two- and four-axis robotic arms, which can be programmed to draw or play games, and several other little devices that creep about freely. Their products are modular and can be upgraded (now or later) with visual and audio sensors. Contact the company for a catalog. (*Spectron Investment Corp., 1342 W Cedar Ave., Denver, CO 80223.*)

Androbot, Inc., offers a smaller desktop robot called F.R.E.D., which is programmable with its own separate keypad, meaning you don't need a computer at all. Equipped with drawing pens, it can do the full complement of Logo graphics. F.R.E.D., which looks like it's related to Topo and B.O.B. (and, of course, it is), can talk, draw and sense a void so that it doesn't fall off

the table. It sells for under \$400, complete.

New Tech Promotions offers a Turtle Tot Personal Robot for \$399.95, plus \$99.95 for a speech option. This, too, is a table-top or floor-model robot but it's housed completely inside a mobile transparent dome and is programmable with Logo. (*New Tech Promotions, 2265 Westwood Blvd., Suite 248, Los Angeles, CA 90024; 213-470-8383.*)

"Yes, but What Does It Do?"

It was fun to ask "the computer question" about robots at IPRC. Like computers, robots have so much potential that it's hard to put into words the fun, challenging, interesting—but not yet very practical—things they can do.

But personal robots are growing up. Like young of all kinds, the components are there, even if they're not fully developed; after all, babies walk before they run. Time, attention, financing and other resources are needed to bring them to maturity.

There are lots of ways to be a part of the predicted robot revolution, whether it's by enjoying a state-of-the-art robot like RB5X or B.O.B., building and learning from Hero, becoming "robot literate" with your kids and Topo or exploring hobby robotics on an educational level. If you have some programming experience, you might consider writing third-party software.


But don't wait too long—like the people who are still waiting for the perfect personal computer, you'll miss out on loads of fun waiting for the perfect personal robot. ®

Circle 181 on Reader Service card.

COMMODORE OWNERS WE'LL FIX YOUR FILES WITH **FANTASTIC FILER™** The all purpose Data Base management system that provides:

- 1.) Menu driven subsections
- 2.) Logical key functions
- 3.) Average of 1000 records per disk
- 4.) Fast record access time
- 5.) Search for records by record number or by specific search criteria
- 6.) Easy to edit, delete or update records
- 7.) Interface with **FANTASTIC FORMS™** to print mailing labels or columnar reports
- 8.) Complete reference manual
- 9.) Technical support available to answer questions
- 10.) Up to 255 characters per record and up to 15 fields

All this for only
\$29.⁹⁵



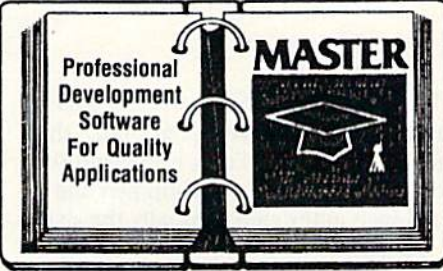
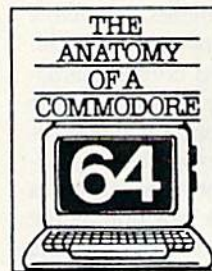
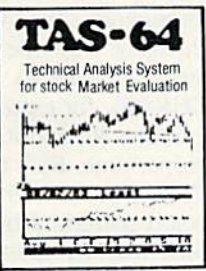
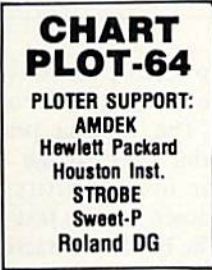
available from:
Micro-W. D.I.
P.O. Box 113
Butler, N.J. 07405
(201) 838-9027

*PHW
LATESCA
1.84.*

GET THE MOST OUT OF YOUR COMMODORE-64 OR VIC-20 COMPUTER



ALSO AVAILABLE:
3 outstanding
Music Albums to
go with Synth-64
**Classical
Christmas
and Rag/Sing Along**
See below



ULTRABASIC-64... Add 50 commands: graphics, music, TURTLE and game features. Tutoric! demo plus. **TAPE \$24.95 DISK \$27.95**

ASSEMBLER-MONITOR-64
High speed language development. Eleven function editor. Screen editing of source file. **DISK \$32.95**

MERCURE-64... Simple, powerful file management with fast design, entry search report capabilities. Tutorial. **DISK \$32.95**

SYNTHY-64... Sets the standard for all of the rest. Best 64-synthesizer anywhere. Samples and manual. **CASSETTE \$24.95 DISK \$27.95**. Also available: 3 great companion music albums; **Classical, Christmas, and Ragtime Sing-Along**. **DISK \$12.95 Each**.

GRAPHICS DESIGNER-64... Menu-driven drawings, floor plans and illustrations etc.. Slide program capability. **DISK \$32.95**

TAS-64... Full featured technical analysis for stock market evaluations. Manual or entire update capability thru DJNRS. Printer hard-copy. **DISK \$84.95**

MACHINE LANGUAGE BOOK
Learn all instructions. Access ROM routines, I/O. Listings for Assembler, SIMULATOR, more. **200 + PAGE BOOK \$14.95**

ANATOMY OF A COMMODORE-64 Complete guide. Full comment ROMS list, detailed internals, descriptions. **300 PAGE BOOK \$19.95**

CHARTPAK-64... Professional quality pie, line and bar charts. Menu driven, interactive, hardcopy. **DISK \$42.95**

CHARTPLOT-64... Same fine features as CHARTPAK-64 with high quality output to plotters. **DISK \$84.95**

ANATOMY OF THE 1541 DISK DRIVE Explains sequential random and program files, DOS, full ROM listing, sample programs. **320 pp. book \$19.95**

ZOOM PASCAL-64... Produces 6502 machine code for speed. Floating point, integers, strings File handling. **DISK \$39.95**

POOL-64/20... Play Fullrack or nine ball using hires graphics. Vic-20 required 8K expander. **TAPE \$14.95 DISK \$17.95**

MASTER-64... Indexed files; powerful screen management; excellent printer generator; programmer's aid; BASIC 4.0 commands; machine language monitor. **NO RUNTIME ROYALTIES**. 150 pp. manual for program developers. **Disk \$84.95**

SUPER DISK UTILITY-64... Speed copy 4 ways: Total, Bam, Append or File. Dump or modify sectors. More. **DISK \$22.95**

XREF-64... Sorted BASIC cross-reference on screen or printer Fast ML Sort. Add your own tokens. **DISK ONLY \$17.95**

FREE CATALOG Ask for a listing of other Abacus Software for Commodore-64 or Vic-20

DISTRIBUTORS

Great Britain:
ADAMSOFT
18 Norwich Ave
Rochdale, Lancs.
01-788-8963

West Germany:
DATA BECKER
Merowingerstr 30
4000 Dusseldorf
0211/312085

Belgium:
Inter Services
AVGillaume 30
Brussel 1160, Belgium
2-660-1447

Sweden:
TIAL TRADING
PO 516
34300 Almhuft
476-12304

France:
Micro Application
147 Avenue Paul-Doumer
Rueil Malmaison, France
1-732-9254

Australia:
CW ELECTRONICS
416 Logan Road
Brisbane, Queens.
07-397-0808

Canada East:
KING MICROWARE LTD.
5950 Cote des Neiges
Montreal, Quebec H3S 1Z6
514/737-9335

New Zealand:
VISCOUNT ELECTRONICS
306-308 Church Street
Palmerston North
63-86-696

AVAILABLE AT COMPUTER STORES, OR WRITE:

Abacus Software

P.O. BOX 7211 GRAND RAPIDS, MICH. 49510

For postage & handling, add \$2.50 (U.S. and Canada), add \$5.00 for foreign. Make payment in U.S. dollars by check, money order or charge card. (Michigan Residents add 4% sales tax.)

FOR QUICK SERVICE PHONE 616-241-5510



Post a Notice

By W.G. Voight

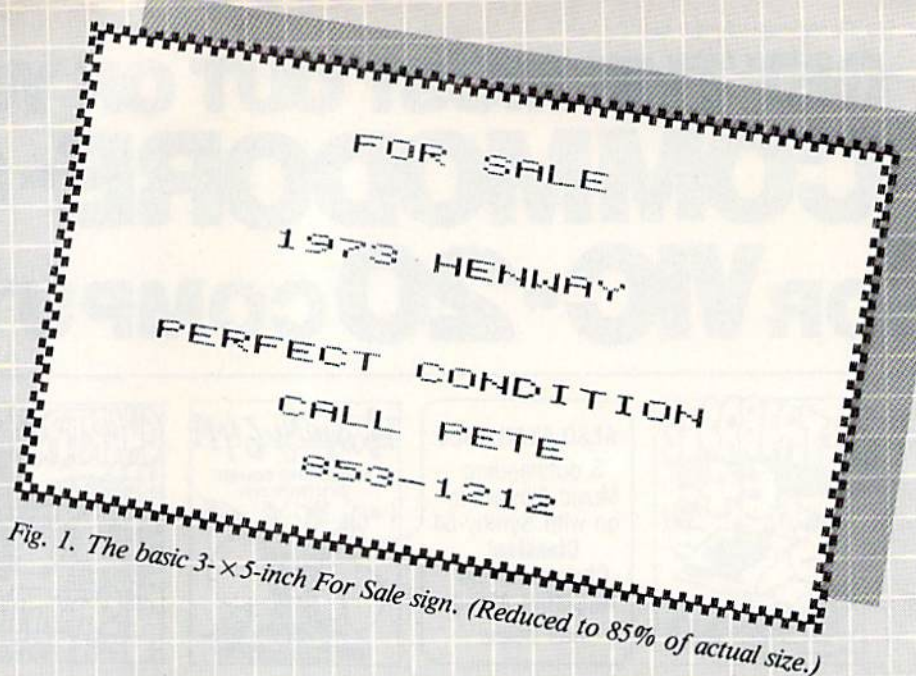


Fig. 1. The basic 3- \times 5-inch For Sale sign. (Reduced to 85% of actual size.)

Do you have something to say, something to sell or something to sing about? Turn your line into a sign and post it.

Not much has been written about bulletin board advertising, but this much is known: The cost is low and the technology is basic—a felt-tip pen and a 3- \times 5-inch index card is usually the state of the art.

Since I have a VIC-20 with a Banana printer, I decided to whip up a program that would print an attractive sign, suitable for posting on the company bulletin board or at the local laundrette. The resulting program is shown in the accompanying listing.

The size of the sign was chosen so as not to completely overpower the other advertisers with whom I'd be sharing space: A 3- \times 5-inch border with all text printed in large characters and centered on each line. A typical sign is shown in Fig. 1. The basic sign has seven lines of

up to 23 characters each, but this may be changed easily, as you'll see later.

The Banana printer has only two print sizes, so the expanded print size for five characters per inch (cpi) was chosen for the text portion of the sign. The border characters are printed in the normal character size, 10 cpi. A sign with a width of five inches will allow twenty-five characters per line at 5 cpi. Taken together, the two border characters at the ends of a line account for one expanded print position, since each is half the width of an expanded character. In addition, the program forces a minimum of one blank position at the end of a line. Therefore, the actual number of text characters is two less than the actual line length.

Line length is set by the variable LL in line 90 of the program. If you need a sign of a different width, changing the value of LL will adjust the number of characters in the line and will adjust the border to the new size. Fig. 2 shows a sign for a garage sale using five lines of 18 characters (LL=20).

The vertical size of the sign is set by the variable NL in line 90. NL is the number of text lines. Each line of text is sandwiched between two lines, which are blank except for the border characters at each end. The printer is told to use Graphics mode (CHR\$(8)) when doing line feeds, so that the border characters touch vertically.

The top border line is printed as a line of the character defined by B\$, followed by three blank lines to provide a pleasing space above the text. The reverse is true at the bottom of the sign: three blank lines followed by the border character line.

How It Works

Lines 1 through 17 document the use of the variables in the program, and need not be entered as part of the finished product.

Lines 80 and 90 assign values to each of the variables. The assignment is done here so that it may be modified easily throughout the whole program by changing only one line. If your printer uses a graphics code other than CHR\$(8), for example, you can change it in line 80, and it will be issued at the proper time. B\$ is the border character. CHR\$(191) was chosen for a checkerboard pattern. Any printable character code may be substituted here if you'd like a different border. NL and LL control the vertical and horizontal size of the sign as described earlier.

Lines 100-190 accept the text lines from the keyboard and assign them to the string variables AD\$(LI), where LI represents the number of each of the text lines from 1 through the number assigned to NL. For example, AD\$(4) contains the text that will be printed in the fourth line of the sign.

Lines 200-290 merge the border lines with the text lines vertically, and use the subroutines above line 1000 to format the lines horizontally.

Lines 1000 and 1010 print three blank lines above the first and below the last line of the text.

Lines 1400-1470 center the text on the print line and add the border character at either end. Then the line is printed.

Lines 2100-2130 assemble and print a line containing either a full line of the border character or a blank line with border characters at the ends.

RUN It Right

C-64 or VIC-20 (unexpanded)
Printer

Address author correspondence to
W.G. Voight, 6812 Halifax St., San
Diego, CA 92120.

GARAGE SALE
 SATURDAY NOV. 3
 1243 MAIN ST.
 CLOTHES & BOOKS

Fig. 2. A smaller sign with LL=20 and NL=5. Note the change in the border character. (Reduced to 85% of actual size.)

How to Use It

Enter the For Sale program into the computer from the Listing, omitting lines 1 through 17 if you wish. Type RUN.

The number of text lines and the maximum number of characters for each line will be shown at the top of the screen. As you enter each line, a question mark will appear at the left side of the screen, indicating that the program is ready for a new line. Do not add spaces at the beginning or end of the line, as the program will consider them part of the text and won't center the lines properly.

When you've entered the last line, the question mark will not appear, but the printer will begin making the sign. When you are finished, typing RUN will not reprint the same sign, but will restart the program from the beginning. If you'd like multiple copies of the sign, add the following two lines to the program.

```
270 INPUT "{SHFT CLEAR}ANOTHER
COPY";COS
280 IFLEFTS(COS,1) = "Y" GOTO 220
```

A response of "Y" or "YES" will cause the same sign to be repeated when lines 270 and 280 are added to the basic program. If you use fan-fold paper, you may have to reposition it before answering the question in order to avoid printing over a perforation.

Of course, the program may be used for other things besides For Sale signs. Perhaps reward cards for classroom use or Keep Out signs for the children's bedroom doors would be good applications. You may not even have an application for this program, but it's worth experimenting with, anyway, if you're interested in Basic programming. ®

```
1 REM:{7 SPACES}GENERATES 3 INCH X 5 INCH
2 REM:{11 SPACES}FOR SALE SIGN
3 REM:
4 REM:{5 SPACES}A$ = STRING TO BE PRINTED
5 REM:{5 SPACES}B$ = BORDER CHARACTER
6 REM:{5 SPACES}C$ = CENTERED TEXT STRING
7 REM:{5 SPACES}G$ = GRAPHICS COMMAND
8 REM:{5 SPACES}N$ = NORMAL PRINT COMMAND
9 REM:{5 SPACES}X$ = EXPANDED PRINT COMMAND
10 REM:{4 SPACES}LI = CURRENT LINE #
11 REM:{4 SPACES}LL = MAX LINE LENGTH
12 REM:{4 SPACES}NL = # OF LINES
13 REM:{4 SPACES}SL = STRING LENGTH
14 REM
15 REM
16 REM:{2 SPACES}*****
17 REM:
80 X$=CHR$(14):G$=CHR$(8):N$=CHR$(15)
90 B$=CHR$(191):NL=7:LL=25
100 PRINT"{SHFT CLR}{5 SPACES}-FOR SALE-(CRSR DN)"
110 PRINT" YOU HAVE ";NL;" LINES"
120 PRINT" OF ";LL-2;" CHARACTERS.{CRSR DN}"
130 FOR LI=1TONL
140 INPUT AD$(LI)
150 IF LEN(AD$(LI))<=LL-2 GOTO 190
160 POKE36878,15:POKE36876,200
170 PRINT" LINE TOO LONG : REDO"
180 POKE36878,0:GOTO140
190 NEXT LI
200 REM *** DO THE OUTPUT ***
210 OPEN1,4
220 R$=B$:GOSUB2100:R$=" ":GOSUB2100
230 GOSUB1000:FORLI=1TONL
240 GOSUB2100:GOSUB1400:GOSUB2100
250 NEXT LI
260 GOSUB1000:GOSUB2100:R$=B$:GOSUB2100
290 CLOSE1:END
1000 REM *** DRAW 3 BLANK LINES ***
1010 R$=" ":FORQ=1TO3:GOSUB2100:NEXTQ:RETURN
1400 REM *** ASSEMBLE AN OUTPUT LINE ***
1410 SL=LEN(AD$(LI))/2
1420 C$=" ":FORN=1TOINT(((LL-1)/2)-SL)
1430 C$=C$+" ":NEXTN:C$=C$+AD$(LI)
1440 FORN=0TO(LL-SL)/2:C$=C$+" ":NEXTN
1450 C$=LEFT$(C$,LL-1)
1460 A$=N$+B$+X$+C$+N$+B$+G$:PRINT#1,A$
1470 RETURN
2100 A$=N$+B$
2110 FORQ=1TO(2*LL)-2:A$=A$+R$:NEXTQ
2120 A$=A$+B$+G$:PRINT#1,A$
2130 RETURN
```


Listing of the For Sale program.



PROGRAM GENERATORS

By Joseph Rotello, Jr.

Are you itching to create your own software, but can't because you don't have the necessary programming skills? Don't give up—put a program generator to work for you.



INT POKE PRINT

For years after the introduction of Basic as a programming language and the appearance of microcomputers, users had to choose between two methods of acquiring software programs. Either they had to settle for existing software available "off the shelf," or they had to program their own.

Pre-made programs often proved inadequate to the need or simply didn't work, and since most users weren't—and still aren't—programmers, self-generated software was seldom possible.

Now, however, the situation has changed. There are hundreds of good, reliable software products available for your trusty C-64 and that nifty disk drive and printer. But a problem still remains. How many months will it take you to sample even ten or 15 of them? And if you buy one or two that *sound* like what you want, will they really meet your particular needs?

Wouldn't it be nice, you think, if you could buy a ready-made program that would create just the pro-

grams you want for your special purposes? Well, you no longer have to entertain futile dreams. Programs that write other programs now exist; moreover, they work well, can be mastered by everyday users and are cost-effective.

To the Rescue!

Program generators (PGs) are not a new phenomenon. They have been around for a long time in the world of mainframe and minicomputers. The main reason they were slow in appearing for microcomputers was that the memory they occupied left little storage room in which to create the desired new program. This limitation has been overcome with the development of micros, like the C-64, with greatly expanded memory capacity.

Microcomputer PGs have evolved into clear, concise, user-friendly programs that take advantage of the in-

herent speed and data-manipulation power of the small computer. The overall characteristics of most PGs can be generally stated as follows:

1. You, the user, do indeed create the program, but the PG dictates the precise form and overall structure of the Basic code that will eventually be generated.
2. Your program is built up via screen menus that extract from you the information about the proposed program's title, content and basic form. This occurs through a variety of detailed question-and-answer sessions.
3. The PG eventually outputs a working Basic program to a disk drive for storage. The resulting program is now a "stand alone." The PG is no longer needed to load and run the new program.

Most of the available PGs share similar basic procedure structures, but internal methods vary. For example, some PG programs are themselves mostly or entirely in machine language. Others are coded in Basic.

Those coded in machine language cannot be listed to the screen or printer, nor can they be modified except by qualified machine language programmers.

PGs coded in Basic may be somewhat slower than those in machine language, but the Basic PGs I've examined don't show any really objectionable increase in execution times over comparable machine language programs.

Whether in machine language or Basic, the PG program code may be composed of many discrete sub-programs, each one charged with producing a likewise discrete, but eventually interwoven, Basic program component.

For example, one PG sub-program section may deal exclusively with program layout and flowchart preparation, another with generating menus or other information displays. Another section might deal with disk structure and data input/output code. Still another may delve into the printer needs and required report-generating procedures.

You can see that the secret of producing a coherent Basic program with a PG lies in its ability to successfully combine bits and pieces of Basic program logic into one program. In many respects, the PG will essentially follow the same procedures any good programmer would employ when creating a Basic program from scratch.

Product Overview

No discussion of program generators would be complete without at least a

Programs For the Home

Dynatech also features a program generator for home applications. Home FileWriter is part of the same family of software as CodeWriter. With this program, there is no need to know computer programming to write unique programs for the home.

Just set up your screen and calculations in plain English. Your C-64 will translate your instructions and draw up the code that the computer will accept.

This program generator will let you handle such home applications as maintaining inventories of household items, mailing lists, tax information, check balancing, medical records and credit card information.

Home FileWriter is available on disk for \$69.95 from Dynatech.

cursory inspection of some of the PG products currently available for the Commodore 64. The following represent the PG software providers who responded to our program-for-review request.

CodeWriter

CodeWriter (Dynatech Microsoftware, 7847 N. Caldwell Ave., Niles, IL 60648; \$99.95) is one of the more simple-to-use PGs I have seen. The program seems best suited to the entry-level computer user, although more advanced programmers will find it powerful enough for many applications.

The program manual is excellently written and very easy to comprehend even for the computer novice. The only drawback to the manual is that only one detailed example of PG use is given. This single example, however, is very well detailed in just about every respect.

The test version came equipped with tutorials on disk that were comprehensive and clear. They also described another sample program to help you understand CodeWriter's program operation. A more definitive manual is in the works and should be available soon.

CodeWriter is itself programmed mostly in Basic, although there seem to be internal references to a few computer-specific operating system routines. CodeWriter's overall execution speed is generally acceptable for most applications.

In my test usage, I found CodeWriter to be pleasant to use. The program does not presume that you understand anything more complicated than how to an-

swer specific questions presented via screen menus.

Although it's impossible to estimate fairly CodeWriter's programming efficiency, I noted that to duplicate an already existing, fairly complex inventory program took about 55 minutes versus the estimated 15 hours the hand-coded version required.

The Last One

The Last One (Computer Marketing Services, 26 Springdale Road, Cherry Hill, NJ 08003; \$99.95) has been available in Great Britain for over two years, initially for the Commodore PET/CBM computers. It is the more thorough and internally complex of the two program generators reviewed here in that it provides a more complete treatment of programming introduction, data files, sorting and report generation, both in the manual and in the actual program.

Most first-time users will not find the manual hard to comprehend, even where more complex programming topics are discussed. As with CodeWriter, a new, more spacious manual is being prepared and should be available by the time you read this article.

The Last One appears well suited to most areas of programming, and advanced programmers should find it powerful enough for just about any of their needs. It is itself programmed mostly in machine language, although there seem to be a few internal program references to Basic where the use of Basic is preferred. The overall program-execution speed is acceptable for any user application.

One interesting feature is the extensive use of flowcharting. The Last One uses a modern "English language" flowchart, with entries that are numbered lines briefly describing the logic to be performed at that point in the program.

Once understood, this method grows on you. In fact, by using this interesting flowchart, the Last One is actually introducing you to an excellent programming principle: Plan your program before you start it!

Epilogue

One thing can't be mentioned often enough. Due to the value of the program generators, always precede initial

Address all author correspondence to Joseph Rotello, Jr., 4734 East 26th St., Tucson, AZ 85711.

EASTCOAST SOFTWARE

ECs...inflation-fighting prices.

No hidden charges! No credit card fees!

COMMODORE

CAT#	LIST	SALE
0171	64 Tutorial Vol 1 D	\$24.95 \$22.70
0187	64 Tutorial Vol 2 D	24.95 22.70
2741	Acct Pay Mgmt/Checks D	99.00 68.55
0064	Alien Addition D	34.00 26.75
0335	Alligator Mix D	34.00 26.75
2713	Alphabet Zoo D	29.95 20.75
2714	Alphabet Zoo R	34.95 24.20
0696	Amdek 300A 12 in Amber Mon	199.00 161.50
0104	Amdek 300G 12 in Green	179.00 143.40
0105	Amdek Color I Monitor	399.00 320.60
2209	Apple Cider Spider R	33.50 23.20
2913	Archon D	40.00 30.75
2050	Assembler 64 D	29.95 13.30
2914	Axis Assassin D	35.00 26.95
1750	B-1 Nuclear Bomber C	16.00 11.10
1764	Bank Street Writer D	69.95 48.35
2667	BC's Quest For Tires D	34.95 24.20
0262	Beachhead D	34.95 26.00
1914	Blade of Blackpoole D	39.95 27.65
2873	Calc Result-Easy R	79.95 61.50
0373	Cardco Print/G	109.95 84.60
2835	Castle Wolfenstein D	29.95 20.70
2946	Centipede R	44.95 37.00
2702	Checkers D	49.95 34.60
2701	Chess D	69.95 48.45
1761	Choplifter R	44.95 31.05
2223	Combat Leader D	39.95 27.65
0443	Comm 64 User Encyclopedia	14.95 10.55
0416	Compuserve Starter Kit	39.95 24.35
2337	Computer Sat D-Harcourt	79.95 62.85
2885	Congo Bongo R	39.95 27.65
2917	Cut & Paste D	50.00 38.50
1765	David's Midnight Magic D	34.95 24.15
1880	Deadline D	49.95 34.60
2204	Death In The Caribbean D	35.00 26.30
1787	Decision Maker C	14.95 10.35
1786	Decision Maker D	19.95 15.05
2948	Defender R	44.95 37.00
2874	Delphi's Oracle D	150.00 111.55
2716	Delta Drawing R	39.95 27.65
0103	Demolition Division D	34.00 26.75
1893	Dino Eggs D	40.00 30.00
1722	Disk Boxes (5 Color Coded)	25.00 12.50
2984	Disk Boxes—Individual	5.00 2.50
2158	Diskey D	49.95 34.60
2945	Donkey Kong R	44.95 37.00
2254	Doodle D	49.95 30.75
2180	Dragonriders Of Pern C	40.00 27.70
2179	Dragonriders Of Pern D	40.00 27.70
2668	Early Games Children C	29.95 20.75
2340	Early Games Children D	29.95 20.75
2675	Early Games Fractions C	29.95 20.75
2674	Early Games Fractions D	29.95 20.75
2676	Early Games Matchmaker C	29.95 20.75
2677	Early Games Matchmaker D	29.95 20.75
2673	Early Games Music C	29.95 20.75
2672	Early Games Music D	29.95 20.75
2671	Early Games Piece Cake C	29.95 20.75
2670	Early Games Piece Cake D	29.95 20.75
1703	Easyscalc 64 D	79.95 59.05
1705	Easyscript 64 D	79.95 35.90
0364	Easyspell D	20.95 16.05
0546	Elementary Commodore	14.95 10.35
0092	Elephant Disks SS/DD (10)	37.00 24.35
1337	Elephant Disks SS/SD (10)	34.00 21.15
2215	Facemaker R	34.95 24.20
2973	Flight Simulator 2 D	49.95 38.05
2918	Flip & File W/Lock (50)	39.95 23.85
1440	Flip-N-File (50 Disks)	29.95 18.85
2136	Floyd Of The Jungle D	29.95 23.05
1954	Fort Apocalypse C	\$34.95 \$24.20

CAT#	LIST	SALE
1950	Fort Apocalypse D	34.95 24.20
1907	Frogger C	34.95 24.15
1905	Frogger D	34.95 24.15
1811	Games Commodore 64 Play	14.95 10.35
2183	Gateway To Apshei R	40.00 27.70
2739	General Ledger D	99.00 68.55
2224	Geopolitic D	39.95 27.65
1847	Gridrunner R	29.95 20.70
2911	Hardhat Mac D	35.00 26.95
1437	Head Cleaning Kit	29.95 17.30
2137	Hellcat Ace D	29.95 23.05
1851	Hes Modem I D	79.95 61.50
1936	Hey Diddle Diddle D	29.95 20.70
1782	Home Accountant D	74.95 48.05
1791	Home Inventory C	14.95 10.35
1790	Home Inventory D	19.95 15.05
2297	Homeworld D	49.95 48.30
1789	Household Finance C	29.95 20.75
1788	Household Finance D	34.95 26.35
2789	How To Use Commodore 64	3.95 3.30
2868	In Search Of / Amazing D	39.95 27.65
2953	Infidel D	49.95 34.60
1844	Jumpman C	40.00 27.70
1839	Jumpman D	40.00 27.70
2065	Jupiter Lander R	29.95 10.55
2037	Kickman R	29.95 13.40
1320	Kids And The Commodore 64	19.95 15.05
2712	Kids On Keys D	29.95 20.75
2218	Kids On Keys R	34.95 24.20
2315	Kidwriter D	34.95 24.20
2214	Kindercomp D	29.95 20.70
2212	Kindercomp R	29.95 20.70
2720	Knights Of The Desert C	39.95 27.60
2722	Knights Of The Desert D	39.95 27.65
1333	Koala Graphic Tablet-CMD64	99.95 75.00
1883	Kraft Joystick (At.Type)	16.95 13.45
2972	Labels—1" White (1000)	9.95 6.75
2989	Lode Runner D	34.95 24.20
2855	Lode Runner R	39.95 27.70
2076	Lode Run	69.95 48.80
1886	Master Type D	39.95 27.65
2970	Math Blaster D	49.95 34.60
0089	Maxell MD1 Disks SS/DD (10)	51.90 28.75
0692	Microline 92-P Printer	599.00
1509	Microline Ribbon	3.20 2.20
2875	Miner 2049er R	39.95 30.75
0671	Mirage Data Base Mgr D	89.95 69.25
0666	Mirage Word Processor D	89.95 69.25
2735	Money Manager D	24.95 17.30
1939	Most Amazing Thing D	39.95 27.60
2916	Mule D	40.00 30.75
2870	Multipan D	99.95 69.20
2242	Murder By The Dozen D	34.95 24.20
2048	Music Composer D	29.95 13.30
2912	Music Const Set D	40.00 30.75
2134	Nato Commander D	34.95 26.90
0101	NEC 1215 Color Monitor	399.00 333.35
0240	NEC 8023 Printer	499.00 432.90
0273	NEC 8023 Ribbon 2-Pac	19.95 17.10
0263	Neutral Zone D	34.95 26.00
1756	Nukewar C	15.00 10.40
2703	Odin D	49.95 34.60
2193	Ornicalc D	79.95 55.35
2947	Pac-Man R	44.95 37.00
2842	Paper Clip D	125.00 86.55
2893	Paral Printer Ext. Cable 6'	34.95 21.80
1957	Pharaoh's Curse C	34.95 24.20
1953	Pharaoh's Curse D	34.95 24.20
0650	PI-3 12 in Amber Monitor	249.00 162.00
2044	Pilot D	59.95 37.70
2834	Pinball D	29.95 20.70
2915	Pinball Const Set D	40.00 30.75
2679	Pipes R	34.95 24.20
2184	Pitstop R	40.00 27.70
2201	Planetfall D	49.95 34.60
2177	Pooyan C/D	29.95 20.70
2983	Powerfile D	130.00 99.95
2820	Practicalc D	55.95 38.05
1894	Quick Brown Fox R	65.00 49.00
2711	Rhymes & Riddles D	29.95 20.75
0503	Riteman Plus Printer	399.00 312.80
2950	Robotron 2084 R	44.95 37.00
2965	Sanyo PR5500 Printer	995.00 762.85
2993	Sargon 2 D	34.95 24.20
2681	Save New York R	34.95 24.20
2043	Sea Wolf R	29.95 13.85
1762	Seafox R	39.95 27.60
1959	Shamus C	34.95 24.20
1948	Shamus D	34.95 24.20
0587	Simons Basic R	24.95 16.05
1416	Smith Corona TP1 Ribbon	7.95 6.35
1937	Snooper Troops #1 D	39.95 27.60

CAT#	LIST	SALE
2710	Snooper Troops #2 D	\$29.95 \$20.75
2837	Software Automouth D	59.95 41.45
0374	Solo Flight C	34.95 26.90
2952	Solo Flight D	34.95 26.90
2968	Spider Eater D	29.95 21.95
2725	Star Battle D	24.95 17.30
2935	Star Trek R	39.95 27.60
1881	Starcross D	39.95 27.65
2949	Stargate R	44.95 37.00
1277	Starwriter Film Ribbon	5.50 4.50
1278	Starwriter Nylon Ribbon	5.75 4.65
2715	Story Machine R	39.95 27.65
2250	Supertext Pro D	99.00 66.00
1952	Survivor D	34.95 24.20
1877	Suspended D	49.95 34.50
1843	Sword Of Fargoal C	30.00 20.80
1838	Sword Of Fargoal D	30.00 20.80
0346	Tax Advantage D	69.95 44.85
1259	Taxan 12 in Amber Monitor	189.00 138.65
1258	Taxan 12 in Green Monitor	179.00 131.60
1528	Taxan Color Mntnr W/Audio	399.00 305.50
1758	Telegard C	23.00 15.95
0444	Telegard D	28.00 19.40
1842	Temple of Apshei C	40.00 27.70
1836	Temple of Apshei D	40.00 27.70
2162	Trushman R	29.95 20.75
1281	Trunk Floppy Storage	29.95 21.50
2195	Turtle Graphics II R	59.95 41.50
1915	Type Attack D	39.95 27.65
0680	Type Tutor / Word Inva C	21.95 15.20
0679	Type Tutor / Word Inva D	24.95 17.30
0884	Ultima 3 D	54.95 38.05
1841	Upper Reaches Apshei C	20.00 13.85
1837	Upper Reaches Apshei D	20.00 13.85
1721	Verbatim SS/DD Hardpack	35.00 27.60
0093	Verbatim SS/DD Softpack	34.00 26.95
1826	Video Pack 80	179.95 135.00
1072	VIP Terminal D	49.95 41.65
0002	Wico Joystick	29.95 21.95
0015	Wico Redball Joystick	34.95 24.40
0008	Wico The Boss Joystick	19.95 14.10
1885	Witness D	49.95 34.60
2889	Wordpro 3+ W/Spell D	99.95 75.00
0264	Worms D	40.00 30.75
2871	Your Commodore 64	14.95 12.50
1822	Z80 Video Pack W/C/PM R	299.95 224.95
2175	Zaxxon C	39.95 27.65
0577	Zaxxon D	39.95 27.65
1878	Zork I D	39.95 27.60
1879	Zork II D	39.95 27.65
1882	Zork III D	39.95 27.65

Key
(D) Disk Program
(R) Rom Cartridge
(C) Cassette Program

Many More Titles Available!

Commodore® is a registered trademark of
COMMODORE ELECTRONICS, LTD.



CHECK ONE: VISA MASTERCARD

Card# _____ Exp. _____

Telephone _____

Name _____

Address _____

City _____

State _____ Zip _____

Please enter my order for: _____

Please specify machine: _____

Please send free catalog

EASTCOAST SOFTWARE

40 Hockersville Rd.
Hershey, PA 17033
MAIL YOUR ORDER OR CALL
(717) 533-8125
800-233-3237

We Ship UPS—Shipping 1% (\$2.50 min.)
C.O.D. Add An Additional \$2.50
Hardware (Printers/Monitors)
Shipping is \$2.50 + 4% (U.P.S.)
For Air Mail, Canadian, APO/FPO Orders,
Shipping \$2.50 + 4% of Total Order (US Funds)
PA Residents Add 6% Tax

No Minimum Order
Visa-Mastercard-C.O.D.—Check

Prices Subject To Change
Sorry, No Foreign Orders

800-233-3237
In PA 717-533-8125

This Ad Prepared April, 1984

program use by performing three very important steps:

- 1) Read the manual at least once before attempting to use the program.
- 2) Be sure to make secure backup copies of all disks provided with the program.
- 3) Return any registration cards promptly, so that any future information or program updates can be sent to you.

Strict adherence to these simple rules will save many hours of frustration in the long run.

The key to effective operation of a program generator is not to jump directly into it with the expectation of writing the ultimate program. When you receive the software, take the time to experiment and begin slowly, so that

you can get into the flow, so to speak.

The best way to approach a PG is like you would a new car. Familiarize yourself with all the pedals and controls, and you'll enjoy the new machine sooner. Work your way into the possibilities of your PG, and you'll discover a new and satisfying dimension of your personal computer. R

Master 64 (for the C-64; 1541-compatible disk required; Abacus Software, PO Box 7211, Grand Rapids, MI 49510; \$84.95) takes a different approach to application generation than either a conventional data manager program or the other two programs reviewed here. Instead of leading you through the design of a file or Basic file-handling program, Master adds 100 new commands to Basic that greatly ease the design of a file-handler and other serious programs.

These commands fall into the categories of drawing, data entry, screen management, report formatting, file management, extended precision math, a programmer's aid package, Basic 4.0 and a simple machine language monitor. Also included are several other utility programs.

The first thing you notice when trying to use Master is that you have to refer constantly to the manual if you more than double the number of Basic commands. Fortunately, the large manual is well set up for reference, with most commands on separate pages, and everything needed to use the command on the same page. On the other hand, nothing in the manual qualifies as a tutorial, and one is badly needed.

Fortunately, there are two very impressive demo programs on the Master disk; after I listed them to a printer, I was able to copy some of their techniques into my own application. Too bad they weren't listed in the manual.

What first impressed me about Master was its Data-Entry commands. They completely overcome all the limitations of Basic's Input and Get commands, allowing you to specify any kind of input you want and to enter it from any desired spot on the screen.

In less than an hour, a skilled Basic programmer can design a data-entry screen that fully conforms to

Master 64

by Jim Strasma

Commodore's recommended standards and is completely foolproof in use. It can even include separate Help screens loaded from disk or transferred from extra screen pages in memory.

The same flexibility applies to work with the printer. By first sending reports to a relative disk file and then to a printer, Master makes it possible to arrange information on a printed page as easily as on the screen. Simply specify the row, column, length and contents of each data item.

File handling is a bit more complicated. A separate program must be run in order to create a new data file, although doing so can be automated within a Master program. The files themselves use ISAM (Indexed Sequential Access Method) for speed.

Like relative files, ISAM allows rapid access to any record within the file. However, there are some hitches; you can't validate (collect) a disk that contains a Master data file, or you'll lose it. Also, space on the disk will only be used efficiently by the file if your chosen record size divides closely into 254. Further, deleted records still use up space on the disk until the file is copied by a separate program.

On the other hand, using commands included in Master, you can greatly compress the size of file data. For instance, you can automatically verify and store a date in only two bytes, and numbers up to 127 in one.

One of my other favorite features is Master's 22-digit precision math. This is essential for many business applications, and I've not found it in any other product.

As you work, you'll also have the usual programmer's aid commands

available (trace, renumber, auto, etc.), along with a full set of Basic 4.0 disk commands and a simple machine language monitor. On the other hand, don't expect to use other programmer's aid programs or cartridges at the same time. Master works well with a transparent IEEE-488 interface, such as the Bus Card, and any connected CBM disk drive, but does not claim to work with anything else you might plug in.

Unfortunately, Master's many features take a heavy toll in memory. Instead of the usual 38K free, you'll have just 20K for your programs. Admittedly, programs will be shorter than usual, because Master's commands do so much of the hard work, but you will still have trouble using it for very large applications.

On the other hand, if your planned application will fit in the memory available, Master will greatly ease your work in developing programs, and you may freely sell your finished program without paying any royalty for using the run-time version of Master that is included. If you would like to protect that program from unauthorized listing and use, Abacus will also sell you a set of dongles that will limit program access to those who have them.

Master is more likely to be useful to a trained programmer than a new user, due to the amount of pre-planning needed to get a viable program out of it. I like Master a lot, but don't use it as often as I'd expected, largely due to its size. On the other hand, in the proper application, nothing else currently available controls your screen and printer more completely or precisely, and the price is reasonable compared to that of other programmer's aids. R

Address all author correspondence to Jim Strasma, 1238 Richland Ave., Lincoln, IL 62656.

NOW HEAR THIS!

DIGITAL AUDIO MAGAZINE™

For the new age in sound reproduction!

Digital Audio brings you news of the most significant breakthrough in sound recording since Edison recited "Mary Had A Little Lamb" into the horn of his prototype phonograph more than a century ago.

- Informative equipment profiles
- Critical Compact Disc reviews
- Maintenance tips
- Regular columns
- Expert technical advice
- Product updates and reports
- Special, in-depth feature articles
- Industry news flashes and much, much more.

Digital Audio. Your new magazine for the new age in sound reproduction.

Sound incredible?
That's the idea.

Order *Digital Audio* now and receive a FREE issue with your first year's subscription—a total of 13 issues of *Digital Audio* for \$19.97—a savings of over 47% off the newsstand price!

If you don't want to cut up this magazine, just send us the requested information on a plain sheet of paper. For faster service call TOLL FREE 1-800-227-1053. In NH, dial 1-924-9261.

Be one of the first to say YES! to *Digital Audio!*

YES, it does sound incredible.

Send me my **FREE** issue and start my one year subscription to *Digital Audio Magazine™* for \$19.97.

CHECK/MO MC VISA AE BILL ME

Card # _____ Exp. date _____

Signature _____

Name _____

Address _____

City _____ State _____ Zip _____

FOR FASTER SERVICE

call Toll-Free 1-800-227-1053

Digital Audio Magazine™
PO Box 976 • Farmingdale, NY 11737
Please allow 6-8 weeks for delivery.

748403

COMMODORE 64

(more power than Apple II at half the price)

\$99.50*

- 170K DISK DRIVE \$159.00*
- TRACTION FRICTION PRINTER \$79.00*

COMPUTER AND SOFTWARE SALE

WE
HAVE
THE
BEST
SERVICE

WE
HAVE
THE
LOWEST
PRICES

VIC-20

(a real computer at the price of a toy)

\$79.50

- COM-64 POWER FOR VIC-20 \$79.00
- NEW VOICE SYNTHESIZER \$59.00 (Com-64 or VIC-20)

* COMMODORE 64 COMPUTER \$99.50

You pay only \$199.50 when you order the powerful 84K COMMODORE 64 COMPUTER! LESS the value of the SPECIAL SOFTWARE COUPON we pack with your computer that allows you to SAVE OVER \$100 off software sale prices!! With only \$100 of savings applied, your net computer cost is \$99.50!!

*170K DISK DRIVE \$159.00

You pay only \$259.00 when you order the 170K Disk Drive! LESS the value of the SPECIAL SOFTWARE COUPON we pack with your disk drive that allows you to SAVE OVER \$100 off software sale prices!! With only \$100 of savings applied, your net disk drive cost is \$159.00.

* TRACTION FRICTION PRINTER \$79.00

You pay only \$179.00 when you order the Comstar T/F deluxe line printer that prints 8 1/2 x 11 full size, single sheet, roll or fan fold paper, labels etc. 40, 66, 80, 132 columns. Impact dot matrix, bi-directional, 80 CPS. LESS the value of the SPECIAL SOFTWARE COUPON we pack with your printer that allows you to SAVE OVER \$100 off software sale prices!! With only \$100 of savings applied your net printer cost is only \$79.00.

4 COLOR PRINTER/PLOTTER \$99.00

Lowest cost, 4 color, 80 column, letter quality PRINTER/PLOTTER for Com-64 or VIC-20 computers!! List programs. High resolution graphics for charts and geometric figures. INCLUDES INTERFACE AND SPECIAL SOFTWARE SAVINGS COUPON!!

80 COLUMN BOARD \$99.00

Now you program 80 COLUMNS on the screen at one time! Converts your Commodore 64 to 80 COLUMNS when you plug in the 80 COLUMN EXPANSION BOARD!! PLUS—you can get an 80 COLUMN BOARD WORD PROCESSOR with mail merge, terminal emulator, ELECTRONIC SPREAD SHEET. List \$59.00 SALE \$24.95 if purchased with 80 COLUMN BOARD!! (Tape or Disk)

80 COLUMNS IN COLOR EXECUTIVE WORD PROCESSOR \$69.00

This EXECUTIVE WORD PROCESSOR is the finest available for the COMMODORE 64 computer! The ULTIMATE for PROFESSIONAL Word-processing application! DISPLAYS 40 OR 80 COLUMNS IN COLOR or Black and White! Simple to operate, powerful text editing with a 250 WORD DICTIONARY, complete cursor and insert/delete key controls line and paragraph insertion, automatic deletion, centering, margin settings and output to all printers! Includes a powerful mail merge, 20,000 WORD DICTIONARY - List \$24.95 SALE \$19.95. EXECUTIVE DATA BASE - List \$69.00 SALE \$49.00. (Disk)

SPECIAL SOFTWARE COUPON

We pack a SPECIAL SOFTWARE COUPON with every COMMODORE 64 COMPUTER-DISK DRIVE-PRINTER-MONITOR we sell! This coupon allows you to SAVE OVER \$100 OFF SALE PRICES! Up to \$500 savings are possible!!

PROFESSIONAL SOFTWARE COMMODORE 64

Name	List	Sale	Coupon
Executive Word Processor	\$99.00	\$69.00	\$59.00
Executive Data Base	\$69.00	\$59.00	\$39.00
20,000 Word Dictionary	\$24.95	\$19.95	\$14.95
Electronic Spreadsheet	\$59.95	\$49.00	\$39.00
Accounting Pack	\$49.00	\$39.00	\$29.00
Total 5.2			
Word Processor			
Tape	\$69.00	\$49.00	\$34.00
Disk	\$79.95	\$59.00	\$39.00
Total Text 2.6			
Word Processor			
Tape	\$44.95	\$34.95	\$22.00
Disk	\$49.00	\$39.00	\$27.00
Total Label 2.6			
Tape	\$24.95	\$18.00	\$12.00
Disk	\$29.95	\$23.00	\$15.00
Programmers Helper (Disk)	\$59.00	\$39.95	\$29.95
80 Column Screen (Disk)	\$59.95	\$39.95	\$29.95
Crush-Crumble-Chomp (Tape/Disk)	\$29.95	\$24.95	\$19.95
Pitstop (Cartridge)	\$39.95	\$29.95	\$24.95
Typing Teacher (Tape/Disk)	\$29.95	\$24.95	\$15.00
Sprite Designer (Disk)	\$16.95	\$14.95	\$10.00
Fireball Joy Stick	\$24.95	\$15.95	\$10.00
Light Pen	\$39.95	\$16.95	\$14.95
Dust Cover	\$ 8.95	\$ 6.95	\$ 4.60

(See 100 coupon items in our catalog!)

Write or call for
Sample SPECIAL SOFTWARE COUPON!

EXECUTIVE QUALITY PROFESSIONAL BUSINESS SOFTWARE

The Cadillac of business programs for Commodore 64 Computers

Item	List	*SALE	Coupon
Inventory Management	\$99.00	\$59.00	\$49.00
Accounts Receivable	\$99.00	\$59.00	\$49.00
Accounts Payable	\$99.00	\$59.00	\$49.00
Payroll	\$99.00	\$59.00	\$49.00
General Ledger	\$99.00	\$59.00	\$49.00

VIC-20 COMPUTER \$79.50

This 25K VIC-20 computer includes a full size 66 key typewriter keyboard color and graphics keys, upper/lower case, full screen editor, 16K level II microsoft basic, sound and music, real time floating point decimal, self teaching book, connects to any T.V. or monitor!

COM-64 POWER FOR VIC-20 \$79.00

Just plug in our 32K RAM MEMORY EXPANDER and you get as much usable programming power as the Commodore-64 computer!! Master control switches on cover, Gold Edge connectors, five year warranty (FREE \$29.95; CARTRIDGE GAME)

NEW VOICE SYNTHESIZER \$59.00

For Com-64 or VIC-20 computers. Just plug it in and you can program words and sentences, adjust volume and pitch, make talking adventure games, sound action games and customized talkies!! FOR ONLY \$19.95 you can add TEXT TO SPEECH, just type a word and hear your computer talk—ADD SOUND TO "ZORK," SCOTT ADAMS AND AARDVARK ADVENTURE GAMES!! (Disk or tape).

16K RAM CARTRIDGE \$49.00

Increases VIC-20 programming power 4 times. Expands total memory to 41K (41,000 bytes). Memory block switches are an outside cover! CARDCO Includes FREE \$29.95 game!!

8K RAM CARTRIDGE \$34.95

Increases VIC-20 programming power 2 1/2 times. Expands total memory to 33K (33,000 bytes). Includes FREE \$16.95 game.

3 SLOT SWITCHABLE EXPANDER \$24.95

Allows you to add 3 cartridges at one time—switch select to turn slots on or off—PLUS reset button. A must for your VIC-20 computer!!

60K MEMORY EXPANDER \$49.00

Sixslot Board — Switch selectable — Reset button — Ribbon cable — CARDCO. A must to get the most out of your VIC-20 Computer!

9" GREEN SCREEN MONITOR \$69.00

Excellent quality SANYO, easy to read, 80 columns x 24 lines, Green Phosphorous screen with anti-glare, metal cabinet! Saves your T.V. PLUS \$9.95 for connecting cable. Com-64 or VIC-20.

12" GREEN OR AMBER MONITOR \$99.00

Your choice of green or amber screen monitor, top quality, SANYO, 80 columns x 24 lines, easy to read, anti-glare, faster scanning! A must for word processing PLUS \$9.95 for connecting cable. Com-64 or VIC-20.

- LOWEST PRICES • 15 DAY FREE TRIAL • 90 DAY FREE REPLACEMENT WARRANTY
- BEST SERVICE IN U.S.A. • ONE DAY EXPRESS MAIL • OVER 500 PROGRAMS • FREE CATALOGS

Add \$10.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add \$20.00 for CANADA, PUERTO RICO, HAWAII orders. WE DO NOT EXPORT TO OTHER COUNTRIES.

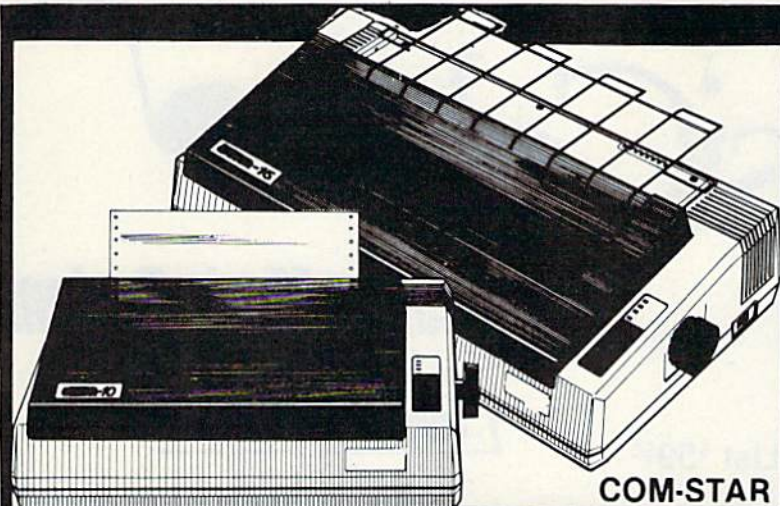
Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail! Canada orders must be in U.S. dollars. VISA — MASTER CARD — C.O.D.

PROTECTO ENTERPRISES

(WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

80 COLUMN PRINTER SALE—\$149.00*



COM-STAR T/F

Tractor
Friction
Printer

only \$ **179****

• 15 Day Free Trial - 180 Day Immediate Replacement Warranty

• **Lowest Priced, Best Quality, Tractor-Friction Printers in the U.S.A.**

- **Fast 80-120-160 Characters Per Second** • 40, 46, 66, 80, 96, 132 Characters Per Line Spacing
- **Word Processing** • **Print Labels, Letters, Graphs and Tables** • **List Your Programs**
- **Print Out Data from Modem Services** • **"The Most Important Accessory for Your Computer"**

***STX-80 COLUMN PRINTER—\$149.00**

Prints full 80 columns. Super silent operation, 60 CPS, prints Hi-resolution graphics and block graphics, expanded character set, exceptionally clear characters, fantastic print quality, uses inexpensive thermal paper! Best thermal printer in the U.S.A.! (Centronics Parallel Interface).

****DELUXE COMSTAR T/F 80 CPS PRINTER—\$179.00**

The COMSTAR T/F (Tractor Friction) PRINTER is exceptionally versatile. It prints 8½" x 11" standard size single sheet stationary or continuous feed computer paper. Bi-directional, impact dot matrix, 80 CPS, 224 characters. (Centronics Parallel Interface).

Premium Quality—120 CPS COMSTAR T/F SUPER-10X PRINTER—\$289.00

COMSTAR T/F (Tractor Friction) SUPER-10X PRINTER gives you all the features of the COMSTAR T/F PRINTER plus a 10" carriage, 120 CPS, 9 x 9 dot matrix with double strike capability for 18 x 18 dot matrix (near letter quality), high resolution bit image (120 x 144 dot matrix), underlining, back spacing, left and right margin settings, true lower decenders with super and subscripts, prints standard, italic, block graphics

and special characters, plus 2K of user definable characters! The COMSTAR T/F SUPER-10X PRINTER was Rated No. 1 by "Popular Science Magazine." It gives you print quality and features found on printers costing twice as much!! (Centronics Parallel Interface) (Better than Epson FX 80).

Premium Quality—120 CPS COMSTAR T/F SUPER-15½" PRINTER—\$379.00

COMSTAR T/F SUPER 15½" PRINTER has all the features of the COMSTAR T/F SUPER-10X PRINTER plus a 15½" carriage and more powerful electronics components to handle large ledger business forms! (Better than Epson FX 100).

Superior Quality SUPER HIGH SPEED—160 CPS COMSTAR T/F 10" PRINTER—\$399.00

SUPER HIGH SPEED COMSTAR T/F (Tractor Friction) PRINTER has all the features of the COMSTAR SUPER-10X PRINTER plus SUPER HIGH SPEED PRINTING—160 CPS, 100% duty cycle, 8K buffer, diverse character fonts, special symbols and true decenders, vertical and horizontal tabs. RED HOT BUSINESS PRINTER at an unbelievable low price!! (Serial or Centronics Parallel Interface)

Superior Quality SUPER HIGH SPEED—160 CPS COMSTAR T/F 15½" PRINTER—\$529.00

SUPER HIGH SPEED COMSTAR T/F 15½" PRINTER has all the features of the SUPER HIGH SPEED COMSTAR T/F 10" PRINTER plus a 15½" carriage and more powerful electronics to handle larger ledger business forms! Exclusive bottom paper feed!!

PARALLEL INTERFACES For VIC-20 and COM-64—\$69.00 For Apple Computers—\$79.00

NOTE: Other printer interfaces are available at computer stores!

Double Immediate Replacement Warranty

We have doubled the normal 90 day warranty to 180 days. Therefore if your printer fails within "180 days" from the date of purchase you simply send your printer to us via United Parcel Service, prepaid. We will IMMEDIATELY send you a replacement printer at no charge, prepaid. This warranty, once again, proves that WE LOVE OUR CUSTOMERS!

Add \$17.50 for shipping, handling and insurance. WE DO NOT EXPORT TO OTHER COUNTRIES EXCEPT CANADA.
Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail! Canada orders must be in U.S. dollars. VISA — MASTER CARD ACCEPTED. We ship C.O.D.

PROTECTO ENTERPRISES (WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

Introducing

MusiCalc™

The Creative Music System



List \$59.95



Turn Your Commodore-64 Into A Sophisticated Musical Instrument

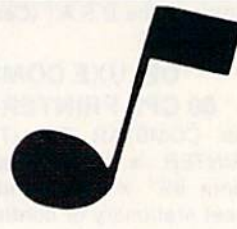
"The Program That Gives You A Reason To Buy A Commodore-64."

New York Times.

With MusiCalc anyone can • Make and record sophisticated music • Print out sheet music from your creations • Turn your computer into a Cord Organ • No Experience Necessary!
To prove it we will send you a **Free Record** with music created on a Commodore 64 computer and MusiCalc
To get your **Free Record** call Protecto Enterprizes



MusiCalc™



ScoreWriter

Combine with MusiCalc 1 and a graphics printer (Super-10) to produce sheet music from your original composition. List \$39.95 **Sale \$29.95** Coupon \$24.95

Synthesizer & Sequencer

This 1st step turns your Commodore-64 into a Cord Organ — a three voice synthesizer and fully interactive step sequencer play along with pre-recorded songs or develop your own and record the music you create.

List \$59.00. **Sale \$39.95.**



Keyboard Maker

Turns your Commodore-64 into a musical keyboard. Comes with over 30 pre-set keyboard scales from Classical to Rock. Requires MusiCalc 1. List \$39.95. **Sale \$29.95.** Coupon \$24.95.

• **LOWEST PRICES** • **15 DAY FREE TRIAL** • **90 DAY FREE REPLACEMENT WARRANTY**
• **BEST SERVICE IN U.S.A.** • **ONE DAY EXPRESS MAIL** • **OVER 500 PROGRAMS** • **FREE CATALOGS**

Add \$3.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add \$6.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES.
Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery. 2 to 7 days for phone orders. 1 day express mail!
VISA — MASTER CARD — C.O.D.
www.Commodore.ca No C.O.D. to Canada, APO-FPO.

PROTECTO ENTERPRIZES

(WE LOVE OUR CUSTOMERS)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

CHALK BOARD COLOR TOUCH TABLET

Chalk Board Touch-Tablet is a revolutionary new 12" x 12" touch sensitive surface that lets you bypass your COMMODORE-64 Computer keyboard. Just touch the pad and watch your ideas appear on your t.v. screen in living color! Power Pad is drawing pad, color graphics, color canvas and piano keyboard, jigsaw puzzle, game board for any age. A fantastic, entertaining, learning experience! • **Free \$29.95 Paint Brush Program!**



List Price \$129.90

Sale \$59.00

LEARNING PAD SALE!!!

- **Bigger — Better — Lower Price Than Koalapad!** • Fantastic Learning Tool • First Graders To Senior Citizens • Learn By Touching Tablet • Color Graphics • Drawing Pad • Game Board • Jigsaw Puzzle • Piano Key Board • Music • Visual Arts • Math • Science • Apple (Macintosh) Mouse Capability

LEO'S 'LECTRIC PAINT BRUSH. When you use Leo's 'Lectric Paintbrush software, you are ready for magical, multi-colored electronic finger painting. Make your own pictures. Color them. Change them. Save them. List \$29.95. **Sale (Free with purchase of CHALKBOARD LEARNING PAD for \$59.00).** (Cart)

BEARJAM. As children play this game and feed the friendly animated bear, they sharpen the visual skills so essential for success in learning. BearJam is a great reading-readiness game. List \$39.95. **Sale \$29.95.** (Cart)

LEARNING PAD PROGRAMMING KIT. Once you're familiar with the COMMODORE-64 Computer keyboard and you understand beginning BASIC, the LEARNING PAD programming kit sets you free to develop games and programs! List \$29.95. **Sale \$19.95.** (Disk)

PIANO MAESTRO. Chalk Board's MicroMaestro software turns your PowerPad into a piano keyboard. Touch the keys. You hear the music and see your composition right on the screen. It is the fun way to learn music. List \$29.95. **Sale \$24.95** (Cart)

LOGICMASTER. With over 180,000 different game designs ... and over 200 million secret codes ... LogicMaster is the most fun you've ever had with your powers of reasoning. Solve the codes all by yourself or work together with family or friends. List \$39.95. **Sale \$29.95.** (Cart)

LEO'S GOLF LINKS. This golf game for one or more players lets you design each hole, including fairways, roughs, traps and greens. Then using woods, irons and putters, you play the course. List \$39.95. **Sale \$29.95.** (Cart)

Add \$3.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add \$6.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail!

VISA — MASTER CARD — C.O.D.

No C.O.D. to Canada, APO-FPO.

**PROTECTO
ENTERPRIZES** (WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

Sound Off

With Your Joystick

Using only your joystick, you can set your C-64 humming and ringing with this program, which takes full advantage of the Commodore's sound capabilities.

By Larry Cotton

There's no reason why you should limit the use of joysticks to moving rocket ships and firing barrages at invading aliens. Joystick data registers 56320 and 56321, when Peeked at and read, can be used to control auditory as well as visual images. This program illustrates how you can control sounds by using only the joystick.

To keep the program short and simple, only one main voice is used—but you'll be amazed at the C-64 sound capability. You can certainly add more voices, but if you're programming in Basic, there will most likely be an unacceptable decrease in speed of pitch changes and reaction to joystick movements.

To achieve the greatest variety of sounds with the least amount of typing, I exploited two interesting characteristics of the 64: the superimposition of one waveform on another and the combining of sync and ring modulation with the triangle waveform.

Sounding Good

The first characteristic means this: A sound in the triangle, sawtooth, square or noise waveforms is normally a constant, unvarying sound, but when one of these four waveforms "rides," or is superimposed on another, nice things happen.

You can best understand the second characteristic by hearing it rather than having it described to you. Suffice it to say, however, that sync and ring modulation are normally used *separately* with the triangle waveform, but you can accomplish the most unusual sounds by combining them: Poking a 23—16 (triangle) + 4 (ring) + 2 (sync) + 1 (gate)—to a control register (54276 for voice 1) does this.

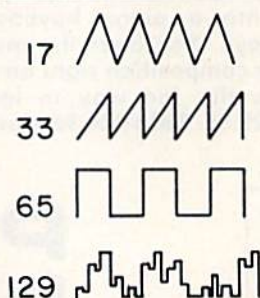
Look at Fig. 1: Under column 1 are the normal "pictures" of triangle, sawtooth, square and noise waveforms. You may hear these by Poking a 17, 33, 65 or 129, respectively, to memory location 54276 for voice 1. But now you do

RUN It Right

Commodore 64

Address all author correspondence to
Larry Cotton, 3513 Canterbury Road,
New Bern, NC 28560.

MAIN WAVEFORMS



EXAMPLE VIBRATO WAVEFORMS

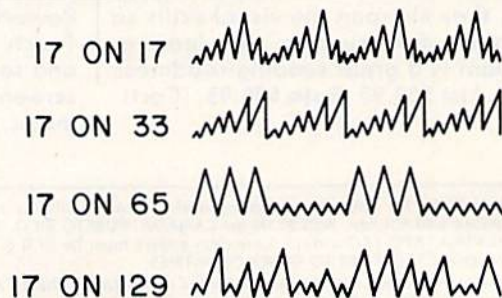


Fig. 1. Waveform illustrations.

NEW 128K COMMODORE - 80 COLUMN

COMPUTER SYSTEM SALE!
HOME • BUSINESS • WORD PROCESSING



LOOK AT ALL YOU GET FOR ONLY \$1195

	LIST PRICE
• B128 COMMODORE 128K 80 COLUMN COMPUTER	995.00
• 8050 DUAL DISK DRIVE (over 1 million bytes)	1795.00
* 4023 - 100 CPS - 80 COLUMN BIDIRECTIONAL PRINTER	499.00
• 12" HI RESOLUTION 80 COLUMN GREEN OR AMBER MONITOR	249.00
• SUPER SCRIPT 80 COLUMN PROFESSIONAL WORDPROCESSOR	149.50
• SUPER BASE PROFESSIONAL DATA BASE	149.50
• BOX OF 10 LORAN LIFETIME GUARANTEED DISKS	49.95
• 1100 SHEETS FANFOLD PAPER	19.95
• ALL CABLES NEEDED FOR INTERFACING	102.05

TOTAL LIST PRICE	4008.95	SALE PRICE	\$1195.00
------------------	---------	------------	-----------

Printer replacement options (replace the 4023 with the following at these sale prices)

	LIST	SALE
* Olympia Executive Letter Quality Serial Printer/Typewriter	849.00	499.00
* Comstar Hi-Speed 160 CPS 15½" Serial-Business Printer	779.00	449.00

Plus You Can Order These Business Programs At Sale Prices

	LIST	SALE		LIST	SALE
ACCOUNTS RECEIVABLE	149.95	99.00	INVENTORY	149.95	99.00
ACCOUNTS PAYABLE	149.95	99.00	GENERAL LEDGER	149.95	99.00
PAYROLL	149.95	99.00			

15 DAY FREE TRIAL We give you 15 days to try out this SUPER SYSTEM PACKAGE!! If it doesn't meet your expectations, just send it back to use prepaid and we will refund your purchase price!!

90 DAY IMMEDIATE REPLACEMENT WARRANTY If any of the SUPER SYSTEM PACKAGE equipment or programs fail due to faulty workmanship or material we will replace it IMMEDIATELY at no charge!!

Add \$50.00 for shipping and handling!!
\$100.00 for Canada, Puerto Rico, Hawaii orders.
 WE DO NOT EXPORT TO OTHER COUNTRIES.
 Enclose Cashiers Check, Money Order or Personal Check.
 Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail!! Canada orders must be in U.S. dollars. We accept Visa and MasterCard. We ship C.O.D. to U.S. addresses only.

PROTECTO ENTERPRISES (WE LOVE OUR CUSTOMERS)
 BOX 550, BARRINGTON, ILLINOIS 60010
 Phone 312/382-5244 to order


```

10 PRINTCHR$(147)
20 FORT=1TO6:PRINT:NEXT
30 PRINT" {15 SPACES}RANDOM {SHFT *}{SHFT Q}
35 PRINT
40 PRINT" {5 SPACES}{SHFT M}{8 SPACES}{SHFT N}{5 SPACES}
  {SHFT B}
50 PRINT" {6 SPACES}{SHFT Q}{6 SPACES}{SHFT Q}{6 SPACES}
  {SHFT Q}{5 SPACES}{SHFT Q}{SHFT *}{3 SPACES}FIRE
60 PRINT" {7 SPACES}{SHFT M}{4 SPACES}{SHFT N}{7 SPACES}
  {SHFT B}
70 PRINT"
80 PRINT" {4 SPACES}PITCH{2 SPACES}DEPTH{2 SPACES}SPEED{
  2 SPACES}MAIN{2 SPACES}VIBE
90 PRINT
100 FORL=54272TO54295:POKEL,0:NEXT
110 P=54299:V=54273
115 POKE54294,50:POKE54287,5
120 POKE54275,8:REM FOR USE W/65V1
130 POKE54289,8:REM FOR USE W/65V3
140 POKE54277,4:POKE54278,89
150 POKE54296,143:REM V3 AUDIO OFF
160 Q=2
170 R=200:REM PITCH
180 S=50:REM SPEED
190 T=65:REM VIB WAVE
200 U=33:REM MAIN WAVE
210 IFR<0 THENR=0
212 IFS<0 THENS=0
213 IFS>255 THENS=255
214 IFU<1 THENU=1
215 IFU>255 THENU=255
216 PRINTTAB(4)R" {CRSR LF}{2 SPACES}"TAB(12)INT(Q*10)"{
  CRSR LF}{2 SPACES}"TAB(19)S" {CRSR LF}{2 SPACES}";
218 PRINTTAB(25)U" {CRSR LF}{2 SPACES}"TAB(31)T" {CRSR LF
  }{2 SPACES}{CRSR UP}"
220 POKE54286,S:REM SPEED OF VIBRATO
230 POKE54290,T:REM VIBRATO WAVEFORM
240 POKE54276,U:REM MAIN WAVEFORM
250 FORZ=1TO1000:W=INT((R+PEEK(P)*Q)/20)
255 IFW>255 THENW=255
256 IFW<1 THENW=1
260 POKEV,W
270 J=PEEK(56320)
280 IFJ=127 THENNEXT
290 IFJ=126 THENS=S+2:GOTO210:REM UP
300 IFJ=125 THENS=S-2:GOTO210:REM DOWN
310 IFJ=111 THENGOSUB500:GOTO210
320 IFJ=119 THENGOSUB600:GOTO210
330 IFJ=117 THENR=R-50:GOTO210
340 IFJ=122 THENR=R+50:GOTO210
350 IFJ=118 THENQ=Q+.3:GOTO210
360 IFJ=121 THENQ=Q-.3:GOTO210
370 IFJ=123 THENR=INT(1000*RND(1))+1:S=INT(250*RND(1))+1
  :Q=INT(1000*RND(1))+1
380 IFJ=123 THENI=INT(5000*RND(1))+1:K=INT(4000*RND(1))+1
390 ONIGOSUB1000,1005,1010,1015
400 ONKGOSUB2000,2005,2010,2015,2020
410 GOTO210
500 IFT=17 THENT=33:RETURN
510 IFT=33 THENT=65:RETURN
520 IFT=65 THENT=129:RETURN
530 IFT=129 THENT=17:RETURN
600 IFU=17 THENU=33:RETURN
610 IFU=33 THENU=65:RETURN
620 IFU=65 THENU=129:RETURN
630 IFU=129 THENU=23:RETURN
640 IFU=23 THENU=17:RETURN
1000 T=17:RETURN
1005 T=33:RETURN
1010 T=65:RETURN
1015 T=129:RETURN
2000 U=17:RETURN
2005 U=33:RETURN
2010 U=65:RETURN
2015 U=129:RETURN
2020 U=23:RETURN

```

Listing of Soundstick program.

three additional things: Poke one of these same values into voice 3 control register 54290; add a Peeked value from 54299 to voice 1's frequency; and turn off normal voice 3 audio by Poking a 143 into 54296.

Poking a waveform (17, 33, 65 or 129) to 54276 and 54290 would normally just turn on those voices (assuming envelope, frequency and so on are set), but when a value of 0 to 255, from register 54299, is added to voice 1's frequency, voice 1's pitch is controlled by the shape of voice 3's waveform!

If you could take pictures of the resultant *vibrato* waveforms, they would look somewhat like the illustrations in column 2. For example, the characteristic mellow sound of the triangle wave could change in a triangle fashion—

*All other combinations
of the waveforms
are possible simply by
appropriate movements
of the joystick and
firebutton.*

smoothly uphill, as values from 54299 increment from 0 to 255, then smoothly downhill, as values from 54299 decrement from 255 to 0.

When voice 1's sawtooth waveform is superimposed over voice 3's square wave, you'll hear alternating high and low pitches as the sawtooth waves play out of the plateau, then abruptly drop to the plain and play there. The value at 54299 alternates from 255 to 0, then back to 255, with no steps. This is the first sound you hear in the program.

When the main waveform is noise (129), you'll hear noise, all right, but when the vibrato waveform (voice 3) is noise, you'll hear a series of randomly pitched tones, or randomly pitched noises. Last but not least, Poking a 23 to voice 1's control register yields the unearthly sounds of the sync and ring modulation combined with the triangle. All other combinations are possible simply by appropriate movements of the joystick and fire button.

About the Program

Plug a joystick into the port (socket) closest to the power switch. Type in the program, save and verify it, then type RUN. After turning up the TV or moni-

EASY C-64 BACK-UP COPIES
 ☆ **NEW IMPROVED VERSION** ☆

CANADA A/M © 1984
ARCHIVAL MAKER

- Now a backup program that anyone can use •
- Easy on the user — Easy on your drive •
- Requires a minimum of user intervention •
- Rated ☆☆☆☆ + by info 64 •
- Now duplicates errors 27 and 29 •
- Make backup copies of up to 99% of your protected software •

(For Archival Use Only)

Only \$49.99

Plus \$2.00 Shipping & Handling



22 MILLER ST., BELFAST, ME. 04915 (207) 338-1410

Send for free list of 200 + items (C-64 or Vic-20)

NEW! **CLEARBASIC-64**
 for the Commodore 64

EXTENDED BASIC

LONG VARIABLE NAMES INDENTATION
 LINE LABELS NAMED SUBROUTINES
 LOCAL VARIABLES IF-THEN-ELSE
 WHILE LOOP BEGIN - END BLOCKS
 NEW BASIC COMMANDS

EDITOR

AUTO LINE NUMBERING LINE RENUMBERING
 INSERT / DELETE LINES FIND STRING
 REPLACE STRING MOVE / COPY LINES

PREPROCESSOR

TRANSLATION OF CLEARBASIC TO C64 BASIC
 COMMENT STRIPPING PROGRAM CRUNCHING
 VARIABLE CROSS REF. LISTING

- * DOES NOT REDUCE BASIC PROGRAM AREA
- * DOES NOT REQUIRE DISK DRIVE
- * DOES NOT USE CARTRIDGE SLOT
- * AVAIL. FOR USE WITH DATASSETTE OR DISK

Send Check or Money Order for \$49.95 to:

CLEARVIEW SOFTWARE

P.O. Box 9446
 Newark, DE 19714-9446
 302/368-0903

* COMMODORE 64, DATASSETTE TRADEMARKS OF COMMODORE BUSINESS MACHINES, INC.

"The Rabbit"
 for your VIC 20 or CBM 64

\$39.95

If you own a VIC 20 or a CBM 64 and have been concerned about the high cost of a disk to store your programs on... worry yourself no longer. Now there's the RABBIT. The RABBIT comes in a cartridge, and at a much, much lower price than the average disk. And speed... this is one fast RABBIT. With the RABBIT you can load and store on your CBM datasette an 8K program in almost 30 seconds, compared to the current 3 minutes of a VIC 20 or CBM 64, almost as fast as the 1541 disk drive.

The RABBIT is easy to install, allows one to Append Basic Programs, works with or without Expansion Memory, and provides two data file modes. The RABBIT is not only fast but reliable. (The Rabbit for the VIC 20 contains an expansion connector so you can simultaneously use your memory board, etc.)



MAE NOW THE BEST FOR LESS!

Please for your own protection consider the MAE first before you buy that other assembler. We've had numerous customers who

wasted their money on some cheaper off brand assembler tell us how much better the MAE is.

The most powerful Macro Assembler/Editor available for the Commodore 64 and other CBM/PET computers, and also for the ATARI 800/XL and Apple II/III.

MAE includes an Assembler, Editor, Word Processor, Relocating Loader, and more all for just \$59.95.

We could go on and describe the MAE but we thought you would like to read our customers' comments. The following are actual unedited comments from correspondence about the MAE:

- "Excellent Development Package"
- "My Compliments to Carl Moser and EHS"
- "Compares to DEC and INTEL"
- "It is a superb program"

TELSTAR 64 — "A Star is Born"

Sophisticated Terminal Communications Cartridge for the 64.

PFO 10D 00D CP D1 D2 BELL 12:30:00 10:14:36
 (TELSTAR's Status Line)

Don't settle for less than the best!

- Upload/Download to/from disk or tape Menu-driven.
- Automatic File Translation. Real Time Clock plus Alarm Clock.
- Communicates in Industry Standard ASCII.
- Line editing capability allows correcting and resending long command lines.
- 9 Quick Read functions.
- Similar to our famous STCP Terminal package.
- Works with Commodore Modems and supports auto-dialing.

The best feature is the price — **only \$49.95** (Cartridge and Manual)

Machine Language Monitor Cartridge
 for the CBM 64

More than 20 commands allow you to access the CBM 64's Microprocessors Registers and Memory Contents. Commands include assemble, disassemble, registers, memory, transfer, compare, plus many more. Someday every CBM 64 owner will need a monitor such as this.

Cartridge and Manual — **\$24.95**



3239 Linda Dr.
 Winston-Salem, N.C. 27106
 (919) 748-8446
 Send for free catalog!



tor's volume (a hi-fi's even better), the sound you'll hear before moving the joystick or pressing the fire button is a sawtooth wave riding, at a moderate speed, on a square wave. Now move the joystick or press the firebutton to observe what happens. Note that the pictures on the screen show you which way to press the stick for various effects.

To change voices or pick random sounds, quickly tap the joystick to the right or left, or tap the firebutton and release it immediately. If you hold them too long, the voices will go through one more change.

Lines 10-90 format the screen. Lines 100-150 clear and Poke values to the sound chip as follows: Line 115 Pokes a frequency into voice 3 and a cutoff frequency to the filter; lines 120 and 130 Poke 8s to the pulse-width registers of voices 1 and 3. This ensures that the main square wave will have a nice hollow sound, and that voice 3's square wave will cause voice 1's pitch to sound the same amount of time up and down.

To change the ratio of up-time and down-time (high to low pitch), try Poking 1 to 15 into memory location 54289. Lines 140 and 150 set a constant volume

envelope for voice 1 and Poke a 143 (15 for maximum volume + bit 7 on, voice 3 audio off) into 54296.

Lines 160-215 assign, and check for the legality of, values for variables that will later be Poked to the sound chip. (Note that Q and R don't get Poked directly; see line 250.)

Lines 216 and 218 print variable status to the screen. Lines 220-240 Poke the changing variables to the sound chip—two waveforms (main at 54276 and vibrato at 54290) and speed (the frequency of voice 3 at 54286).

Lines 250-280 form a 1000-cycle loop if the joystick or fire button are *not* touched. For each cycle, a new frequency, W, is generated and Poked into one of voice 1's frequency registers. (The other, 54272, always stays at zero.)

Meanwhile, the joystick register 56320 is continually being Peeked at. W is based on two values controlled by the joystick—pitch R (with the joystick diagonal one way) and depth Q (with the joystick diagonal the other way), plus the value Peeked from register 54299, factored by a constant. If J stays at 127 (with all the joystick switches open), the program loops back to line 250 and the

interesting vibrato effect continues.

Lines 280-380 check the status of the joystick and fire button. Note the simple way of detecting whether the fire button or stick is pushed, and which way. Also note the REM statements to show you what's happening.

Lines 370-400 provide for a random sound to be picked by the computer when you press the stick momentarily to the left.

Lines 500-530 and 600-640 are subroutines that cycle through the waveforms when you push the fire button or move the joystick to the right. Lines 1000-1015 and 2000-2020 are subroutines that are called by the random-choice GOSUB statements in lines 390 and 400.

Be sure to keep a close eye on the changing values as you move the joystick or press the fire button, and write down the sounds you like best so you can repeat them. Interesting settings are, in order of appearance on the screen: 420, 20, 184, 33, 33 or 600, 80, 150, 23, 17 or 700, 50, 150, 23, 33 or 100, 60, 10, 129 and 17. Feel free to experiment and stick a little joy into your sound programs. R

Circle 147 on Reader Service card.

Power With Ease

For The Commodore 64

M'FILE

Full-Powered Data Management System
Easy to use Menu-Driven Screens
Complete numeric and formula capabilities
Versatile Report Generator
Merges to most major wordprocessors
Supports thousands of record-keeping applications
ONLY \$79.95

SMART

The complete personal system featuring:
Simplified Wordprocessing
Money Management
Amortization — Loans / Savings
Record Keeping — Mail List / Home Inventory
Time Management — Calendar / Scheduling
All Programs load from a Main Menu
ONLY \$79.95

Microsoft Inc.

SOPHISTICATED SOFTWARE

WALLSTREET MICROSCOPE

Detailed fundamental price and financial analysis of common stocks.
Each stock rated against 10 criteria.
Strong buy and sell signals makes success a high probability.
Available with 10 year history of Fortune 500 Companies and many more soon.
ONLY \$99.95

MUSICWRITER — 64

Musicwriter — 64 **OUTPUTS SHEET MUSIC** using high resolution printer graphics!!!
Create — Edit — Play Three Full Voices
Ideal professional tool for composers, arrangers, musicians or vocalists.
Great learning tool for students.
ONLY \$69.95

For Orders Contact:
Double E Electronics

12027 Pacific St.
Omaha, NE 68154
(402) 334-7870

Call or write for a free brochure!

To Order:
(800) 228-2270

Visa & MasterCard Accepted

Meet the PCjr's Best Friend...

jr[®]

Learning to use your IBM PCjr becomes easy and fun with jr magazine. Because jr keeps things simple, the whole family will learn and understand while they enjoy themselves.

jr will explain how the PCjr works and guide you step-by-step in setting up your system. Most of all jr will answer your most important questions month after month... like

- **What can I use my PCjr for?** jr magazine will teach you how to prepare household budgets, balance your checkbooks, do your taxes and organize schedules and lists.

- **What about the kids?** From kindergarten to college, jr helps the kids with educational programs in every subject area.

- **Are there more serious uses for PCjr?** Yes! You'll improve your own business skills by learning about word processing, spreadsheets and graphics.

- **What about having fun with PCjr?** Relax and enjoy all the latest games with your whole family.

Plus:

- **What programs should I choose for the PCjr?** jr magazine will tell you what programs on the market will run on the PCjr, and which ones won't. Plus what new programs are on the way. jr will evaluate them before you buy.

Order your subscription to jr today and you'll get the special charter subscription rate of \$14.97. That's 25% off the basic subscription rate! Plus, with your pre-payment of check, American Express, Visa or Mastercard we'll send you a FREE issue making a total of 13 issues for \$14.97.

Take advantage of this incredible charter subscription offer. Mail the attached card, the coupon or call TOLL FREE 1-800-258-5473. In New Hampshire call 1-924-9471... TODAY!



Sign me up as a charter subscriber to jr. I understand that with prepayment of check or credit card I'll receive a FREE issue making a total of 13 issues for \$14.97. Save \$5.00 off the basic rate!

CHECK/MO MC AE VISA BILL ME

Card # _____ Exp. Date _____

Signature _____

Name _____

Address _____

City _____ State _____ Zip _____

Canada & Mexico \$17.97, 1 year only, US funds drawn on US bank.
Foreign Surface \$34.97, 1 year only, US funds drawn on US bank.
Foreign airmail, please inquire. Please allow 6-8 weeks for delivery.

348F3

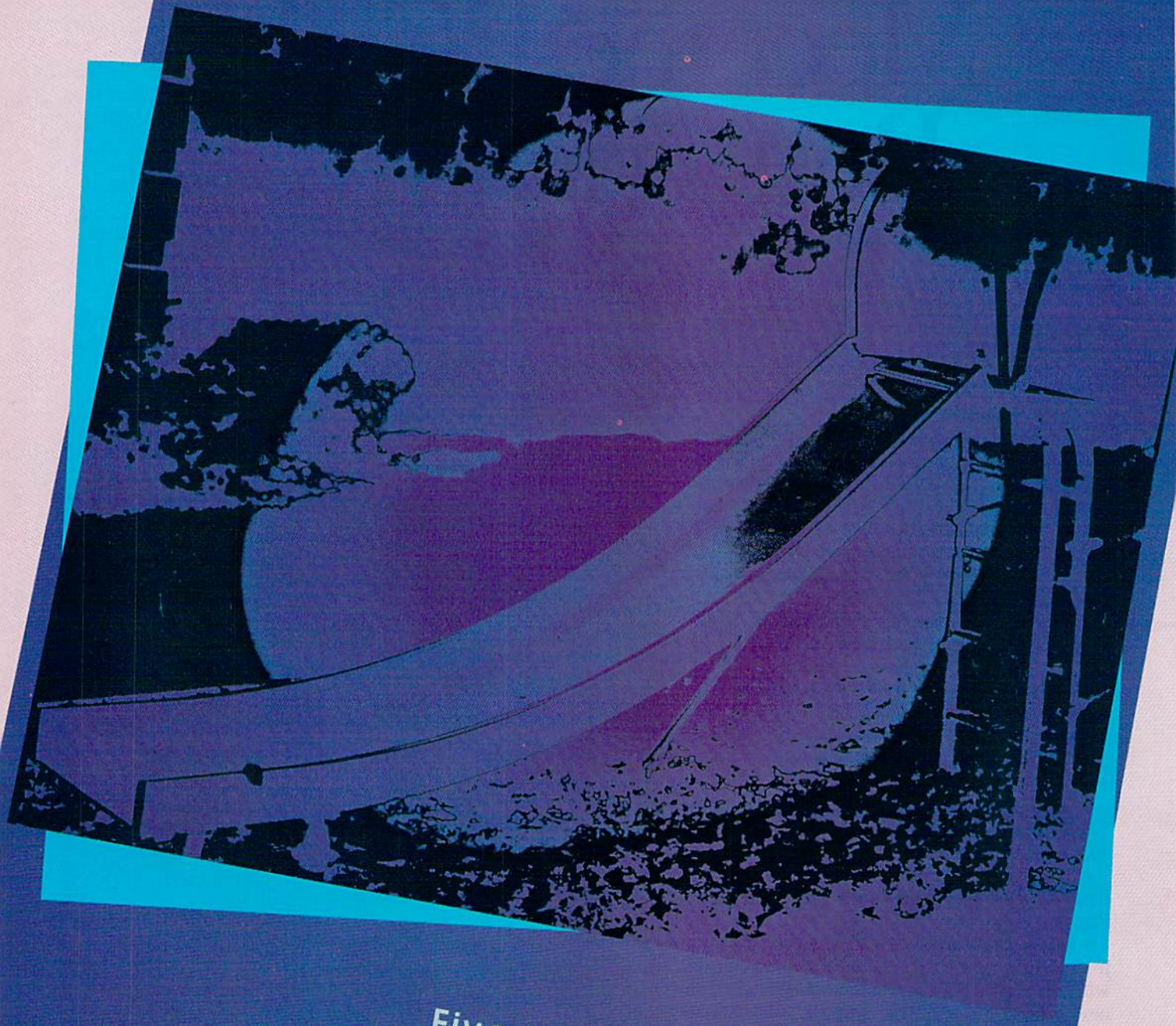
jr

For IBM's Home Computer

Box 903 Farmingdale, NY 11737

www.Commodore.ca

May Not Reprint Without Permission



Five-in-a-row tic-tac-toe may sound easy, but don't be deceived. This game of strategy offers a slippery set of circumstances that can send you on either a smooth ride or a turbulent tumble.

By Robert Rossa



Slide is a simple strategic board game that pits you against the computer, which has been programmed with a greedy strategy and rarely loses.

Slide is played on a five-by-five square board with 25 cells. You and the computer take turns entering single tokens from the top (numbered 1-5) or the left (lettered A-E). A token entered into a row or column will slide tokens already present on the board over or down one cell. Tokens may be shoved off the game board. The first player to have five tokens in a row, either horizontally, vertically or diagonally, wins.

On the game boards drawn by this program, the computer has the crosses and you have the circles. In the sample position shown in Fig. 1, you win (horizontally) by making move 2, but lose (diagonally) by making move C.

Making the Best Move

The first few moves of the computer are random, to provide some variety in the games. You can select how many moves in advance the computer can consider—either two, four, six or eight moves ahead. Obviously, the more moves ahead, the more time it will take

the computer to make a selection. You can gradually advance the level of play as you learn the game.

To determine its best move, the computer must look at the game tree (see Fig. 2). Each move is drawn as a branch of a tree. Note that the tree is drawn with its branches hanging downward. Each path downward from the root (at the top) represents a possible sequence of moves. Each move has a value, so you can pick the move with the largest value.

For speed, the move-selection logic is written in machine language. I wrote the algorithm in Basic and then translated it into machine language. In Basic, at level 4, I could mow the lawn while the computer was deciding its next move. Another factor allowing more speed is the use of pruning; we don't have to consider all possible moves four plays ahead.

Each position is given a numerical weight, which is intended to measure a player's advantage. If the player who just moved has a win, the weight is as large as possible, in this case, 32.

If the opposing player wins, the weight is -32 , as small as possible. Otherwise, the weight is the advantage the player who just moved has over his opponent.

There are ten possible moves from

any position. How can a player determine the best move? Suppose you are looking just two levels ahead. For each of your ten possible moves, you look at what your opponent can do. For each of your possible moves, your opponent has ten possibilities, so there are 100 combinations of moves.

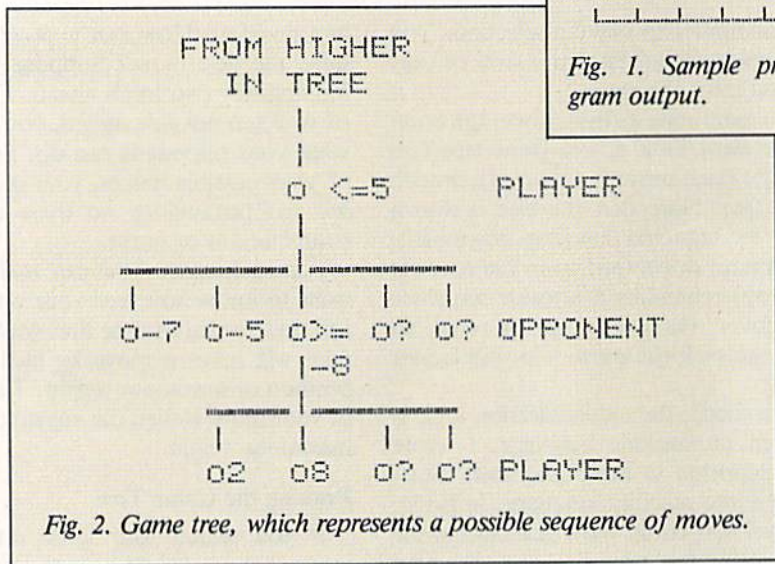
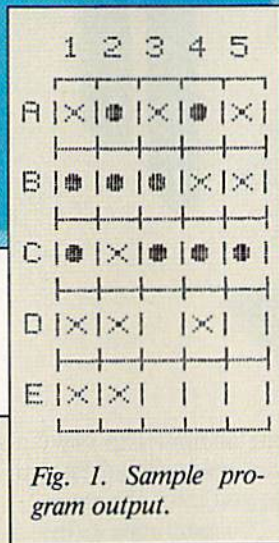
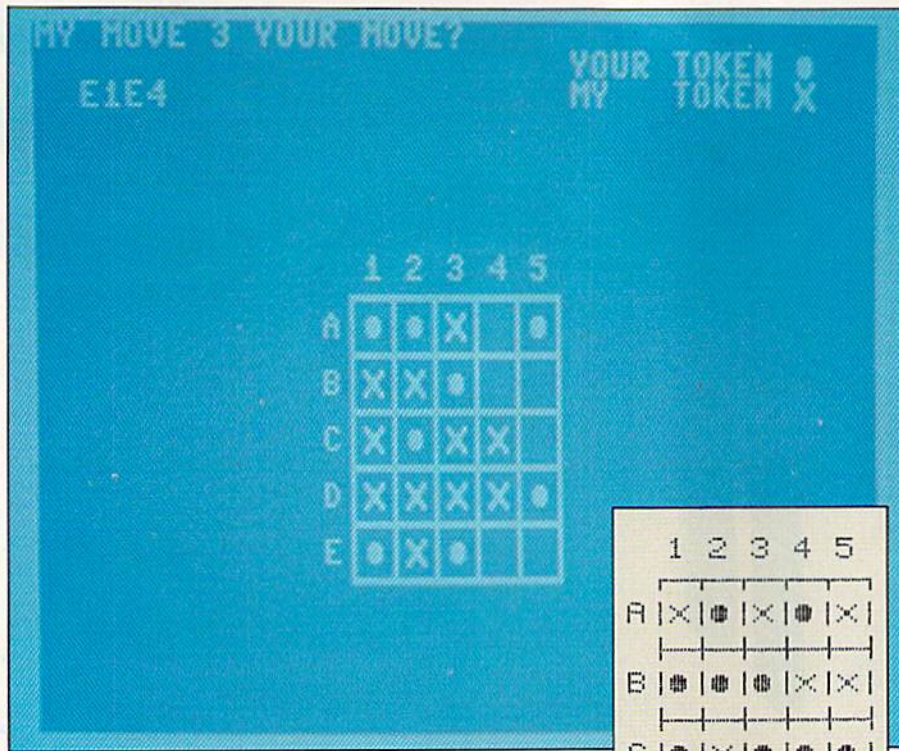
For each move you can make, you want to know how well your opponent can do. So you assume that your opponent will select a move by picking the position of maximum weight. The value of your move is then the negative of this maximum weight.

Pruning the Game Tree

If you search four levels ahead, it seems that you might have to look at all 10,000 sequences: you move, then your opponent moves, then you move again, then your opponent moves. For each of the 1000 possibilities at level 3, the value is the negative of your opponent's best possible move.

For each of the 100 positions at level 2, the value (to your opponent) is the negative of *your* best possible move. Finally, at level 1, the value of each of your ten possible moves is the negative

Address all author correspondence to Robert Rossa, 1901 Starling, Jonesboro, AR 72401.



of your opponent's best possible moves.

If you search six levels ahead, you'll have 1,000,000 sequences at which to look. Clearly, this is a tedious task even for a computer. Fortunately, there's a way of eliminating most of the possible sequences—it's called pruning the game tree.

For example, consider Fig. 2. Suppose it represents your knowledge about a particular part of a game tree just as you finish finding the value of the second game position in the bottom row.

When you find that this value is 8, then you can say that the value of the position just above it (its parent) can't be better than -8 for your opponent.

Since your opponent already knows he has better moves, including one with a value of -5, there is no need to continue evaluating the other possibilities (children) of the position. At this point, you can prune the game tree, that is, stop considering the -8 position and move on to the position to its right in the figure.

You'll be able to follow this pruning process when you play the game, since the program places the moves it's considering on the screen.

The Program

To load and play the game, you need only enter the Basic listings. The first Basic program (Listing 1), consisting mostly of Data statements, Pokes the machine language needed by the game. The second program (Listing 2) plays the game.

Listing 2 begins by protecting the machine code. Then it gets the game tree's depth of search by asking you to choose a level.

The variable CC, initialized in line 90, counts the moves made by the computer while it is playing randomly. The control for random moving is in line 280. The variable BQ is the move number, which is needed by the subroutine that updates the screen and internal game boards.

Lines 100-120 decide which player starts. AQ is a code for the current player; 1 is you and -1 is the computer. Line 130 is executed if the computer moves first; it sets up the game board and makes the computer's first move. Line 140 sets up the game board if you move first.

Lines 150-240 obtain a player's move, recode it for the routine that updates the board and then call that routine.

The game board is coded in memory in the 25 bytes starting at location 28672 (A in line 470). When the search routine is called, it calls itself recursively. It needs up to eight copies of the game board, depending on the level you choose. These are located in the 200 bytes beginning at location A.

The board evaluation routine, called from the Basic program by SYS RT in lines 260 and 320, needs to know which

You must match wits against the C-64 in placing five tokens in a row—either verti- cally, horizontally or diagonally—on the game board.

of these eight boards it is supposed to evaluate. This is the purpose of location LZ, which is Poked in lines 260 and 320.

The evaluation routine returns a 1 in location CZ, if you have five in a row; otherwise, it returns a 0. Location CZ+1 is the return for the computer, so lines 260 and 270 check to see if there is a winner. S4 and T4 keep track of the number of wins for each player.

Line 290 calls the tree-search routine that selects the computer's move. BQ is the move picked; if the computer has only losing moves, you force move 1 in line 300. Line 310 then updates the board. Lines 320-340 check for a winner and then cycle back for the next move. Lines 350-360 contain the logic for a random move by the computer.

The subroutine at 370-520 sets a number of constants: S, the starting location of the screen; DN, the screen width; MR and MC, the starting row and column for the game board on the screen; LC, the starting screen RAM location for the board; D2, twice the screen width; and the characters used to draw the board.

Certain vital memory locations are given symbolic names in line 470. In line 510, the internal board at level 0 in array A is initialized. Line 510 is also executed before each new game.

The subroutine in lines 530-710 builds the screen, using the symbolic parameters set up by the initialization routine. The routine in lines 720-1070 updates the board after a move. The level 0 board in array A is looked at by this routine. Peeks and Pokes must be

used, since A is not a Basic dimensioned array.

Finally, the last few lines at 1080-1130 print the score and provide for a continuation of the match. I have found the match at level 6 to be pretty uneven—in the computer's favor. R

Note: If you want the assembly language version, to understand how the evaluation algorithm works, send your request with a self-addressed stamped envelope to RUN editorial office, 80 Pine St., Peterborough, NH 03458.

Listing 1. Loads machine code for the Slide game.

```

5 REM LOADS MACHINE CODE FOR SLIDE GAME.
10 DATA 162, 20, 169, 0, 157, 200, 112, 202
20 DATA 16, 250, 174, 225, 112, 24, 105, 25
30 DATA 202, 16, 251, 168, 136, 169, 4, 141
40 DATA 220, 112, 169, 0, 141, 218, 112, 141
50 DATA 219, 112, 169, 4, 141, 221, 112, 185
60 DATA 0, 111, 240, 56, 16, 2, 169, 2
70 DATA 170, 202, 254, 218, 112, 169, 0, 24
80 DATA 125, 223, 112, 109, 221, 112, 142, 222
90 DATA 112, 170, 254, 204, 112, 174, 222, 112
100 DATA 173, 220, 112, 205, 221, 112, 208, 3
110 DATA 254, 214, 112, 169, 4, 56, 237, 221
120 DATA 112, 205, 220, 112, 208, 3, 254, 216
130 DATA 112, 254, 202, 112, 136, 206, 221, 112
140 DATA 16, 189, 169, 5, 205, 218, 112, 208
150 DATA 8, 169, 1, 141, 200, 112, 76, 131
160 DATA 96, 205, 219, 112, 208, 5, 169, 1
170 DATA 141, 201, 112, 206, 220, 112, 16, 146
180 DATA 162, 9, 160, 4, 189, 204, 112, 201
190 DATA 5, 208, 5, 169, 1, 141, 201, 112
200 DATA 202, 136, 16, 240, 189, 204, 112, 201
210 DATA 5, 208, 5, 169, 1, 141, 200, 112
220 DATA 202, 16, 241, 169, 5, 160, 1, 205
230 DATA 214, 112, 208, 3, 140, 200, 112, 205
240 DATA 215, 112, 208, 3, 140, 201, 112, 205
250 DATA 216, 112, 208, 3, 140, 200, 112, 205
260 DATA 217, 112, 208, 3, 140, 201, 112, 96
270 DATA 169, 0, 141, 250, 112, 174, 254, 112
280 DATA 189, 226, 112, 188, 236, 112, 141, 235
290 DATA 112, 136, 152, 201, 5, 16, 54, 24
300 DATA 109, 235, 112, 160, 3, 170, 238, 250
310 DATA 112, 189, 0, 111, 240, 11, 232, 232
320 DATA 232, 232, 232, 136, 16, 240, 238, 250
330 DATA 112, 206, 250, 112, 240, 20, 138, 168
340 DATA 136, 136, 136, 136, 136, 185, 0, 111
350 DATA 157, 0, 111, 152, 170, 206, 250, 112
360 DATA 208, 238, 76, 83, 97, 200, 233, 5
370 DATA 168, 173, 235, 112, 136, 48, 5, 24
380 DATA 105, 5, 16, 248, 160, 0, 140, 250
390 DATA 112, 160, 3, 170, 189, 0, 111, 240
400 DATA 7, 238, 250, 112, 232, 136, 16, 244

```

More →

RUN It Right

Commodore 64

Listing 1 continued.

```

410 DATA 206 , 112 , 48 , 14 , 138 , 168 , 136
420 DATA 185 , 111 , 157 , 0 , 111 , 202 , 136
430 DATA 76 , 64 , 97 , 173 , 255 , 112 , 157 , 0
440 DATA 111 , 96 , 170 , 170 , 170 , 170 , 170
450 DATA 170 , 170 , 170 , 170 , 170 , 170 , 170
460 DATA 170 , 170 , 170 , 170 , 170 , 170 , 170
470 DATA 174 , 254 , 112 , 188 , 226 , 112 , 202 , 189
480 DATA 226 , 112 , 170 , 169 , 24 , 141 , 0 , 113
490 DATA 189 , 0 , 111 , 153 , 0 , 111 , 232 , 200
500 DATA 206 , 0 , 113 , 16 , 243 , 96 , 170 , 170
510 DATA 172 , 254 , 112 , 190 , 236 , 112 , 189 , 1
520 DATA 113 , 153 , 81 , 004 , 96 , 170 , 170 , 170
530 DATA 170 , 170 , 170 , 170 , 170 , 170 , 170
540 DATA 170 , 170 , 170 , 170 , 170 , 170 , 170
550 DATA 169 , 1 , 141 , 29 , 113 , 141 , 254 , 112
560 DATA 169 , 255 , 141 , 255 , 112 , 76 , 212 , 97
570 DATA 169 , 1 , 56 , 237 , 29 , 113 , 141 , 29
580 DATA 113 , 173 , 255 , 112 , 73 , 254 , 141 , 255
590 DATA 112 , 238 , 254 , 112 , 174 , 254 , 112 , 169
600 DATA 0 , 157 , 11 , 113 , 169 , 224 , 157 , 20
610 DATA 113 , 169 , 1 , 157 , 236 , 112 , 32 , 112
620 DATA 97 , 32 , 144 , 97 , 32 , 208 , 96 , 173
630 DATA 254 , 112 , 141 , 225 , 112 , 32 , 0 , 96
640 DATA 174 , 29 , 113 , 189 , 200 , 112 , 240 , 17
650 DATA 174 , 254 , 112 , 189 , 236 , 112 , 157 , 11
660 DATA 113 , 169 , 32 , 157 , 20 , 113 , 76 , 228
670 DATA 98 , 169 , 1 , 56 , 237 , 29 , 113 , 170
680 DATA 189 , 200 , 112 , 240 , 3 , 76 , 212 , 98
690 DATA 173 , 254 , 112 , 201 , 1 , 240 , 71 , 205
700 DATA 30 , 113 , 240 , 97 , 32 , 192 , 97 , 169
710 DATA 0 , 174 , 254 , 112 , 232 , 56 , 253 , 20
720 DATA 113 , 201 , 224 , 240 , 224 , 174 , 254 , 112
730 DATA 221 , 20 , 113 , 48 , 11 , 48 , 9 , 157
740 DATA 20 , 113 , 189 , 236 , 112 , 157 , 11 , 113
750 DATA 174 , 254 , 112 , 202 , 189 , 236 , 112 , 201
760 DATA 1 , 48 , 13 , 174 , 254 , 112 , 189 , 20
770 DATA 113 , 202 , 24 , 125 , 20 , 113 , 16 , 3
780 DATA 76 , 212 , 98 , 76 , 228 , 98 , 32 , 192
790 DATA 97 , 162 , 2 , 169 , 0 , 56 , 253 , 20
800 DATA 113 , 202 , 221 , 20 , 113 , 48 , 11 , 240
810 DATA 9 , 157 , 20 , 113 , 189 , 236 , 112 , 157
820 DATA 11 , 113 , 76 , 212 , 98 , 174 , 29 , 113
830 DATA 189 , 202 , 112 , 168 , 169 , 1 , 56 , 237
840 DATA 29 , 113 , 170 , 152 , 56 , 253 , 202 , 112
850 DATA 174 , 254 , 112 , 221 , 20 , 113 , 48 , 11
860 DATA 240 , 9 , 157 , 20 , 113 , 189 , 236 , 112
870 DATA 157 , 11 , 113 , 173 , 30 , 113 , 201 , 2
880 DATA 240 , 26 , 174 , 254 , 112 , 202 , 189 , 236
890 DATA 112 , 201 , 1 , 240 , 15 , 174 , 254 , 112
900 DATA 169 , 0 , 56 , 253 , 20 , 113 , 202 , 221
910 DATA 20 , 113 , 16 , 174 , 254 , 112 , 254

```

```

920 DATA 236 , 112 , 189 , 236 , 112 , 201 , 11 , 240
930 DATA 3 , 76 , 230 , 97 , 169 , 1 , 56 , 237
940 DATA 29 , 113 , 141 , 29 , 113 , 173 , 255 , 112
950 DATA 73 , 254 , 141 , 255 , 112 , 206 , 254 , 112
960 DATA 96 , 170 , 170 , 170 , 170 , 170 , 170 , 170
969 REM TO CHANGE GAME COLOR CHANGE 14 IN LINE 970 TO D
    ESIRED COLOR.
970 DATA 169 , 14 , 162 , 251 , 157 , 255 , 215 , 157
980 DATA 249 , 216 , 157 , 243 , 217 , 157 , 237 , 218
990 DATA 202 , 208 , 241 , 96 , 170 , 170 , 170 , 170
1000 DATA 25 , 50 , 75 , 100 , 125 , 150 , 175 , 200
1010 DATA 49 , 50 , 51 , 52 , 53 , 1 , 2 , 3 , 4 , 5
8000 FORI=24576TO25367
8010 READK
8020 POKEI,K
8030 NEXTI
8100 FORI=28898TO28906
8110 READK
8120 POKEI,K
8130 NEXTI
8140 FORI=28930TO28939
8150 READK
8160 POKEI,K
8170 NEXTI
8180 POKE28895,0:POKE28896,5
8200 PRINT"(SHT CLR)NOW LOAD AND RUN THE SECOND PROGRA
    M":STOP

```

Listing 2. Slide program for the C-64.

```

10 POKE51,0:POKE52,96:POKE55,0:POKE56,96:GOSUB1200
20 INPUT"WHAT LEVEL=2,4,6,OR 8";WG:WG=INT(WG)
30 IF WG<2THENWG=2
40 IFWG>8THENWG=8
50 IFWG=3ORWG=5ORWG=7THENWG=WG+1
60 PRINT"LEVEL=";WG
70 RU= 24784:AU=28927:IU=28926:IU=28908:RT=24576
80 GOSUB370
90 CC=1:BQ=0
100 PRINT"YOU FIRST?"
110 GETA$:IFA$=""THEN110
120 IFA$="Y"THENAQ=1:GOTO140
130 AQ=-1:BQ=1:GOSUB530:GOSUB720:GOTO150
140 GOSUB530
150 PRINT"(HOME){35 SPACES}{HOME}";
160 IFBQ>0THENPRINT"(HOME)MY MOVE ";VS(BQ);
170 PRINT" YOUR MOVE?(2 SPACES){CRSR LF}"
180 GETA$
190 IFA$=""THEN180
200 PRINT"(HOME){10 SPACES}YOUR MOVE ";A$
210 IF(A$>"0"ANDAS<"6")THENBQ=ASC(A$)-48:GOTO240
220 IF(A$>"A"ANDAS<"E")THENBQ=ASC(A$)-59:GOTO240

```

More

COMMODORE OWNERS

Join the world's largest, active Commodore Owners Association.

- Access to thousands of public domain programs on tape and disk for your Commodore 64, VIC 20 and PET/CBM.
- Monthly Club Magazine
- Annual Convention
- Member Bulletin Board
- Local Chapter Meetings

Send \$1.00 for Program Information Catalogue.
(Free with membership).

Membership Fees for 12 Months	Canada — \$20 Can.
	U.S.A. — \$20 U.S.
	Overseas — \$30 U.S.

T.P.U.G. Inc.
Department "R"
1912A Avenue Road, Suite 1
Toronto, Ontario, Canada M5M 4A1

• LET US KNOW WHICH MACHINE YOU USE •

Circle 70 on Reader Service card.

AT LAST! BOOKS THAT TELL ALL!

Commodore 64: The Inside View and **Vic 20: The Inside View** are indispensable tools for anyone developing machine language programs. Written by Microcomputer Consultant Bruce Atkins, these books unveil the technical inner workings of both computers. Included in each column is:

- a hardware/firmware overview
- details of the operating system kernel and Basic interpreter
- details of bugs and documentation irregularities
- complete disk drive hardware/firmware documentation
- six programs: 1) machine language monitor; 2) disassembler; 3) mini-assembler; 4) disk copy; 5) disk sector dump; 6) disk sector patch

LBA COMPUTER PRODUCTS
P.O. Box 2009 (415) 828-2754
Dublin, CA 94568

Please send me:

___ **VIC 20: The Inside View** @ \$14.95 _____
___ **Commodore 64: The Inside View** @ \$16.95 _____
Shipping/Handling \$2.00 per book _____
CA Residents add 6½% _____ Total
Enclosed _____

Name _____
Address _____
City _____ State _____ Zip _____

VIC 20 and Commodore 64 are trademarks of Commodore Business Machines, Inc.

Announcing ... TOTL. MONEYMINDER

FOR THE COMMODORE 64™

The home accounting package that will make your budget, not break it! **ONLY \$39.95**

Money-Saving Bonus Paks of 64 Software

(BP-1)—(disk)
totl.text/
totl.speller/totl.label
reg. price \$103 NOW \$79

(BP-2)—(disk)
totl.business/
totl.time manager/
totl.infomaster/totl.text
reg. price \$228 NOW \$159

(BP-3)—(disk)
totl.infomaster/
totl.text/totl.speller
reg. price \$129 NOW \$99

(BP-4)—(disk)
totl.text/
totl.speller/
research assistant
reg. price \$118 NOW \$89

(BP-5)—(tape)
totl.text/totl.label
reg. price \$60 NOW \$49

INFORMATION AND ORDER COUPON

	TAPE	DISK
TOTL.TEXT 2.0 (VIC + 8K)	<input type="checkbox"/> 24.95	<input type="checkbox"/> 28.95
TOTL.TEXT 2.5 (VIC + 16K)	<input type="checkbox"/> 34.95	<input type="checkbox"/> 38.95
TOTL.LABEL 2.1 (VIC + 16K)	<input type="checkbox"/> 19.95	<input type="checkbox"/> 23.95
TOTL.TIME MGR. 2.1 (VIC + 8K)	<input type="checkbox"/> 29.95	<input type="checkbox"/> 33.95
RESEARCH ASST. 2.0 (VIC + 8K)	<input type="checkbox"/> 29.95	<input type="checkbox"/> 33.95
TOTL.BUSINESS 3.0 (VIC + 24K)	<input type="checkbox"/> 39.95	<input type="checkbox"/> 43.95
TOTL.TEXT 2.6 (C-64)	<input type="checkbox"/> 39.95	<input type="checkbox"/> 43.95
TOTL.SPELLER 3.6 (C-64)	<input type="checkbox"/> 19.95	<input type="checkbox"/> 23.95
TOTL.LABEL 2.6 (C-64)	<input type="checkbox"/> 34.95	<input type="checkbox"/> 38.95
TOTL.TIME MGR. 2.6 (C-64)	<input type="checkbox"/> 34.95	<input type="checkbox"/> 38.95
RESEARCH ASST. 2.0 (C-64)	<input type="checkbox"/> 34.95	<input type="checkbox"/> 38.95
TOTL.INFOMASTER 3.6 (C-64)	<input type="checkbox"/> 49.95	<input type="checkbox"/> 49.95
TOTL.BUSINESS 3.6 (C-64)	<input type="checkbox"/> 94.95	<input type="checkbox"/> 94.95
TOTL.MONEYMINDER 3.6 (C-64)	<input type="checkbox"/> 39.95	<input type="checkbox"/> 39.95
BONUS PAK # _____		

Check, Money Order or C.O.D. * also accepted. C.O.D. Charges/Sales Tax
* C.O.D. orders \$2.00 additional (CA residents add 6½% sales tax) Shipping & Handling \$3.00
Amount Enclosed _____

FOR ORDERING ONLY—CALL OUR TOLL FREE NUMBERS
Continental U.S. 1-800-351-1555, California 1-800-351-1551
Hawaii and Alaska 415-943-7877

SEND MORE INFORMATION (no charge for catalog)
Name _____
Street _____
City _____ State _____ Zip _____
Phone () _____ MC VISA
Card # _____ Exp. Date _____

TOTL quality you can afford
SOFTWARE, INC. 1555 Third Avenue
Walnut Creek, CA 94596
415/943-7877

Commodore 64 and VIC 20 are trademarks of Commodore Business Machines Inc.

POWER PERFORMANCE & CLASS



TOTL
SOFTWARE, INC.
quality you can afford



Listing 2 continued.

```
230 GOTO150
240 AQ=1:GOSUB720
260 POKELZ,0:SYSRT:IFPEEK(CZ)=1THENPRINT"YOU WIN!{6 SPA
CES}":T4=T4+1:GOTO1080
270 IFPEEK(CZ+1)=1THENPRINT"I WIN!{14 SPACES}":S4=S4+1:
GOTO1080
280 IFCC<4THEN350
290 SYS25000
300 BQ=PEEK(28940):IFBQ=0THENBQ=1
310 AQ=-1:GOSUB720
320 POKELZ,0:SYSRT:IFPEEK(CZ+1)=1THENPRINT"I WIN!{5 SPA
CES}":S4=S4+1:GOTO1080
330 IFPEEK(CZ)=1THENPRINT"YOU WIN!{9 SPACES}":T4=T4+1:G
OTO1080
340 GOTO150
350 CC=CC+1:BQ=INT(RND(XX)*10+1)
360 GOTO310
370 REM INITIALIZE
380 S=1024:DN=40:REM FOR 40-COLUMN SCREEN USE DN=40
400 MR=8:MC=13
410 POKE28958,WG
420 LC=S+DN*MR+MC:D2=2*DN
430 VB=93:HB=64:XX=91:TH=114:BH=113:LH=107:RH=115
440 PRINTCHR$(142)
450 UL=112:UR=110:BL=109:BR=125
460 WH=81:BK=86
470 A=28416:CZ=28872:PZ=28874:LZ=28897
490 DATA 1,2,3,4,5,A,B,C,D,E
500 FOR I=1 TO 10:READY$(I):NEXT
510 FOR I=0 TO 24:POKEA+I,0:NEXTI
520 RETURN
530 REM BUILD SCREEN
540 PRINT"(SHIFT CLR)":SYS25344
550 FOR I=1 TO 5
560 POKELC+2*I,48+I
570 POKELC+D2*I,I
580 FORJ=0 TO 5
590 POKELC+D2*I+1+2*J,VB
600 POKELC+2*I+D2*J+DN,HB
610 NEXTJ:NEXTI
620 FOR I=1 TO 4:FORJ=1 TO 4
630 POKELC+DN+1+2*I+D2*J,XX
640 NEXTJ
650 POKELC+DN+1+2*I,TH
660 POKELC+11*DN+1+2*I,BH
670 POKELC+DN+1+D2*I,LH
680 POKELC+DN+11+D2*I,RH
690 NEXTI
700 POKELC+1+DN,UL:POKELC+DN+11,UR:POKELC+11*DN+1,BL:PO
KELC+11*DN+11,BR
705 PRINT"(HOME){COMD 7}":PRINTTAB(25);"YOUR TOKEN {SHF
```

```
T Q}":PRINTTAB(25);"MY{3 SPACES}TOKEN {SHIFT V}"
710 RETURN
720 REM INSERT TOKEN INTO CURRENT COPY OF GAME AND ALSO
SCREEN.
730 REM ON ENTRY AQ=1 IF PLAYER IS WHITE, -1 IF BLACK.
740 REM BQ IN RANGE 1-5 FOR COLUMN, 6-10 FOR ROW.
750 TQ=WH:NQ=1:IFAQ=-1THEN TQ=BK:NQ=255
760 CQ=BQ-1:IFBQ>5THEN870
770 GOSUB980:IFQ=0THEN840
780 FOR I=Q TO 1 STEP -1
790 IQ=I-1
800 EQ=PEEK(A+5*IQ+CQ):POKEA+5*I+CQ,EQ
810 VQ=PEEK(LC+D2*I+BQ*2)
820 POKELC+D2+D2*I+BQ*2,VQ
830 NEXTI
840 POKEA+CQ,NQ
850 POKELC+D2+BQ*2,TQ
860 GOTO970
870 CQ=BQ-6:RQ=5*CQ:GOSUB1030
880 IFQ=0THEN950
890 FOR I=Q TO 1 STEP -1
900 IQ=I-1
910 EQ=PEEK(A+RQ+IQ):POKEA+RQ+I,EQ
920 VQ=PEEK(LC+D2+D2*CQ+I*2)
930 POKELC+D2+D2*CQ+I*2+2,VQ
940 NEXTI
950 POKEA+RQ,NQ
960 POKELC+D2+D2*CQ+2,TQ
970 RETURN
980 CQ=4
990 FOR I=0 TO 3
1000 IFPEEK(A+5*I+CQ)=0THENNQ=I:I=4
1010 NEXTI
1020 RETURN
1030 CQ=4
1040 FOR I=0 TO 3
1050 IFPEEK(A+RQ+I)=0THENNQ=I:I=4
1060 NEXTI
1070 RETURN
1080 PRINT"GAMES: YOU ";T4;"{3 SPACES}ME ";S4
1090 PRINT"WANT ANOTHER GAME?"
1100 GETA$
1110 IFA$=""THEN1100
1120 IFA$<"THEN GOSUB510:GOTO90
1130 PRINT"THANK YOU":STOP
1200 PRINT"(SHIFT CLR){17 SPACES}SLIDE"
1210 PRINT"(12 SPACES)BY ROBERT ROSSA"
1220 PRINT"(7 SPACES)ARKANSAS STATE UNIVERSITY"
1230 PRINT:PRINT"PRINT"{4 SPACES}GET FIVE TOKENS IN A R
OW TO WIN"
1240 FOR I=1 TO 2000:NEXT
1250 RETURN
```


SELL **SELL**

Selling RUN will make money for you. Consider the facts:

Fact 1: Selling RUN increases store traffic—our dealers tell us that RUN is one of the hottest-selling computer magazines on the newsstands.

Fact 2: There is a direct correlation between store traffic and sales. Increase the number of people coming through your door and you'll increase sales.

Fact 3: Fact 1 + Fact 2 = INCREASED SALES, which means more money for you. And that's a fact.

For information on selling RUN, call 1-800-343-0728 (in New Hampshire call 1-924-9471) and speak with Ginnie Boudrieau, our bulk sales manager. Or write to her at RUN, 80 Pine Street, Peterborough, N.H. 03458.

RUN



PERSONAL PERIPHERAL PRODUCTS presents
SMOOTH TALKER™

VIC-20



COM-64

IT WILL TALK YOUR EARS OFF!!
Low Cost • Easy To Use • High Quality
Speech for Your VIC-20 or Commodore 64

- Unlimited vocabulary
- Exclusive exception dictionary allows you to customize words
- 4 levels of inflection allows you to have multi-voice conversations
- SAY command works just like a PRINT STATEMENT but it also TALKS
- Works with Speakeasy to give you crisp, clear, easy to use speech.

Introductory Pricing

Smoothtalker 64	\$19.95
Smoothtalker 20	\$19.95
Talking Print (automatically talks existing print statements)	\$19.95
Speakeasy	\$59.00
C-64 Adapter	\$12.95

VIC-20 RAM Sale

	Kit	Assembled
8K	\$19.95	\$24.95
16K	39.95	44.95
3 Slot Switched & Fused	19.95	24.95
C-64 4 Slot (non-buffered)	34.95	44.95

Add \$2.00 shipping/handling

PERSONAL PERIPHERAL PRODUCTS

OS200 Winfield Rd.

Winfield, IL 60190-(312) 961-2347

COM-64 & VIC-20 IS A TRADEMARK OF COMMODORE



Circle 199 on Reader Service card.

Have you placed your vote for RUN's best advertisement of the month?

To do so, simply turn to the reader service card and fill in the company name and reader service number.

Circle 204 on Reader Service card.

When it saves you Time, it saves you Money...

it all adds up to a great addition!

Simply hook up ADDON to your Commodore 64.

Then forget it. ADDON makes it easy for you to work with numbers.

To add, subtract, multiply and divide them.

It even has omnidirectional cursor keys for easy maneuverability. ADDON. Because Time is Money. And that's what counts.

From:



ONLY
79.95 ea.



801 S. Victoria Ave., Suite 105
Ventura, CA 93003 (805) 656-1330

The Art and Science Of Programming

Programming is both an art and a science. This article discusses various techniques to help you become a more creative and more competent programmer.

By John Kula

There are two prerequisites you should consider before any programming begins. Without them, a program can still be good, but it will never be great.

The first is research, which means acquiring a complete understanding not only of all the facts pertinent to the intended program, but also of the program's *intent*.

For example, if you want to write a utility program that renumbers the lines of programs in memory, you must also decide (among other things) whether you intend to renumber all the embedded line numbers (i.e., those that follow a GOTO, GOSUB and so on) or whether you intend to catch them manually after-the-fact.

There's nothing inherently wrong in either choice, as long as the choice was intentional. But if you didn't do your research, and thus weren't aware of any limitation, that's another story.

The line renumberer is a very simple, almost trivial, example; the principle becomes more significant as the complexity of the program increases. I'm currently working on a simulation for the C-64 that will require a total of over 100K of memory (more on that in a while). Naturally, it's complex, and my research took three months to amass; but I'm confident that I've covered at least 95% of the angles.

The second prerequisite is a *precis*. Some programmers insist that nothing short of a complete and detailed flowchart will suffice, but I suspect this is a hangover from the days when programs had to be written in machine language. Although certain portions of a program may need flowcharting, this is necessary only when the logical sequence of events begins to get a bit convoluted.

Of more importance in the overall scheme of events is a summary of the program's major steps and blocks.

When a flowchart can't be avoided, however, don't worry about the correct usage of the symbols right away... you'll learn that with experience. Those symbols were developed as aids and shouldn't end up being stumbling blocks.

Writing a Program

There's no strict sequence of events in the actual writing of a program. You must write code before there's anything to debug. Obviously, with enough work, any piece of coding could be made more simple and elegant. But you should avoid the word-processor syndrome.

Word processors can make changes very easily, thus giving the impression that perfection is only one more draft away. So it is with computers, particularly those with good screen editors.

Once your program does what it was intended to do with no apparent bugs, take a stab or two at condensing it and then leave it be! The more you tinker with it, the more likely you are to introduce some extraneous bug. Knowing when to stop is a greater advantage than saving one or two more bytes of memory.

I find it most useful to keep two versions of a completed program on file. The working copy is the condensed version, so it takes less time to load and run. The backup copy is fully expanded and documented, so if I must make changes months later, (and it's a rare program that won't benefit from changes), I can follow the logic and remember my assumptions.

Documenting a Program

I've found a couple of techniques to be particularly useful in documenting a program. First, I frequently use the REM statement to explain what's happening in key areas and to identify each subroutine. I often use line numbers

Address all author correspondence to John Kula, 2522 Belmont Ave., Victoria, B.C., Canada, V8R 4A4.

that end in zero for program lines and those that end in any other digit for remarks or spacings (a line that contains only a colon has no effect on the program, but leaves a very satisfying separation on a listing). This numbering system helps me delete unwanted lines when I'm condensing the program into a working version.

The only caution here is that the target line for a GOTO or GOSUB statement should not be a line you're using for a remark or space. Even if you never intend to condense the program, you might eventually give it to someone (like myself) who will. Be kind to us inveterate tinkerers.

A second valuable technique is to indent all For...Next loops, as is common in Pascal. This makes the logic of the listing easier to follow and helps flag any errors in loop nesting. Again, leading colons work well for indentation; you can stack them as high as you want without any ill effect.

As a final note, the first two lines of every one of my backup programs contain printer information for listings. All my listings begin with the filename in expanded print and the date of the last update or amendment. I keep the milestone listings (those with important and/or significant changes) in dead storage for future reference. The others make satisfactory kindling for the fireplace.

Taking Command

It's a lot easier to write a program when you have access to some extended Basic commands. My most useful and most used program is Power 64, a programmer's utility, which gives me several very valuable additional commands.

A renumber command renumbers literal and embedded lines, usually has quite a few more bells and whistles, such as the ability to renumber line ranges within the program rather than the entire program (great for merging), and it's fast.

Search and substitute commands are my favorites; they do exactly what they suggest...search for a specified pattern (variable, keyword string and so on) and substitute. Deleting a range of line numbers with one command is handy. So is automatic line numbering. Single-stepping through a program aids debugging, as does dumping all variables.

This is only a partial list, but it gives an idea of what's available to make the job of coding and debugging less of an irritation.

Getting the Bugs Out

Debugging a program can be a frustrating experience and not even professionals get off lightly. Debugging actually involves two different kinds of bugs. The syntactical ones arise from errors in the use of Basic and are generally easy to spot, because most of them are fatal: an error message appears on the screen and the program stops running; or the computer locks up and doesn't respond to the keyboard; or the screen doesn't change for so long that you start to get suspicious (this latter bug is an endless loop, which isn't fatal in the strictest sense, but is just as effective at killing the program).

The other kind is the functional bug, which is more insidious because you don't find out about it until you run the program and receive unexpected answers or results. Because the syntactical bug indicates the line number in which your error might be, fatal errors should be the easiest to diagnose and correct.

What about the others? Well, there are essentially two possibilities: either the program's basic assumptions are incorrect and it's not a realistic simula-

tion of actual events, or there's an error in the logic of the coding. Let's assume that you're absolutely confident of your program's accuracy; the alternative is unappealing and has few remedies other than some more research and recoding.

The solution involves narrowing down the search area. First, create some test data (the simpler and more trivial, the better) and write it into your program. Then go through and insert breakpoints (i.e., the Stop command) at every spot where data has just been manipulated.

Now run the program and check the data produced at each breakpoint against your own hand-calculated data. If they correspond, enter CONT and repeat the process at the next break. When you reach a break where the data isn't the same, you'll know the problem is somewhere between the last Stop command and this one. Of course, this debugging is a bit less tedious if you have a utility program with a trace function or single-step capability.

It's a Trap

One aspect of programming that isn't given much press coverage but is closely

Circle 82 on Reader Service card.

"RUN"
it for less.

MICRO-GRIP™ IV

Designed specifically for the Epson
MX-70/80 and RX-80 printers.

#670
\$39.95/ea.

DISKFILE



For dustfree protection of your software, Diskfile provides storage for fifty 5¼" floppy disks. Vertical filing prevents warping. Comes with 5 adjustable dividers with moveable tabs and built-in carrying handle. Compact 8" x 7" x 7".

Suggested List Price — \$29.95/ea.
YOUR COST — \$19.95/ea.

No.	Item	Price
#628	5¼" Diskfile	\$19.95/ea.

TERMS & CONDITIONS
A minimum order of 10.00 is required, not including shipping. Prices effective 2/1/84 and are subject to change without notice. Automatic credit is extended to federal agencies, but to keep our prices competitive, we must request payment with orders from all other individuals and institutions. No C.O.D.'s. Freight charges added to credit card orders. All others shipped freight-collect. CASH ONLY. No merchandise may be returned without prior written authorization from this office. Merchandise ordered in error or not wanted is subject to a 25% restocking charge. Defective material replaced at no charge. All returns limited to a merchandise credit only. Mass. residents add 5% sales tax.



Bill Cole Enterprises, Inc.

P.O. BOX 60 • DEPT R8 • WOLLASTON, MA 02170-0060 • 617-963-5510



For Credit Card Orders ONLY! Call Toll Free 1-800-225-8249



We carry a COMPLETE line of computer supplies.

related to debugging is error-trapping, which detects any errors that could otherwise enter the system through user input. PET Basic, version 2.0, as contained in the VIC-20 and the C-64, does a bit of this automatically, but not nearly enough. Basic will trap you if you try to input a string when it expects a number, but not vice versa (of course it can't read your mind to know whether you meant it to be a numeric string or not).

For example, one of the big headaches in PET Basic is the null string. If the string variable contained no previous data, you get the null string when you respond to a string input prompt only by hitting the return key. We humans know there's nothing there, but the computer is not amused, particularly if you want it to find the ASCII value of the null string. A commonly touted solution has been to add a CHR\$(0) to every string input. For example:

```
10 INPUT "STRING"; QS
20 QS = QS + CHR$(0)
```

The theory behind this is that it won't affect a normal string, but will ensure that an accidental null string contains something recognizable to the com-

Obviously, any piece of coding could be made more simple and elegant. But you should avoid the word-processor syndrome.

puter. Unfortunately, this *does* add something to the string—a reverse @. So if at some point you need to find the length or the numerical value of the string, you'll end up with a more insidious problem than you had at the start.

My own recommendation is more mundane, but it ensures there will never be a null string or unexpected additions to a string. It is:

```
10 INPUT "STRING"; QS
20 IF QS = "" GOTO 10
```

Error-trapping involves taking into account every possible form of input

and assessing its validity. Just because you specify a range of acceptable responses in your program doesn't mean that someone won't try another response, accidentally or not. If you expect a numeric response with a small range, use an ON...GOTO command to test the input. You may admonish bad data with an appropriately stern message, default it to some unpopular value or do something else with it.

The important point to remember about the ON...GOTO and ON...GOSUB commands is that they test for positive integers. Values of zero default to the following line in the program, as do values greater than the options for which you provide. For example:

```
10 INPUT "NUMBER (4 TO 6)"; Q
20 ON Q - 3 GOTO 40,50,60
30 PRINT "TRY AGAIN, TWIT": GOTO 10
40 PRINT "Q=4": END
50 PRINT "Q=5": END
60 PRINT "Q=6": END
```

The input variable Q in line 10 has become the variable Q - 3 in line 20. If this variable is zero or greater than the number of items in the list, then the computer just ignores the ON...GOTO command (line 20) and executes the next line (line 30).

But what about negative variables? Those will result in a fatal ?Illegal Quantity error and a crash. And this is an excellent example of the need for error-trapping. Most people wouldn't bother trying to input a negative number, and it would be a highly unlikely accident. But in this example, an input of 0, 1 or 2 would result in a negative variable in line 20! Add the following error trap in line 15.

```
15 IF Q < 3 THEN Q = 3
```

All the angles have finally been covered.

Keeping your input routines as flexible as possible may not necessarily trap errors, but *will* make for better "live-aware compatibility." The following routine is too rigid, allowing only two responses.

```
10 INPUT "READY TO CONTINUE"; QS
20 IF QS = "Y" GOTO 50
30 IF QS = "N" GOTO 10
40 PRINT "YOU ARE NAUGHTY etc. etc."
50 Continue with program
```

Why not allow a greater variety (yeh, yup, ya, nah, nope) by adding the following line.

```
15 QS = LEFT$(QS,1)
```

Better yet, since all you're trying to do is delay further execution until you're ready, all you really need is:

```
10 INPUT "READY TO CONTINUE"; QS
20 IF LEFT$(QS,1) = "N" GOTO 10
```

Circle 96 on Reader Service card.

The Complete Printer Interface

* with Daisy Wheel Emulator



For Your VIC
or C-64

- Uses serial port
- Interfaces any Centronics compatible printer including:
 - * Star
 - * Epson
 - Okidata
 - Prowriter
 - Centronics

- Completely compatible with existing software
- Does not use a userport
- Normal ASCII-only mode

TO ORDER: CALL TOLL FREE
1-800-255-0511 or send check, money order
or charge card information. Add \$3.00
shipping and handling. Kansas residents
add 4% sales tax. Personal checks
allow 3 weeks for delivery.

only \$59.95

(with 2K Buffer \$69.95)

VIC 20 & C 64 are TM of
Commodore Business Machines, Inc.

Dealer Inquiries Invited

XETEC, Inc.
3010 Arnold Rd.
Salina, KS 67401

XETEC



To make life even easier (and let's face it, few users would bother typing N to the above prompt—they'd just wait until they were ready to continue and then type Y), why not offer the anticipated response in the prompt itself, so that you only have to hit the return key. Here's the coding for a new line 10:

```
INPUT
"
READY TO CONTINUE
{space}
{space}
{CTRL 9}
Y
{CTRL 0}
{CRSR LF}
{CRSR LF}
{CRSR LF}
"
;
QS
```

If you type in this line and run it, you should see a Y flashing under the cursor prompt, after the input. You only have to hit the return key to activate the Y response. In this case, an even more elegant solution would be the following, which is what I usually use in these circumstances.

```
10 PRINT "HIT ANY KEY TO CONTINUE"
20 WAIT 197,64: WAIT 197,64,64
30 POKE 198,0
```

In case you're wondering, line 30 clears the keyboard buffer, so when you hit the key to continue the program, the key itself doesn't appear on the screen and cause an error.

Squeeze It

Program condensation makes good sense from many perspectives, but may become an absolute necessity if you ever encounter an ?Out Of Memory error. Remarks are a great place to start, especially since everything on a line consisting of a REM statement is stored in memory exactly as you type it—no number conversion or keyword tokenizing.

Elimination of all unnecessary blanks is another spacesaver, but caution is required here. Sometimes you must leave an extra space to prevent the computer from thinking it recognizes a keyword. For example, ON T AND S GOTO 130 can be condensed to ON T ANDSGOTO 130. The blank is required so that TAN is not treated as a keyword.

There are lots of such little tricks for picking up a few bytes here and there. But when that's not enough, you'll probably want to consider breaking up your increasingly large program into

two or more smaller programs and loading them separately when required. This will only work, however, when each segment runs independently of the others, so be careful.

Although you may insert a Load command for execution when the program reaches it, there will be difficulties. There's no way to delete the old contents without also deleting your Load instruction. And if the new program is longer than the original, you'll run into problems as soon as the new program tries to load into the area used previously for variables. The simple solution is to trick the computer into thinking that it's executing a Load command from the keyboard; the Load command in the Immediate mode also automatically executes a New command.

To perform this, you must first set up the appropriate commands on the screen, in their appropriate locations, via Print statements. Then ASCII code 13s (returns) are Poked into the keyboard buffer. These returns are timed to coincide with the cursor being on the same line of the screen as one of the lines previously printed there. Once the

first command, Load, has been executed, the cursor automatically moves down to the second line, RUN. The second return from the buffer executes this line, and the second program has been successfully loaded and run. Assuming that the new program filename is "NEW.PROG", here's the listing:

```
10 PRINT "{4 CRSR DN}"
20 REM {CRSR DN}=CURSOR DOWN
30 PRINT "LOAD"CHR$(34)"0:NEW.PROG"
  CHR$(34)" ,8{4 CRSR DN}"
40 PRINT "RUN"
50 PRINT "{9 CRSR UP}"
60 REM {CRSR UP}=CURSOR UP
70 POKE 631,13:POKE 632,13
80 REM THESE ARE TWO <returns>
  POKED INTO THE KEYBOARD BUFFER
90 POKE 198,2
99 REM THIS SPECIFIES THAT THE
  BUFFER CURRENTLY CONTAINS TWO
  CHARACTERS
```

One final, little-known fact about computers. The integrated circuit chips in a computer actually run on smoke. If you sit at your computer too long and start to see smoke escaping, you'll know those little chips are soon going to run out of smoke and stop working. [R]

Circle 112 on Reader Service card.

New dimensions in Bible study.

THE WORD processor
the complete KJV Bible on disks \$199.95*

TOPICS
an index to over 200 Scripture subjects \$49.95*
* plus \$3 postage/handling

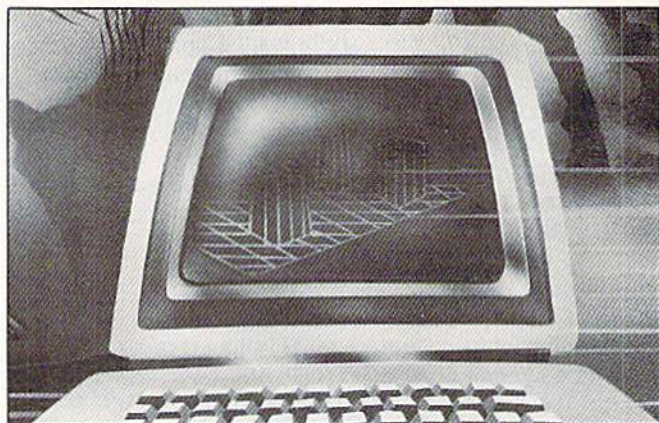
For information contact:
Bible Research Systems
9415 Burnet, Suite 208
Austin, TX 78758
(512) 835-7981

Requires APPLE II+, IBM PC and compatibles, TRS80, CP/M 2.2 (Z-80), KAYPRO, OSBORNE, COMMODORE 64, Z-100.

"Software for personal Bible study."

Beale's Buried Treasure

(continued from p. 57)



```
670 PRINT
680 INPUT "CODE VALUE(9 SPACES)";CV
690 INPUT "LETTER ASSIGNMENT(2 SPACES)";LS
700 PRINT "(6 CRSR UPS)WORKING....."
710 FOR X = 1 TO WL
720 :({3 SPACES})IF C(X) = CV THEN C$(X)=L$
730 NEXT X
740 GOTO 610
750 :
760 READ A:IF A<> -1 THEN PRINT"READ ERROR":END
770 RETURN
780 PRINT "WORKING....."
790 FOR X = 1 TO 518
800 :({3 SPACES})READ A
810 NEXT X
820 RETURN
830 PRINT "WORKING....."
840 FOR X = 1 TO 763
850 :({3 SPACES})READ A:C$(X)="-"
860 NEXT X
870 RETURN
880 PRINT "WORKING....."
890 FOR X = 1 TO 618
900 READ A
910 NEXT X
920 RETURN
930 PRINT "WORKING....."
940 FOR X = 1 TO 518
950 :({3 SPACES})READ C(X)
960 NEXT X
970 RETURN
980 PRINT "WORKING....."
990 FOR X = 1 TO 763
1000 :({3 SPACES})READ C(X):C$(X)="-"
1010 NEXT X
1020 RETURN
1030 PRINT "WORKING....."
1040 FOR X = 1 TO 618
1050 :({3 SPACES})READ C(X)
1060 NEXT X
1070 RETURN
1080 :
1090 PRINT "WORKING....."
1100 FOR X = 1 TO 1322
1110 :({3 SPACES})READ DC$(X)
1120 NEXT X
1130 FOR X = 1323 TO 2906
1140 :({3 SPACES})DC$(X) = "-"
1150 NEXT X
1160 RETURN
1170 END
1180 REM(7 SPACES)BEALE CODE --- PAPER ONE
1190 :
1200 DATA 71, 194, 38, 1701, 89, 76, 11, 83, 1629, 48,
94, 63
1210 DATA 132, 16, 111, 95, 84, 341, 975, 14, 40, 64, 2
7, 81
1220 DATA 139, 213, 63, 90, 1120, 8, 15, 3, 126, 2018,
40, 74
1230 DATA 758, 485, 604, 230, 436, 664, 582, 150, 251,
284
1240 DATA 308, 231, 124, 211, 486, 225, 401, 370, 11, 1
01
1250 DATA 305, 139, 189, 17, 33, 88, 208, 193, 145, 1,
94, 73
1260 DATA 416, 918, 263, 28, 500, 538, 356, 117, 136, 2
19
1270 DATA 27, 176, 130, 10, 460, 25, 485, 18, 436, 65,
84
```

```
1280 DATA 200, 283, 118, 320, 138, 36, 416, 280, 15, 71
, 224
1290 DATA 961, 44, 16, 401, 39, 88, 61, 304, 12, 21, 24
, 283
1300 DATA 134, 92, 63, 246, 486, 682, 7, 219, 184, 360,
780
1310 DATA 18, 64, 463, 474, 131, 160, 79, 73, 440, 95,
18, 64
1320 DATA 581, 34, 69, 128, 367, 460, 17, 81, 12, 103,
820
1330 DATA 62, 116, 97, 103, 862, 70, 60, 1317, 471, 540
, 208
1340 DATA 121, 890, 346, 36, 150, 59, 568, 614, 13, 120
, 63
1350 DATA 219, 812, 2160, 1780, 99, 35, 18, 21, 136, 87
2, 15
1360 DATA 28, 170, 88, 4, 30, 44, 112, 18, 147, 436, 19
5, 320
1370 DATA 37, 122, 113, 6, 140, 8, 120, 305, 42, 58, 46
1, 44
1380 DATA 106, 301, 13, 408, 680, 93, 86, 116, 530, 82,
9
1390 DATA 102, 38, 416, 89, 71, 216, 728, 965, 818, 2,
38
1400 DATA 121, 195, 14, 326, 148, 234, 18, 55, 131, 234
, 361
1410 DATA 824, 5, 81, 623, 48, 961, 19, 26, 33, 10, 110
1, 365
1420 DATA 92, 88, 181, 275, 346, 201, 206, 86, 36, 219,
329
1430 DATA 829, 840, 68, 326, 19, 48, 122, 85, 216, 284,
919
1440 DATA 861, 326, 985, 233, 64, 68, 232, 431, 960, 50
29
1450 DATA 81, 216, 321, 603, 14, 612, 81, 360, 36, 51,
62
1460 DATA 194, 78, 60, 200, 314, 676, 112, 4, 28, 18, 6
1, 136
1470 DATA 247, 819, 821, 1060, 464, 895, 10, 6, 66, 119
38
1480 DATA 41, 49, 602, 423, 962, 302, 294, 875, 78, 14,
23
1490 DATA 111, 109, 62, 31, 501, 823, 216, 280, 34, 24,
150
1500 DATA 1000, 162, 296, 19, 21, 17, 340, 19, 242, 86,
234
1510 DATA 140, 607, 115, 33, 391, 67, 104, 86, 52, 88,
16, 80
1520 DATA 121, 67, 95, 122, 216, 548, 96, 11, 201, 77,
364
1530 DATA 218, 65, 667, 890, 236, 154, 211, 10, 98, 34,
119
1540 DATA 56, 216, 119, 71, 218, 1164, 1496, 1817, 51,
39
1550 DATA 210, 36, 3, 19, 540, 232, 22, 141, 617, 84, 2
90, 80
1560 DATA 46, 207, 411, 150, 29, 38, 46, 172, 85, 194,
36
1570 DATA 261, 543, 897, 624, 18, 212, 416, 127, 931, 1
9, 4
1580 DATA 63, 96, 12, 101, 418, 16, 140, 230, 460, 538,
19
1590 DATA 27, 88, 612, 1431, 90, 716, 275, 74, 83, 11,
426
1600 DATA 89, 72, 84, 1300, 1706, 814, 221, 132, 40, 10
2, 34
1610 DATA 858, 975, 1101, 84, 16, 79, 23, 16, 81, 122,
324
1620 DATA 403, 912, 227, 936, 447, 55, 86, 34, 43, 212,
107
1630 DATA 96, 314, 264, 1065, 323, 428, 601, 203, 124,
95
1640 DATA 216, 814, 2906, 654, 820, 2, 301, 112, 176, 2
13
1650 DATA 71, 87, 96, 202, 35, 10, 2, 41, 17, 84, 221,
736, 820
1660 DATA 214, 11, 60, 760, -1
1670 :
1680 :
1690 :
1700 REM(7 SPACES)BEALE CODE --- PAPER TWO
1710 :
1720 :
1730 DATA 115, 73, 24, 818, 37, 52, 49, 17, 31, 62, 657
, 22, 7, 15, 140, 47, 29
1740 DATA 107, 79, 84, 56, 238, 10, 26, 822, 5, 195, 30
8, 85, 52, 159, 136, 59
1750 DATA 210, 36, 9, 46, 316, 543, 122, 106, 95, 53, 5
8, 2, 42, 7, 35, 122
1760 DATA 53, 31, 82, 77, 250, 195, 56, 96, 118, 71, 14
0, 287, 28, 353, 37
1770 DATA 994, 65, 147, 818, 24, 3, 8, 12, 47, 43, 59,
818, 45, 316, 101, 41
1780 DATA 78, 154, 994, 122, 138, 190, 16, 77, 49, 102,
57, 72, 34, 73, 85, 35
1790 DATA 371, 59, 195, 81, 92, 190, 106, 273, 60, 394,
629, 270, 219, 106, 388
```

More

Listing continued.

1800 DATA 287, 63, 3, 6, 190, 122, 43, 233, 400, 106, 2
90, 314, 47, 48, 81, 96

1810 DATA 26, 115, 92, 157, 190, 110, 77, 85, 196, 46,
10, 113, 140, 353, 48

1820 DATA 120, 106, 2, 616, 61, 420, 822, 29, 125, 14,
20, 37, 105, 28, 248

1830 DATA 16, 150, 7, 35, 19, 301, 125, 110, 496, 287,
98, 117, 520, 62, 51

1840 DATA 219, 37, 113, 140, 818, 138, 549, 8, 44, 287,
388, 117, 18, 79, 344

1850 DATA 34, 20, 59, 520, 557, 107, 612, 219, 37, 66,
154, 41, 20, 50, 6, 584

1860 DATA 122, 154, 248, 110, 61, 52, 33, 30, 5, 38, 8,
14, 84, 57, 549, 216

1870 DATA 115, 71, 29, 85, 63, 43, 131, 29, 138, 47, 73
, 238, 549, 52, 53, 79

1880 DATA 118, 51, 44, 63, 195, 12, 238, 112, 3, 49, 79
, 353, 105, 56, 371, 566

1890 DATA 210, 515, 125, 360, 133, 143, 101, 15, 284, 5
49, 252, 14, 204, 140

1900 DATA 344, 26, 822, 138, 115, 48, 73, 34, 204, 316,
616, 63, 219, 7, 52

1910 DATA 150, 44, 52, 16, 40, 37, 157, 818, 37, 121, 1
2, 95, 10, 15, 35

1920 DATA 12, 131, 62, 115, 102, 818, 49, 53, 135, 138,
30, 31, 62, 67, 41, 85

1930 DATA 63, 10, 106, 818, 138, 8, 113, 20, 32, 33, 37
, 353, 287, 140, 47, 85

1940 DATA 50, 37, 49, 47, 64, 6, 7, 71, 33, 4, 43, 47,
63, 1, 27, 609, 207

1950 DATA 229, 15, 190, 246, 85, 94, 520, 2, 270, 20, 3
9, 7, 33, 44, 22, 40, 7

1960 DATA 10, 3, 822, 106, 44, 496, 229, 353, 210, 199,
31, 10, 38, 140, 297

1970 DATA 61, 612, 320, 302, 676, 287, 2, 44, 33, 32, 5
20, 557, 10, 6, 250

1980 DATA 566, 246, 53, 37, 52, 83, 47, 320, 38, 33, 81
8, 7, 44, 30, 31, 250

1990 DATA 10, 15, 35, 106, 159, 113, 31, 102, 406, 229,
549, 320, 29, 66, 33

2000 DATA 101, 818, 138, 301, 316, 353, 320, 219, 37, 5
2, 28, 549, 320, 33, 8

2010 DATA 48, 107, 50, 822, 7, 2, 113, 73, 16, 125, 11,
110, 67, 102, 818, 33

2020 DATA 59, 81, 157, 38, 43, 590, 138, 19, 85, 400, 3
8, 43, 77, 14, 27, 8, 47

2030 DATA 138, 63, 140, 44, 35, 22, 176, 106, 250, 314,
216, 2, 10, 7, 994

2040 DATA 4, 20, 25, 44, 48, 7, 26, 46, 110, 229, 818,
190, 34, 112, 147, 44

2050 DATA 110, 121, 125, 96, 41, 51, 50, 140, 56, 47, 1
52, 549, 63, 818, 28

2060 DATA 42, 250, 138, 591, 98, 653, 32, 107, 140, 112
, 26, 85, 138, 549, 50

2070 DATA 20, 125, 371, 38, 36, 10, 52, 118, 136, 102,
420, 150, 112, 71, 14

2080 DATA 20, 7, 24, 18, 12, 818, 37, 67, 110, 62, 33,
21, 95, 219, 520, 102

2090 DATA 822, 30, 83, 84, 305, 629, 15, 2, 10, 8, 219,
106, 353, 105, 106, 60

2100 DATA 242, 72, 8, 50, 204, 184, 112, 125, 549, 65,
106, 818, 190, 96, 110

2110 DATA 16, 73, 33, 818, 150, 409, 400, 50, 154, 285,
96, 106, 316, 270, 204

2120 DATA 101, 822, 400, 8, 44, 37, 52, 40, 240, 34, 20
4, 38, 16, 46, 47, 85

2130 DATA 24, 44, 15, 64, 73, 138, 818, 85, 78, 110, 33
, 420, 515, 53, 37, 38

2140 DATA 22, 31, 10, 110, 106, 101, 140, 15, 38, 3, 5,
44, 7, 98, 287, 135

2150 DATA 150, 96, 33, 84, 125, 818, 190, 96, 520, 118,
459, 370, 653, 466

2160 DATA 106, 41, 107, 612, 219, 275, 30, 150, 105, 49
, 53, 287, 250, 207, 134

2170 DATA 7, 53, 12, 47, 85, 63, 138, 110, 21, 112, 140
, 495, 496, 515, 14, 73

2180 DATA 85, 584, 994, 150, 199, 16, 42, 5, 4, 25, 42,
8, 16, 822, 125, 159

2190 DATA 32, 204, 612, 818, 81, 95, 405, 41, 609, 136,
14, 20, 28, 26, 353

2200 DATA 302, 246, 8, 131, 159, 140, 84, 440, 42, 16,
822, 40, 67, 101, 102

2210 DATA 193, 138, 204, 51, 63, 240, 549, 122, 8, 10,
63, 140, 47, 48, 140

2220 DATA 288, -1

2230 :

2240 :

2250 :

2260 REM(7 SPACES)BEALE CODE --- PAPER THREE

2270 :

2280 DATA 317, 8, 92, 73, 112, 89, 67, 318, 28, 96, 107
, 41, 631, 78, 146, 397

2290 DATA 118, 98, 114, 246, 348, 116, 74, 88, 12, 65,
32, 14, 81, 19, 76, 121

2300 DATA 216, 85, 33, 66, 15, 108, 68, 77, 43, 24, 122
, 96, 117, 36, 211, 301

2310 DATA 15, 44, 11, 46, 89, 18, 136, 68, 317, 28, 90,
82, 304, 71, 43, 221

More

software that was
designed for you?

of course, it's from

new leaf!™

introducing our newest leaf . . .

»MARIAH»

Strategy and luck combine to bring you this challenging game. Proceed carefully across the pathways towards your goal, but watch out for Mariah, or she'll blow you away. Whether you're 6 or 96, you will find it hard to resist just one more game! For the 64 only.

Disk 33.50

or, select from our existing crop . . .

BIORHYTHM+

Classic Biorhythm with audio feedback and compatibility comparisons. Plus, ours will give you the option of a printed chart.* For the VIC-20™ (3K) or the 64.

Cassette 14.50

Disk 19.50

C*A*R*S

(Car Analysis Reporting System) Let us help you control your runaway vehicle costs. Whether for home use or for a fleet of vehicles, you can graph and monitor operating efficiency and cost of ownership including car insurance, payments, taxes and license fees as well as repairs. It distinguishes between operating and ownership cost. Again, ours will give you the option of printed reports.* The program runs on the VIC-20™ (24K) and the 64.

Cassette 35.50

Disk 39.50

ESP·Calc

(Electronic Spreadsheet Planning Calculator) The first truly easy-to-use spreadsheet with a unique entry format designed for novice users. This full-featured spreadsheet is an excellent tool for planning and repetitive calculations for both home and small business use. Complete with 3-ring manual and ready-to-use examples. You can even make printed copies of your spreadsheets.* Same program runs on the VIC-20™ (24K) and the 64.

Cassette 43.50

Disk 47.50

*On any Commodore™ compatible printer

(618) 397-3660

Coming soon . . . The Magic Shoppe



Product ordered

 VIC-20™ Disk

Amount enclosed

Name _____

Address _____

City _____

State _____

Zip _____

Phone Number () _____

MC or VISA # _____

Expiration date _____

Interbank # (MC) _____

Missouri residents add 5.125% sales tax

120 Lynnhaven • Belleville, IL 62223

Mastercard and VISA customers, please add 3%





ULTRA COPY 64

DISK DUPLICATION SYSTEM FOR C-64

- Analyze disk tracks for data & errors
- Skip empty tracks to speed copying
- Copy everything incl. DOS flag & false ID
- Put errors 20,21,22,23,27 & 29 on copy as required by latest protection schemes
- Fast, reliable copying with 1 or 2 drives

\$39.95 plus \$3 shipping. Mastercard and Visa

98 % OF SOFTWARE CAN BE ULTRACOPY'ED

C-64 ULTRA RESET SWITCH

- Built into new 6 foot disk drive cable
- Nothing to solder - no connections
- Eliminate voltage spikes & switch wear
- Recover programs after system crashes

\$16.95 plus \$3 shipping. Mastercard and Visa

ULTRABYTE Call (313) 562-9855

23400 Michigan, Suite 502, Dearborn, MI 48124
Satisfaction guaranteed, 10 day return privilege

Listing continued.

2320 DATA 198, 176, 310, 319, 81, 99, 264, 380, 56, 37, 319, 2, 44, 53, 28, 44

2330 DATA 75, 98, 102, 37, 85, 107, 117, 64, 88, 136, 48, 151, 99, 175, 89, 315

2340 DATA 326, 78, 96, 214, 218, 311, 43, 89, 51, 90, 75, 128, 96, 33, 28, 103

2350 DATA 84, 65, 26, 41, 246, 84, 270, 98, 116, 32, 59, 74, 66, 69, 240, 15

2360 DATA 8, 121, 20, 77, 89, 31, 11, 106, 81, 191, 224, 328, 18, 75, 52, 82

2370 DATA 117, 201, 39, 23, 217, 27, 21, 84, 35, 54, 109, 128, 49, 77, 88, 1

2380 DATA 81, 217, 64, 55, 83, 116, 251, 269, 311, 96, 54, 32, 120, 18, 132

2390 DATA 102, 219, 211, 84, 150, 219, 275, 312, 64, 109, 106, 87, 75, 47, 21

2400 DATA 29, 37, 81, 44, 18, 126, 115, 132, 160, 181, 203, 76, 81, 299, 314

2410 DATA 337, 351, 96, 11, 28, 97, 318, 238, 106, 24, 93, 3, 19, 17, 26, 60

2420 DATA 73, 88, 14, 126, 138, 234, 286, 297, 321, 365, 264, 19, 22, 84, 56

2430 DATA 107, 98, 123, 111, 214, 136, 7, 33, 45, 40, 13, 28, 46, 42, 107, 196

2440 DATA 227, 344, 198, 203, 247, 116, 19, 8, 212, 230, 31, 6, 328, 65, 48, 52

2450 DATA 59, 41, 122, 33, 117, 11, 18, 25, 71, 36, 45, 83, 76, 89, 92, 31, 65

2460 DATA 70, 83, 96, 27, 33, 44, 50, 61, 24, 112, 136, 149, 176, 180, 194, 143

2470 DATA 171, 205, 296, 87, 12, 44, 51, 89, 98, 34, 41, 208, 173, 66, 9, 35

2480 DATA 16, 95, 8, 113, 175, 90, 56, 203, 19, 177, 183, 206, 157, 200, 218

2490 DATA 260, 291, 305, 618, 951, 320, 18, 124, 78, 65, 19, 32, 124, 48, 53

2500 DATA 57, 84, 96, 207, 244, 66, 82, 119, 71, 11, 86, 77, 213, 54, 82, 316

2510 DATA 245, 303, 86, 97, 106, 212, 18, 37, 15, 81, 89, 16, 7, 81, 39, 96

2520 DATA 14, 43, 216, 118, 29, 55, 109, 136, 172, 213, 64, 8, 227, 304, 611

2530 DATA 221, 364, 819, 375, 128, 296

2540 DATA 11, 18, 53, 76, 10, 15, 23, 19, 71, 84, 120, 134, 66, 73, 89, 96, 230

2550 DATA 48, 77, 26, 101, 127, 936, 218, 439, 178, 171, 61, 226, 313, 215, 102

2560 DATA 18, 167, 262, 114, 218, 66, 59, 48, 27, 19, 13, 82, 48, 162, 119, 34

2570 DATA 127, 139, 34, 128, 129, 74, 63, 120, 11, 54, 61, 73, 92, 180, 66, 75

More →

MOVING?

SUBSCRIPTION PROBLEM?

Get help with your subscription by calling our new toll free number:

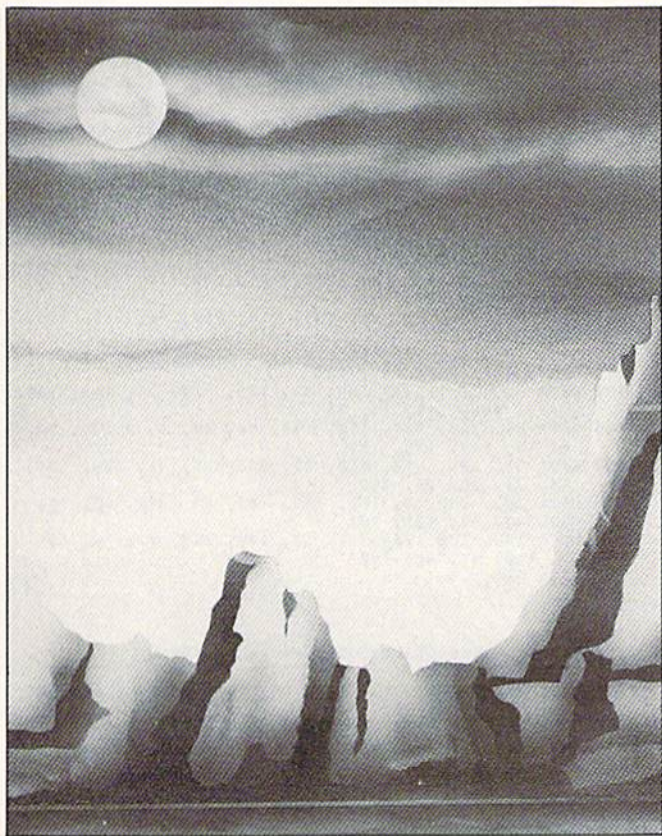
1-800-645-9559*

between 9 a.m. and 5 p.m. EST,
Monday-Friday.

If possible, please have your mailing label in front of you as well as your cancelled check or credit card statement if you are having problems with payment.

If moving, please give both your old address and new address.

* New York State residents call 1-800-732-9119.



Listing continued.

- 2580 DATA 101, 124, 265, 89, 96, 126, 274, 896, 917, 43
4, 461, 235, 890, 312
- 2590 DATA 413, 328, 381, 96, 105, 217, 66, 118, 22, 77,
64, 42, 12, 7, 55, 24
- 2600 DATA 83, 67, 97, 109, 121, 135, 181, 203, 219, 228
, 256, 21, 34, 77, 319
- 2610 DATA 374, 382, 675, 684, 717, 864, 203, 4, 18, 92,
16, 63, 82, 22, 46, 55
- 2620 DATA 69, 74, 112, 135, 186, 175, 119, 213, 416, 31
2, 343, 264, 119, 186
- 2630 DATA 218, 343, 417, 845, 951, 124, 209, 49, 617, 8
56, 924, 936, 72, 19
- 2640 DATA 29, 11, 35, 42, 40, 66, 85, 94, 112, 65, 82,
115, 119, 236, 244, 186
- 2650 DATA 172, 112, 85, 6, 56, 38, 44, 85, 72, 32, 47,
73, 96, 124, 217, 314
- 2660 DATA 319, 221, 644, 817, 821, 934, 922, 416, 975,
10, 22, 18, 46, 137, 181
- 2670 DATA 101, 39, 86, 103, 116, 138, 164, 212, 218, 29
6, 815, 300, 412, 460
- 2680 DATA 495, 675, 820, 952, -1
- 2690 :
2700 :
2710 :
2720 :
2730 REM(7 SPACES)DECLARATION OF INDEPENDENCE
2740 :
2750 DATA WHEN, IN, THE, COURSE, OF, HUMAN, EVENTS, IT, BECOMES
, NECESSARY, FOR, ONE
2760 DATA PEOPLE, TO, DISSOLVE, THE, POLITICAL, BANDS, WHICH,
HAVE, CONNECTED, THEM, WITH
2770 DATA ANOTHER, AND, TO, ASSUME, AMONG, THE, POWERS, OF, THE
, EARTH, THE, SEPARATE, AND
2780 DATA EQUAL, STATION, TO, WHICH, THE, LAWS, OF, NATURE, AND
, OF, NATURES, GOD, ENTITLED
2790 DATA THEM, A, DECENT, RESPECT, TO, THE, OPINIONS, OF, MANK
IND, REQUIRES, THAT, THEY
2800 DATA SHOULD, DECLARE, THE, CAUSES, WHICH, IMPEL, THEM, TO
, THE, SEPARATION, WE, HOLD
2810 DATA THESE, TRUTHS, TO, BE, SELF, EVIDENT, THAT, ALL, MEN,
ARE, CREATED, EQUAL, THAT
2820 DATA THEY, ARE, ENDOWED, BY, THEIR, CREATOR, WITH, CERTAIN,
UNALIENABLE, RIGHTS
2830 DATA THAT, AMONG, THESE, ARE, LIFE, LIBERTY, AND, THE, PUR
SUIT, OF, HAPPINESS, THAT
2840 DATA TO, SECURE, THESE, RIGHTS, GOVERNMENTS, ARE, INSTIT
UTED, AMONG, MEN, DERIVING
2850 DATA THEIR, JUST, POWERS, FROM, THE, CONSENT, OF, THE, GOV
ERNED, THAT, WHENEVER, ANY
2860 DATA FORM, OF, GOVERNMENT, BECOMES, DESTRUCTIVE, OF, THE
SE, ENDS, IT, IS, THE, RIGHT
2870 DATA OF, THE, PEOPLE, TO, ALTER, OR, TO, ABOLISH, IT, AND, T
O, INSTITUTE, NEW
2880 DATA GOVERNMENT, LAYING, ITS, FOUNDATION, ON, SUCH, PRIN
CIPLES, AND, ORGANIZING
2890 DATA ITS, POWERS, IN, SUCH, FORM, AS, TO, THEM, SHALL, SEEM
, MOST, LIKELY, TO, EFFECT
2900 DATA THEIR, SAFETY, AND, HAPPINESS, PRUDENCE, INDEED, WI
LL, DICTATE, THAT
2910 DATA GOVERNMENTS, LONG, ESTABLISHED, SHOULD, NOT, BE, CH
ANGED, FOR, LIGHT, AND
2920 DATA TRANSIENT, CAUSES, AND, ACCORDINGLY, ALL, EXPERIEN
CE, HATH, SHOWN, THAT
2925 DATA MANKIND
2930 DATA ARE, MORE, DISPOSED, TO, SUFFER, WHILE, EVILS, ARE, S
UPFERABLE, THAN, TO, RIGHT
2940 DATA THEMSELVES, BY, ABOLISHING, THE, FORMS, TO, WHICH, T
HEY, ARE, ACCUSTOMED, BUT
2950 DATA WHEN, A, LONG, TRAIN, OF, ABUSES, AND, USURPATIONS, P
URSUIING, INVARIABLY, THE
2960 DATA SAME, OBJECT, EVINCES, A, DESIGN, TO, REDUCE, THEM, U
NDER, ABSOLUTE, DESPOTISM
2970 DATA IT, IS, THEIR, RIGHT, IT, IS, THEIR, DUTY, TO, THROW, O
FF, SUCH, GOVERNMENT, AND
2980 DATA TO, PROVIDE, NEW, GUARDS, FOR, THEIR, FUTURE, SECURI
TY, SUCH, HAS, BEEN, THE
2990 DATA PATIENT, SUFFERANCE, OF, THESE, COLONIES, AND, SUCH
, IS, NOW, THE, NECESSITY
3000 DATA WHICH, CONSTRAINS, THEM, TO, ALTER, THEIR, FORMER, S
YSTEMS, OF, GOVERNMENT, THE
3010 DATA HISTORY, OF, THE, PRESENT, KING, OF, GREAT, BRITAIN,
IS, A, HISTORY, OF, REPEATED
3020 DATA INJURIES, AND, USURPATIONS, ALL, HAVING, IN, DIRECT
OBJECT, THE
3030 DATA ESTABLISHMENT, OF, AN, ABSOLUTE, TYRANNY, OVER, THE
SE, STATES, TO, PROVE, THIS
3040 DATA LET, FACTS, BE, SUBMITTED, TO, A, CANDID, WORLD, HE, H
AS, REFUSED, HIS, ASSENT
3050 DATA TO, LAWS, THE, MOST, WHOLESOME, AND, NECESSARY, FOR,
THE, PUBLIC, GOOD, HE, HAS
3060 DATA FORBIDDEN, HIS, GOVERNORS, TO, PASS, LAWS, OF, IMMED
IATE, AND, PRESSING
3070 DATA IMPORTANCE, UNLESS, SUSPENDED, IN, THEIR, OPERATIO
N, TILL, HIS, ASSENT, SHOULD
3080 DATA BE, OBTAINED, AND, WHEN, SO, SUSPENDED, HE, HAS, UTTE
RLY, NEGLECTED, TO, ATTEND
3090 DATA TO, THEM, HE, HAS, REFUSED, TO, PASS, OTHER, LAWS, FOR
, THE, ACCOMMODATION, OF

More →

DISCOUNT PRICES COMPUTERS & EQUIPMENT

COMPUTERS	EQUIPMENT
   	     

PRINTERS		
   	   	   

FREE Price List + Information Kit
Call For Your Discount Prices
 Since 1978

Micro Management Systems, Inc.
 2803 Thomasville Road East
 Cairo, Georgia 31728
 (912) 377-7100
1-800-841-0860

Attention Subscribers

We occasionally make our mailing list available to other companies or organizations with products or services which we feel might be of interest to you. If you prefer that your name be deleted from such a list, please fill out the coupon below or affix a copy of your mailing label and mail it to:

CW Communications/Peterborough
 RUN
 PO Box 954
 Farmingdale, NY 11737

Please delete my name from mailing lists sent to other companies or organizations.

Name _____

Address _____

City _____ State _____ Zip _____

Listing continued.

3110 DATA LARGE, DISTRICTS, OF, PEOPLE, UNLESS, THOSE, PEOPLE, WOULD, RELINQUISH, THE

3110 DATA RIGHT, OF, REPRESENTATION, IN, THE, LEGISLATURE, A, RIGHT, INESTIMABLE, TO

3120 DATA THEM, AND, FORMIDABLE, TO, TYRANTS, ONLY, HE, HAS, CALLED, TOGETHER

3130 DATA LEGISLATIVE, BODIES, AT, PLACES, UNUSUAL, UNCOMFORTABLE, AND, DISTANT, FROM

3140 DATA THE, DEPOSITORY, OF, THEIR, PUBLIC, RECORDS, FOR, THE, SOLE, PURPOSE, OF

3150 DATA FATIGUING, THEM, INTO, COMPLIANCE, WITH, HIS, MEASURES, HE, HAS, DISSOLVED

3160 DATA REPRESENTATIVE, HOUSES, REPEATEDLY, FOR, OPPOSING, WITH, MANLY, FIRMNES

3170 DATA HIS, INVASIONS, ON, THE, RIGHTS, OF, THE, PEOPLE, HE, HAS, REFUSED, FOR, A, LONG

3180 DATA TIME, AFTER, SUCH, DISSOLUTIONS, TO, CAUSE, OTHERS, TO, BE, ELECTED, WHEREBY

3190 DATA THE, LEGISLATIVE, POWERS, INCAPABLE, OF, ANNILIATION, HAVE, RETURNED, TO, THE

3200 DATA PEOPLE, AT, LARGE, FOR, THEIR, EXERCISE, THE, STATE, REMAINING, IN, THE

3210 DATA MEANTIME, EXPOSED, TO, ALL, THE, DANGERS, OF, INVASION, FROM, WITHOUT, AND

3220 DATA CONVULSIONS, WITHIN, HE, HAS, ENDEAVORED, TO, PREVENT, THE, POPULATION, OF

3230 DATA THESE, STATES, FOR, THAT, PURPOSE, CONSTRUCTING, THE, LAWS, OF, NATURALIZATION

3240 DATA OF, FOREIGNERS, REFUSING, TO, PASS, OTHERS, TO, ENCOURAGE, THEIR, MIGRATION

3250 DATA HITHER, AND, RAISING, THE, CONDITIONS, OF, NEW, APPROPRIATIONS, OF, LANDS

3260 DATA HE, HAS, OBSTRUCTED, THE, ADMINISTRATION, OF, JUSTICE, BY, REFUSING, HIS

3270 DATA ASSENT, TO, LAWS, FOR, ESTABLISHING, JUDICIARY, POWERS, HE, HAS, MADE, JUDGES

3280 DATA DEPENDENT, ON, HIS, WILL, ALONE, FOR, THE, TENURE, OF, THEIR, OFFICES, AND, THE

3290 DATA AMOUNT, AND, PAYMENT, OF, THEIR, SALARIES, HE, HAS, ELECTED, A, MULTITUDE, OF

3300 DATA NEW, OFFICES, AND, SENT, HITHER, SWARMS, OF, OFFICERS, TO, HARASS, OUR, PEOPLE

3310 DATA AND, EAT, OUT, THEIR, SUBSTANCE, HE, HAS, KEPT, AMONG, US, IN, TIMES, OF, PEACE

3320 DATA STANDING, ARMIES, WITHOUT, THE, CONSENT, OF, OUR, LEGISLATURE, HE, HAS

3330 DATA AFFECTED, TO, RENDER, THE, MILITARY, INDEPENDENT, OF, AND, SUPERIOR, TO, THE

3340 DATA CIVIL, POWER, HE, HAS, COMBINED, WITH, OTHERS, TO, SUBJECT, US, TO, A

3350 DATA JURISDICTION, FOREIGN, TO, OUR, CONSTITUTION, AND, UNACKNOWLEDGED, BY, OUR

3360 DATA LAWS, GIVING, HIS, ASSENT, TO, THEIR, ACTS, OF, PRETENDED, LEGISLATION, FOR

3370 DATA QUARTERING, LARGE, BODIES, OF, ARMED, TROOPS, AMONG, US, FOR, PROTECTING, THEM

3380 DATA BY, A, MOCK, TRIAL, FROM, PUNISHMENT, FOR, ANY, MURDERS, WHICH, THEY, SHOULD

3390 DATA COMMIT, ON, THE, INHABITANTS, OF, THESE, STATES, FOR, CUTTING, OFF, OUR, TRADE

3400 DATA WITH, ALL, PARTS, OF, THE, WORLD, FOR, IMPOSING, TAXES, ON, US, WITHOUT, OUR

3410 DATA CONSENT, FOR, DEPRIVING, US, IN, MANY, CASES, OF, THE, BENEFITS, OF, TRIAL, BY

3420 DATA JURY, FOR, TRANSPORTING, US, BEYOND, SEAS, TO, BE, TRIED, FOR, PRETENDED

3430 DATA OFFENCES, FOR, ABOLISHING, THE, FREE, SYSTEM, OF, ENGLISH, LAWS, IN, A

3440 DATA NEIGHBORING, PROVINCE, ESTABLISHING, THEREIN, AN, ARBITRARY, GOVERNMENT

3450 DATA AND, ENLARGING, ITS, BOUNDARIES, SO, AS, TO, RENDER, IT, AT, ONCE, AN, EXAMPLE

3460 DATA AND, FIT, INSTRUMENT, FOR, INTRODUCING, THE, SAME, ABSOLUTE, RULE, IN, THESE

3470 DATA COLONIES, FOR, TAKING, AWAY, OUR, CHARTERS, ABOLISHING, OUR, MOST, VALUABLE

3480 DATA LAWS, AND, ALTERING, FUNDAMENTALLY, THE, FORMS, OF, OUR, GOVERNMENTS, FOR

3490 DATA SUSPENDING, OUR, OWN, LEGISLATURE, AND, DECLARING, THEMSELVES, INVESTED

3500 DATA WITH, POWER, TO, LEGISLATE, FOR, US, IN, ALL, CASES, WHATSOEVER, HE, HAS

3510 DATA ABDICATED, GOVERNMENT, HERE, BY, DECLARING, US, OUT, OF, HIS, PROTECTION, AND

3520 DATA WAGING, WAR, AGAINST, US, HE, HAS, PLUNDERED, OUR, SEAS, RAVAGED, OUR, COASTS

3530 DATA BURNT, OUR, TOWNS, AND, DESTROYED, THE, LIVES, OF, OUR, PEOPLE, HE, IS, AT, THIS

3540 DATA TIME, TRANSPORTING, LARGE, ARMIES, OF, FOREIGN, MERCENARIES, TO, COMPLEAT

3550 DATA THE, WORKS, OF, DEATH, DESOLATION, AND, TYRANNY, ALREADY, BEGUN, WITH

3560 DATA CIRCUMSTANCES, OF, CRUELTY, &, PERFDY, SCARCELY, PARALLELED, IN, THE, MOST

3570 DATA BARBAROUS, AGES, AND, TOTALLY, UNWORTHY, THE, HEAD, OF, A, CIVILIZED, NATION

3580 DATA HE, HAS, CONSTRAINED, OUR, FELLOW, CITIZENS, TAKEN, CAPTIVE, ON, THE, HIGH, SEAS

3590 DATA TO, BEAR, ARMS, AGAINST, THEIR, COUNTRY, TO, BECOME, THE, EXECUTIONERS, OF

3600 DATA THEIR, FRIENDS, AND, BROTHERN, OR, TO, FALL, THEMSELVES, BY, THEIR, HANDS, HE

3610 DATA HAS, EXCITED, DOMESTIC, INSURRECTIONS, AMONGST, US, AND, HAS, ENDEAVORED, TO

3620 DATA BRING, ON, THE, INHABITANTS, OF, OUR, FRONTIERS, THE, MERCILESS, INDIAN

3630 DATA SAVAGES, WHOSE, KNOWN, RULE, OF, WARFARE, IS, AN, UNDISTINGUISHED

3640 DATA DESTRUCTION, OF, ALL, AGES, SEXES, AND, CONDITIONS, IN, EVERY, STAGE, OF

3650 DATA THESE, OPPRESSIONS, WE, HAVE, PETITIONED, FOR, REDRESS, IN, THE, MOST, HUMBLE

3660 DATA TERMS, OUR, REPEATED, PETITIONS, HAVE, BEEN, ANSWERED, ONLY, BY, REPEATED

3670 DATA INJURY, A, PRINCE, WHOSE, CHARACTER, IS, THUS, MARKED, BY, EVERY, ACT, WHICH, MAY

3680 DATA DEFINE, A, TYRANT, IS, UNFIT, TO, BE, THE, RULER, OF, A, FREE, PEOPLE, NOR, HAVE

3690 DATA WE, BEEN, WANTING, IN, ATTENTIONS, TO, OUR, BRITISH, BROTHERN, WE, HAVE

3700 DATA WARNED, THEM, FROM, TIME, TO, TIME, OF, ATTEMPTS, BY, THEIR, LEGISLATURE, TO

3710 DATA EXTEND, AN, UNWARRANTABLE, JURISDICTION, OVER, US, WE, HAVE, REMINDED, THEM

3720 DATA OF, THE, CIRCUMSTANCES, OF, OUR, EMIGRATION, AND, SETTLEMENT, HERE, WE, HAVE

3730 DATA APPEALED, TO, THEIR, NATIVE, JUSTICE, AND, MAGNANIMITY, AND, WE, HAVE

3740 DATA CONJURED, THEM, BY, THE, TIES, OF, OUR, COMMON, KINDRED, TO, DISAVOW, THESE

3750 DATA USURPATIONS, WHICH, WOULD, INEVITABLY, INTERRUPT, OUR, CONNECTIONS, AND

3760 DATA CORRESPONDENCE, THEY, TOO, HAVE, BEEN, DEAF, TO, THE, VOICE, OF, JUSTICE, AND, OF

3770 DATA CONSANGUINITY, WE, MUST, THEREFORE, ACQUIESCE, IN, THE, NECESSITY, WHICH

3780 DATA DENOUNCES, OUR, SEPARATION, AND, HOLD, THEM, AS, WE, HOLD, THE, REST, OF

3790 DATA MANKIND, ENEMIES, IN, WAR, IN, PEACE, FRIENDS, WE, THEREFORE, THE

3800 DATA REPRESENTATIVES, OF, THE, UNITED, STATES, OF, AMERICA, IN, GENERAL, CONGRESS

3810 DATA ASSEMBLED, APPEALING, TO, THE, SUPREME, JUDGE, OF, THE, WORLD, FOR, THE

3820 DATA RECTITUDE, OF, OUR, INTENTIONS, DO, IN, THE, NAME, AND, BY, AUTHORITY, OF

3830 DATA THE, GOOD, PEOPLE, OF, THESE, COLONIES, SOLEMNLY, PUBLISH, AND, DECLARE, THAT

3840 DATA THESE, UNITED, COLONIES, ARE, AND, OF, RIGHT, OUGHT, TO, BE, FREE, AND

3850 DATA INDEPENDENT, STATES, THAT, THEY, ARE, ABSOLVED, FROM, ALL, ALLEGIANCE, TO, THE

3860 DATA BRITISH, CROWN, AND, THAT, ALL, POLITICAL, CONNECTION, BETWEEN, THEM, AND, THE

3870 DATA STATE, OF, GREAT, BRITAIN, IS, AND, OUGHT, TO, BE, TOTALLY, DISSOLVED, AND, THAT

3880 DATA AS, FREE, AND, INDEPENDENT, STATES, THEY, HAVE, FULL, POWER, TO, LEVY, WAR

3890 DATA CONCLUDE, PEACE, CONTRACT, ALLIANCES, ESTABLISH, COMMERCE, AND, TO, DO, ALL

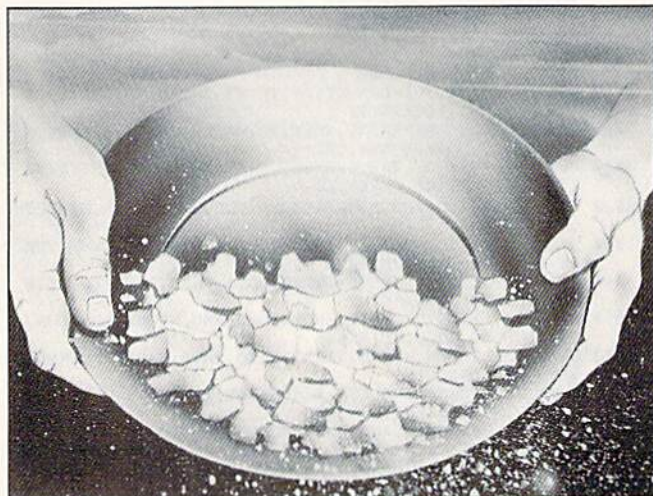
3900 DATA OTHER, ACTS, AND, THINGS, WHICH, INDEPENDENT, STATES, MAY, OF, RIGHT, DO, AND

3910 DATA FOR, THE, SUPPORT, OF, THIS, DECLARATION, WITH, A, FIRM, RELIANCE, ON, THE

3920 DATA PROTECTION, OF, DIVINE, PROVIDENCE, WE, MUTUALLY, PLEDGE, TO, EACH, OTHER, OUR

3930 DATA LIVES, OUR, FORTUNES, AND, OUR, SACRED, HONOR

3940 DATA NNNNNNNNN



THE BEST FOR LESS

CASSETTE INTERFACE



Use any portable cassette recorder to load and save programs * Controls the cassette motor to start and stop the tape * Allows you to connect two cassette recorders together to make backup copies of any VIC-20 or C64 tape program. Only \$34.95.

FULL RS232 INTERFACE



* Connects to the User port provides full RS232 signals for any RS232 modem or printer * 2 foot cable terminates in a male DB25 connector * Female/female & female/male null modem available \$10.95 * Comes with type in basic terminal program, and full description on printer hook up and programming. Only \$39.95.

TO ORDER: SEE YOUR DEALER OR CALL:

VISA (206) 236-2983 MasterCard

Phone orders mention this ad and get a \$1.00 discount. All orders add \$1.60 each for shipping. COD orders \$1.65 extra. We also have a VIC/C64 Interface cable for the VOLKSMODEM and ECHO GP.

Mark the reader's service card for a FREE catalog.

SEND MAIL ORDERS TO:

Omnitronix

PO BOX 43 DEPT. HL8 MERCER IS. WA 98040

SUPER FORTH 64™

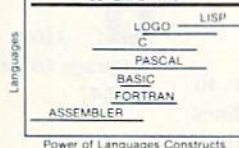
TOTAL CONTROL OVER YOUR COMMODORE-64™ USING ONLY WORDS
MAKING PROGRAMMING FAST, FUN AND EASY!

MORE THAN JUST A LANGUAGE...
A complete, fully-integrated program development system.
Home Use, Fast Games, Graphics, Data Acquisition, Business
Real Time Process Control, Communications, Robotics, Scientific, Artificial Intelligence

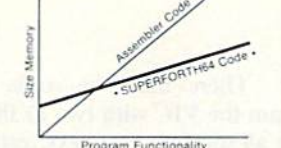
A Powerful Superset of MVPFORTH/FORTH 79 + Ext. for the beginner or professional

- 20 to 600 x faster than Basic
- 1/4 x the programming time
- Easy full control of all sound, hi res. graphics, color, sprite, plotting line & circle
- Controllable SPLIT-SCREEN Display
- Includes interactive interpreter & compiler
- Forth virtual memory
- Full cursor Screen Editor
- Provision for application program distribution without licensing
- FORTH equivalent Kernel Routines
- Conditional Macro Assembler
- Meets all Forth 79 standards*
- Source screens provided
- Compatible with the book "Starting Forth" by Leo Brodie
- Access to all I/O ports RS232, IEEE, including memory & interrupts
- ROMABLE code generator
- MUSIC EDITOR
- SPRITE EDITOR
- Access all C-64 peripherals including 4040 drive
- Single disk drive backup utility
- Disk & Cassette based. Disk included
- Full disk usage—680 Sectors
- Supports all Commodore file types and Forth Virtual disk
- Access to 20K RAM underneath ROM areas
- Vectors kernel words
- TRACE facility
- DECOMPILER facility
- Full String Handling
- ASCII error messages
- FLOATING POINT MATH SIN/COS & SQRT
- Conversational user defined Commands
- Tutorial examples provided, in extensive manual
- INTERRUPT routines provide easy control of hardware timers, alarms and devices
- USER Support

SUPER FORTH 64™ is more powerful than most other computer languages!
* SUPERFORTH64 *



SUPER FORTH 64™ compiled code becomes more compact than even assembly code!



A SUPERIOR PRODUCT in every way! At a low price of only

\$96

Call: (415) 651-3160

PARSEC RESEARCH
Drawer 1776, Fremont, CA 94538

Take this ad to your local dealer, or a Dollar Book store. Phone orders also accepted. Immediate delivery! Dealer inquiries invited. CA residents must include tax.

© PARSEC RESEARCH (Established 1976) Commodore 64 & VIC-20 TM of Commodore or C.O.D.

Some people have a distinct advantage when it comes to education!

(Some people use Quality Input's Educational software.)

Circle 136 on Reader Service card.

ACT/SAT REVIEW \$179.95
more than 98 programs and 50,000 questions

Other Packages Available

- ACT \$99.95
- SAT 99.95
- Basic Math 22.95
- Basic Algebra 22.95
- Intermediate Algebra 22.95
- Shutterbug 64 (Photography) 39.95
- Geometry 22.95
- Problem Solving 22.95
- Consumer Math 22.95
- Q-Stat (Statistical) 269.95

Commodore • IBM
Apple • ACORN



Quality Input

309 W. Beaufort Normal, IL 61761 309/454-1061

(from page 12)

insert a line to open a file to the printer, such as:

```
10 OPEN 4,4
```

Finally, add a close statement, such as 990 CLOSE 4 just before the end of your program.

After doing this, your program will print to the printer instead of the screen. If you want it to appear temporarily on the screen, just change the second 4 in the Open statement to 3, and you'll be using the screen again. Some books tell you to use the CMD command instead of the above, but there are many problems with that approach, and I do *not* recommend it for anything but making program listings.

Q: There must be some way to program the VIC with two or three lines to use all the function keys, rather than having to use two or three lines for each key.

Denny Jakoubek
Garner, IA

A: Here's a three-liner for you:

```
100 GET AS:IF AS="" THEN 100
110 ON ASC(AS) - 132 GOSUB 200,300,400,
    500,600,700,800,900
120 GOTO 100
```

If you press F1, the program will branch to line 200. If you press F2, it will go to line 300 and so on. Each section should end with something like 290 RETURN to bring the program back to watch the function keys again.

One nice aspect of this method is that keys other than F1-F8 will simply fall through to line 120, thus effectively being ignored.

Q: Is there any way to get something printed with both upper- and lowercase letters?

Mike Manning
Sauk Village, IL

A: Yes, but the method depends on the device in question. To shift to Text mode (lower- and uppercase) on the screen, press the Commodore key while holding down the shift key. To output text to a Commodore serial bus printer, such as the 1525, open your file

to it with a secondary address of seven (i.e., OPEN 4,4,7).

If you have an IEEE-488 bus Commodore printer, you need to open two files to the printer, one to secondary address seven and the other not. For example:

```
100 OPEN 7,4,7
110 PRINT #7
120 OPEN 4,4
```

Don't forget to close both files when you are done with them.

If you have a non-Commodore printer, you'll need an interface able to convert the Commodore character codes (PETSCII) into those used by the printer (usually ASCII).

Q: How can I know the machine language to program my own games on the 64?

Joseph Bober
Brooklyn, NY

A: Keep reading *RUN*, join a user's group and take a class. But don't forget Basic; many fine games have been written in it.

Q: Regarding Magic trick #33. Whenever I take my 64's reset line low, I get a complete reset, right down to totally clearing user memory! Should I continue to develop a hardware NMI switch, or is my machine ill?

Thomas Snyder
Martins Creek, PA

A: It's most unlikely that your machine is ill. While I agree that your machine's memory will appear cleared after a reset, it isn't actually. Though Basic programs you had in memory will no longer list, they will still be in memory. The trick is that you'll have to restore the pointers that tell Basic where your program is.

Doing so is beyond the scope of this column, but is fully described in chapter 8 of my book *The PET Personal Computer Guide*, from Osborne/McGraw-Hill. (Just remember your pointers are three locations after those of the PET, and your text area is at \$0800, not \$0400.) You'll also need a machine language monitor, available from most dealers and user groups.

Similarly, machine language programs or Poked data that you had in safe memory locations, such as from \$C000-CFFF hexadecimal, will still be there unchanged after a reset. Don't bother making a hardware NMI switch for the 64; it would simply duplicate the restore key already on your keyboard. (See last month's Magic column, trick #58C, for Louis Sander's clarification of trick #533.)

Q: I want to read Data statements randomly, so questions can be asked in a different order.

Raymond Allen
Cortez, FL

A: Reading Data statements in random order is difficult, but selecting questions randomly is quite simple. Just read all the questions into a string array, and then randomly select which array element to use next. For example:

```
100 FOR I=0 TO 9
110 : READ A$(I)
120 NEXT
130 DATA 0,1,2,3,4,5,6,7,8,9
140 FOR I=0 TO 9
150 : ? A$(RND(0)*10)
160 NEXT
```

Line 150 randomly selects one data item from the ten in the array read by lines 100-120. By adding lines to mark questions after they are answered correctly, you can prevent duplications. You may also want to make the array two-dimensional, to hold the answers along with the questions.

Other

Q: How would one transfer text created on a Radio Shack Model 100 to a 64? Specifically, what connections, modems and word processing programs should be used? Thank you.

Gilbert Gall
Nashville, TN

A: First, you'll need Commodore's 1011-A RS-232 interface (or an equivalent). You'll also need to swap RS-232 lines 2 and 3 inside the interface or add a null modem adapter to do the same thing. Then connect the Tandy

MICRO-SYS DISTRIBUTORS. THE COMMODORE CONNECTION.

commodore

SOFTWARE FOR C-64

Business

Multipan (Spreadsheet)	\$ 63.00
Calc Result (Easy)	\$ 45.00
Calc Result (Advanced)	\$ 95.00
Superbase 64	\$ 95.00
Mirage Concepts (Data Base)	\$ 89.00
Mirage Concepts (Word Processor) (40/80 c/m & 30K Dictionary)	\$ 89.00
Mirage Concepts (Report Generator)	\$ 49.00
Home Accountant (Continental)	\$ 49.00
Tax Advantage (Continental)	\$ 39.00
Southern Solutions Accounting G/L, A/R, A/P, P/R, I/M	each \$ 69.95

Utilities

Disk Utility Program (Fast Copy, File Copy, Disassembler & more)	\$ 49.00
Smart + 64 Terminal	\$ 49.00
TOOL 64	\$ 39.95
Simon's Basic	\$ 39.95
80 Column Expander (Cartridge)	\$ 60.00

ACCESSORIES

Solo Flight (Simulator)	\$ 34.95
Helicat Avenger	\$ 34.95
Oscar by Databar (Bar Code Reader)	\$ 79.95
CBM 1541 (new version)	\$ 269.00
Concord Parallel Disk Drive	\$ 345.00
Concord Slave Drive	Call
MSD Super Disk (Single)	\$ 395.00
MSD Super Disk (Dual)	\$ 695.00
1600 Modem	\$ 63.00
Vic 1650 Automatic Modem	\$ 109.95
Hayes Smart 300 Modem	\$ 249.00
Hayes Smart 1200 Modem	\$ 629.00
Vic 1530 Datasette	\$ 65.00
Cardco Datasette	\$ 55.00
5 Slot Expander (64)	\$ 65.00
Printer Utility Program (Cardco)	\$ 19.95
64 Relay Cartridge	\$ 45.00
Numeric Key Pad	\$ 49.00
Alien Voice Box (Talks & Sings)	\$ 119.00
When I'm 64 (Voice Box Sings)	\$ 35.00
Voice Box Dictionary	\$ 35.00
Texas Instruments LCD Programmer	\$ 55.95
Verbatim Diskettes:	
Single Sided/Single Density	\$ 26.00
Single Sided/Double Density	\$ 30.00
Double Sided/Double Density	\$ 42.00
Vic 20:	
3-Slot Expander	\$ 39.00
6-Slot Expander	\$ 79.95

16K Memory	\$ 79.95
CBM 4023 Ribbons	\$ 9.95
CBM 8023 Ribbons	\$ 9.95
Flip N' File 10, 15, 25, 50	Call
Power Strips w/surge stopper	Call
Computer Care Kit	\$ 19.95
Disk Cleaning Kit	\$ 12.95

INTERFACES

Superbox (Transparent IEEE, 3-Slot, Reset)	\$ 139.95
Interpod (Intelligent IEEE & RS-232) ..	\$ 139.95
The Connection (By Tymac) (Commodore Graphics + 2K Buffer) ..	\$ 95.00
Cardco + G Parallel Interface	\$ 89.00
Vic Switch	\$ 149.95
IEEE to Centronics	\$ 149.95
Pet-to-IEEE Cable	\$ 39.00
IEEE-to-IEEE Cable	\$ 49.00
4 Prong A/V Cable	\$ 15.00
Centronics Cable (male to male)	\$ 34.95
RS232 Cable (male to male)	\$ 31.95
Networking for C-64 & CBM Equipment	Call

MONITORS

CBM 1702 Color Monitor	\$ 269.00
Panasonic TR-120 (Green)	\$ 142.00
Panasonic TR-120 (Amber)	\$ 156.00
Panasonic DT-1300 Color	\$ 425.00
Monitor Stand (Tilt & Swivel)	\$ 29.95
RGB Monitor Cable:	
ET-100C (Apple)	\$ 33.80
ET-101C (IBM)	\$ 33.80
Green & Amber Monitors	\$ 95.00

LETTER QUALITY PRINTERS

CBM 6400 Printer	\$1425.00
Abati (20 CPS)	\$ 475.00
Cardco LQ/1 Printer	\$ 495.00
NEC Spinwriter	Call

DOT MATRIX PRINTERS

CBM MPS-801 Printer (50cps)	\$ 245.00
-----------------------------------	-----------

Call to Order

1-800-527-1738

All Others Call

1-214-231-2645

Micro-Sys

D I S T R I B U T O R S

CBM 4023 (100 CPS)	\$ 339.00
CBM 8023 (160 CPS)	\$ 565.00
Panasonic KX-P1090 (100 CPS)	\$ 285.00
Panasonic KX-P1091 (120 CPS)	\$ 325.00
Panasonic KX-P1092 (180 CPS)	Call
Panasonic KX-P1093	Call

COMMODORE BUSINESS MACHINES

Executive 64 Portable	\$ 795.00
B128-80 (128K 80 column)	\$ 695.00
SuperPet (5 languages)	\$1059.00
CBM 8032	\$ 595.00
CBM 8096	\$ 675.00
CBM 2031 single disk	\$ 295.00
CBM 8050 Dual Disk 1 meg.	\$ 995.00
CBM 8250 Dual Disk 2 meg.	\$1295.00
CBM 9060 Hard Disk/5 Meg.	\$2195.00
64K Expansion Board	\$ 275.00
SuperPet Upgrade Kit	\$ 695.00

BUSINESS SOFTWARE — 8032/8096

Wordpro 4 + or 5 +	\$ 295.00
Calc Result	\$ 199.95
The Manager	\$ 199.00
Superbase (8096 only)	\$ 225.00
BPI Accounting System	
6 Separate Modules	each \$ 325.00
Southern Solutions Accounting	
5 Separate Modules	each \$ 285.00
McTerm Communications Package	\$ 175.00

BUSINESS SOFTWARE — B128

Superscript II (40K Dictionary)	\$ 199.00
Superbase (Data Base)	\$ 199.00
Complete Accounting System (G/L, A/R, A/P, O/E, P/R, I/M)	\$ 199.00
Calc Result	\$ 199.00

TERMS

Orders under 50.00 add 10.00 Handling fee
MasterCard, VISA, Money Order, Bank Check
COD (add 5.00)
Add 3% For Credit Cards

All Products In Stock Shipped Within 24 Hours

F.O.B. Dallas, Texas
All Products Shipped With Manufacturers
90 Day Warranty

PRICES ARE SUBJECT TO
CHANGE WITHOUT NOTICE.

DEALERS INQUIRIES WELCOME

641 Presidential Drive • Richardson, Texas 75081 • 9:30 a.m. - 6:30 p.m. (Mon.-Fri.) • 10:30 a.m. - 2:30 p.m. (Sat.)

100's serial port to the 1011A via an RS-232 cable with DB-25S (male) connectors at both ends. Radio Shack and other electronic stores will have suitable cables and adapters.

Next, you'll need a suitable terminal program for the 64. As mentioned last month, I use Telstar 64 from Eastern House Software for this chore. To establish communication between the Tandy and the 64, start Telstar and use its @ command to set it to 300 baud, 8 bits, no parity and 1 stop bit.

Also select H, for Half Duplex mode. Then set the Tandy's Telcom program to STAT 38N1E, go to Terminal mode and select Half Duplex. At this point, anything appearing on either screen will also appear on the other one.

To transfer files, first open a file on Telstar, using the W command, specifying PET ASCII as the file type. Then exit to Terminal mode. Now press the return key twice on the Tandy and select UPLOAD, pressing the return key again when it asks for the width. Your file will then begin appearing on the 64's

screen and will be buffered into memory at the same time.

When the Tandy stops sending, be sure to use Telstar's C (close) command, followed by W for write. This will dump the memory buffer into the disk file and close it properly.

Finally, to use the new file on the 64, I use the Paper Clip word processor from Batteries Included. Its Control-J File Load command handles everything.

The entire process is very reliable, takes much less time to do than to describe and can be reversed to send files from the 64 to the Tandy.

Q: I would like to write a Cobol compiler and other software. Where can I obtain technical information on the Commodore 64's operating system?

Gordon Bates
Council Bluffs, IA

A: A short list of serious and trustworthy software developers have retrieved such information directly from

Commodore in the past. If you qualify, Commodore might be interested in hearing from you. If Commodore doesn't help you, Abacus Software of Grand Rapids, MI, offers a good book on the subject, called *Anatomy of the Commodore 64*. I, for one, would be interested in a Cobol compiler for the 64 that doesn't need the CP/M card.

Q: On several occasions in reading *RUN*, I have come across the phrase "copy-protected disk." What does this mean?

R. Gangadharan
Flushing, NY

A: It is a polite way of saying a disk has been altered to make it difficult to duplicate. The purpose is to keep people from giving away copies of the programs on the disk. Many such programs force the disk into an intentional error every time they are started.

Unfortunately, efforts by the drive to recover from the error cause some 1541s

Circle 272 on Reader Service card.

for your Commodore 64

ULTRAVENTURE An exciting game based on the original Adventure. This game has over 700 travel options, 140 rooms, 64 objects and treasures, with a 300 word vocabulary! It can take days or even weeks to get a good score. **\$24.95** (disk only)

ULTRAMATH For children in grades kindergarten through six. This educational program can help teach your children all of the math skills needed in elementary school. Includes drills on addition, subtraction, multiplication, division & inequalities. **\$19.95**

ULTRACASINO Playing this package of eight games is better than money. Includes keno, slot machines, roulette, craps, blackjack, poker and even greyhound racing! Good luck. **\$29.95** (disk only)

ULTRASYN This is a fantastic sounding musical synthesizer that you can even play through your home stereo. You can play up to four different octaves on your keyboard waveforms with the function keys. It has a colorful strobe-like background. **\$12.95**



C.O.D.

ULTRASOFT
1630 Foothills Drive
Sierra Vista, AZ 85635
(602) 459-4551

Shipping \$2.00 in U.S.; \$5.00 outside U.S.

Commodore 64 is a trademark of Commodore Business Machines, Inc.

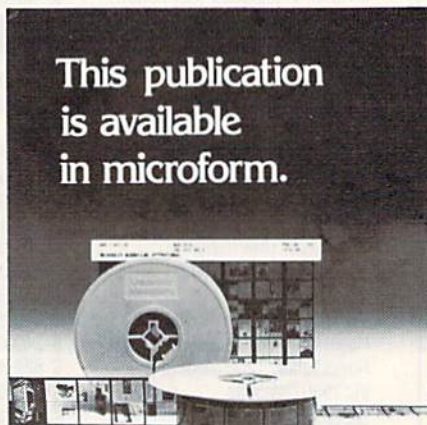
ATTENTION

FOREIGN COMPUTER STORES/MAGAZINE DEALERS

You have a large technical audience that speaks English and is in need of the kind of microcomputer information the Wayne Green Publications group provides.

Provide your audience with the magazines they need and make money at the same time. For details on selling *Microcomputing*, *80 Micro*, *inCider*, *HOT CoCo*, *RUN*, *jr*, and *Wayne Green Books* contact:

SANDRA JOSEPH WORLD WIDE MEDIA
386 PARK AVE. SOUTH NEW YORK, N.Y. 10016
PHONE-(212) 686-1520 TELEX-620430



This publication
is available
in microform.

University Microfilms International

300 North Zeeb Road
Dept. P.R.
Ann Arbor, Mi. 48106
U.S.A.

30-32 Mortimer Street
Dept. P.R.
London WIN 7RA
England



At last! . . . A dual 6522 versatile interface adapter (VIA) board for the Commodore-64.

The 6522 VIA, long the preferred input/output chip for 6502 microcomputers, is now available for the C-64. 6522 programming techniques, covered in many available books, can now be applied to the C-64 for even the most sophisticated real-time control applications. Board allows full use of the IRQ interrupt. When combined with the C-64's memory capacity, it provides an extremely powerful yet cost-effective development system and controller in one package. Includes extensive application notes and programming examples.

Up to four boards can be connected together, providing sixteen 8-bit ports. Order Model 64IF22, \$169 for one, postpaid USA. Each additional \$149.

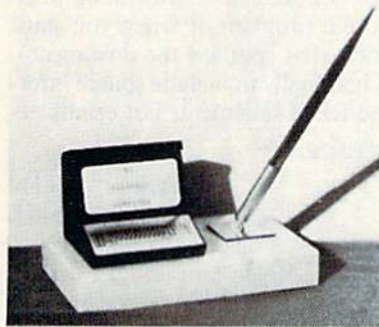
Complete reconstructed Assembly Language source code for the C-64's BASIC and KERNAL ROMs, all 16 K!

Extensively commented and cross-referenced. Far more than a mere "memory map" of useful locations, this book really does tell all. An incredible time-saver in effective C-64 programming and understanding. Order C-64 Source \$29.95, postpaid USA.

SCHNEDLER SYSTEMS

1501 N. Ivanhoe, Dept. R8
Arlington, VA 22205

Telephone orders/information: (703) 237-4796
VISA MASTERCARD



A COMPUTER BUFF'S DELIGHT

Both useful and unique; fashioned as a beautiful desk set.

Your very own miniature computer, crafted in genuine walnut with gold plated key board and screen, fixed along side a slim gold florentined ball point pen. Mounted on 3x5 inch Carrara Marble Base. Display screen reads "My Personal Computer"

Priced at only \$27.95 plus 2.50 shipping and handling.

Add \$1.50 for personalizing

Please allow 3 to 4 weeks for delivery. Check or Money Order only.

Send to:

Blaine-Ann Engraving
21 Hanley Avenue
Melville, New York 11747

to go out of alignment. It is to your advantage to avoid such programs, even if you are honest (as I hope you are).

Q: We have a PET Emulator program that we had hoped to use with cassette tapes from our PET 4016 and 4032, but we now have Commodore 64s. After numerous attempts, we can use very few of the old programs, as they do not load on the 64s.

Is it possible that the tapes won't load because the cassette is from a different model, and therefore the emulator won't work?

Mrs. B. Klemm
Bloomingdale, NJ

A: There are some differences in the three different cassette recorders used by Commodore over the years, and in the computers' use of the cassettes. But your 64s should be able to read a PET cassette.

If they don't, indicated by a Load Error message after trying and failing, try again, using the same Datassette that originally recorded the cassette. Also, be sure the Datassette and its cord are as far away from televisions and other sources of interference as possible.

If the program is found, and the computer returns to the Ready mode without an error message, your problem probably isn't in the Datassette. The emulator was only intended to handle Basic programs, so some machine language games and aids won't work with it.

Update: Readers Michael Keryan and John Streit report the restore key is different from all others on the keyboard. Its controlling circuit requires a sudden change from the key to couple enough signal to trigger its timer. This means the key must be pressed quickly (which is not the same thing as firmly) before it will register.

Don't bother cleaning your keyboard unless a quick tap of the restore key while holding down the stop key fails to activate the restore function. **[R]**

Our columnist, Jim Strasma, and his wife, Ellen, have written six books about Commodore computers. They also edit the Midnite Software Gazette, a small magazine specializing in timely brief reviews and hints about Commodore systems.

Super Software Specials!

For Commodore 64

\$1.00 credit for phone orders over \$100

GAMES	LIST	SPECIAL
Aerobics	D	44.95 - 32.26
Beach Head	D	34.95 - 24.86
Blue Max	D,C	34.95 - 24.86
Castle Wolfenstein	D	29.95 - 21.66
Chess (Odesta)	D	69.95 - 50.76
Dragonriders of Pern	X,D	40.00 - 28.56
Eagles	D	39.95 - 28.56
Knights of the Dessert	D,C	39.95 - 28.56
Joust	X	44.95 - 37.19
Lode Runner	D	34.95 - 24.86
Minnesota Fats Pool	X	29.95 - 21.66
Miner 2049'er	X	39.95 - 28.56
Pole Position	X	44.95 - 37.19
Pro Tour Golf	D	39.95 - 28.56
Q Bert	X	49.95 - 35.96
Quest for Tires	D	34.95 - 25.86
Ringside Seat	D	39.95 - 28.56
Sargon II	D	34.95 - 24.86
Trains	D	39.95 - 28.56
Ultima 2	D	59.95 - 43.36
Ulysses & Golden Fleece	D	32.95 - 23.88
EDUCATIONAL		
Algebra Arcade	D	49.95 - 35.96
Alligator Mix	D	34.00 - 24.16
Biology Facts	D	39.95 - 28.56
Delta Drawing	X	39.95 - 28.56
Kidwriter	D	34.95 - 24.86
Learn about Sounds	D	39.95 - 28.56
Master Type	D	39.95 - 28.56
Math Blaster!	D	49.95 - 35.96
Musicalc Pro	D	149.95 - 108.96
SAT (Barrons)	D	89.95 - 65.56
SAT (Krell)	D	299.95 - 252.96
Speed Reader II	D	69.95 - 50.76
U.S. Government Facts	D	39.95 - 28.56
Word Spinner	D	34.95 - 25.86
World Geography	D	39.95 - 28.56

Ask for FREE price list

Educators: ask for special educational catalog

HOME & BUSINESS

Clone Machine w/Unguard	D	49.95 - 35.96
Data Manager 2	D	49.95 - 35.96
Homeword	D	69.95 - 50.76
Home Accountant	D	74.95 - 54.46
Maxell Disks	D	51.00 - 29.00
Multiplan	D	99.95 - 71.96
Paperclip w/Dictionary	D	119.95 - 86.76
SAM	D	59.95 - 42.36
Super Text	D	99.00 - 71.96
Word Writer	D	49.95 - 35.96
Word Pro 3+ w/and spellright	D	99.95 - 71.96

HARDWARE

Hes Modem	69.95 - 50.76
Koala Pad	99.95 - 71.96
Maxell Disks (10)	51.00 - 29.50

Please specify format

c = cassette d = disk x = cartridge



C.O.D. • M.O. • Cert. Checks • School P.O.
• VISA • MasterCard • Checks Allow 2 Weeks
• N.Y.S. Res. Add Sales Tax • US Orders
Under \$150. Add \$2.00 P & H • All Canadian,
US Funds \$3.00 P & H • Foreign, Charges Only,
Min. P & H \$7.00

Box 525, Dept. 40
East Setauket, N.Y. 11733
(516) 751-2535



(from p. 16)

on the screen, type RUN and hit the return key. Remember, if the Run command is on the last line, it will scroll everything up one line.

This program works well when added to "Spriten Up!" (RUN, February 1984) to make a hard copy of the sprites you design.

David Lutz
Cave Creek, AZ

\$BA Random numbers—Type in the following program and run it a few times. Each time you run the program, write down the numbers. Now turn off your computer and do it again. You might be surprised by the results, which show an identical sequence of numbers each time.

```
10 FOR A = 1 TO 6 : B = INT(RND(1)*100) : PRINT B : NEXT
```

Change the RND(1) to RND(0), then repeat all your steps. You'll see that a zero value in RND's argument makes for a lot more randomness. Positive values should be used as arguments for RND only when you want the series of numbers to repeat, as in testing a program.

Ian Lauder
Kalispell, MT

\$BB Input hint—The ominous appearance of ?REDO FROM START can be unsettling to the user who doesn't realize that the computer merely wants numeric rather than string input (or vice versa). The following routine allows a program to accept inputs in either form, displaying them in a chosen format. The technique permits flexibility in data entry, while ensuring that the output is standardized.

```
100 INPUT "MONTH";MS
110 FOR M = 1 TO 13 : READ MOS
120 IF LEFT$(MS,3) = MOS THEN 150
130 IF VAL(MS) = M THEN 150
140 NEXT
150 PRINT MOS
160 PRINT:RESTORE:GOTO100
170 DATA JAN,FEB,MAR,APR,MAY,JUN,JUL,AUG,SEP,OCT,
NOV,DEC,???
```

In my example, months can be entered in numeric or alphabetic form and abbreviated or spelled in full, and the

program returns their three-letter abbreviations. Simple changes will make the program return the numeric form of the month, or even its fully spelled name. Of course, the technique isn't limited to months of the year, but can be used in a wide variety of situations.

Eddie Johnson
Albuquerque, NM

\$BC GET trick—Sometimes you might want to display a screen for a certain length of time by using a For...Next loop. But other times you may not want to waste time waiting for the loop to end. The following code allows a pre-timed wait to be terminated by a keypress.

```
100 FOR I = 1 TO 500 : GET AS : IF AS = "" THEN NEXT
110 Continuation goes here.
```

Stan Tomasevich
Lexington, KY

\$BD For...Next tip—When using Basic, you must be very careful with the following.

```
10 FOR H = 1 TO 20
20 NEXT H
30 PRINT H
```

The final output, which you might expect to be 20, will be 21. Not only will that value be printed, but every time H is called, until it is changed, the value 21 will be returned.

Russell P. Marsella
Lincoln, RI

\$BE REMarkable idea—As your program collection grows, it becomes impossible to remember where you got each program. This, of course, can be frustrating when you must know who wrote a program or when you must look up the magazine article that contains the documentation. A simple solution is habitually to include source information in a low-numbered REM statement. For example:

```
0 REM ** RUN, AUGUST 84, PAGE 10 **
```

Charles L. Moore
Fairfield, AL

\$BF Screen Poke hint—When you assign variables to the screen position of a character, and use the common $S = X + [\text{screen width}] * Y$

the X and Y take 14 bytes of memory, and the math slows down the computer.

Instead, use only one variable, for example, S. Add or subtract one to move horizontally, and add or subtract (screen width) to move vertically. It's faster, and it can save needed memory in a small VIC. The screen width is, of course, 22 in a VIC and 40 in a C-64.

Timothy C. Shea
Burlington, VT

\$CO Custom character trick—When using custom characters on the VIC, you can also use the regular characters at will, just by printing their reversed versions. To prove it, type in POKE 36869,255 to get into Custom Character mode.

As you subsequently press keys, you'll see whatever random RAM patterns make up your pseudo-custom char-

acters. Now press {CTRL 9} to put the VIC into Reverse mode, and notice that the keys print their normal characters.

Joseph Chan
Barrington, RI

\$C1 Reverse field hint—When working on a program that uses reversed lettering, you don't have to use the CTRL 9 reverse field symbol inside quotes to enable the Reverse Field mode. POKE 199,1 will cause the subsequent printing to be in reverse field. POKE 199,0 will undo the reverse, as will printing a return.

Paul James
Cleveland, TN

\$C2 Lining up numbers—There are many ways to format numbers, which in the noncomputer world are always lined up according to the position of their decimal points, but which computers love to left justify. The following is a simple program to align the decimal points in numbers containing from one to three digits:

```
10 FOR I=9 TO 109 STEP 50
20 PRINT SPC(ABS(I<100)) SPC(ABS(I<10)) I
30 NEXT I
```

This is useful when printing highly variable numbers to a particular screen location and, of course, when printing out columns of numbers.

Roy E. Kannaday, Jr.
Littleton, CO

\$C3 Joystick trickery—With an Atari-style joystick in port 1, you can slow down screen printing by moving the joystick to the left. This duplicates the action of the CTRL key and is very useful when reading long program listings.

Mike Zuerlein
Casper, WY

\$C4 Typing tip—If you are a one-handed typist, you know that it's difficult to use the CTRL RVS key, because it slows you down. Well, now you need only one hand, and you don't have to stretch clear across the keyboard.

Just press the CTRL and R keys. It works in or out of Quote mode, and it's very handy if you are using your hand to spot text on a listing.

Doug Hanley
Las Vegas, NV

\$C5 Keyboard tip—If you've just accidentally deleted a line and the full line is still on the screen, just move the cursor up to the line number and press the return key. The line will be added back into the current program in memory, at the appropriate position.

Glenn Davison
Aurora, CO

\$C6 Moving program lines—If you need to move a line from one place in a program to another, first list the line you wish to move; next, move the cursor up to the line number and type the new line number over the old one; then press the return key. Finally, delete the original line by typing only the line number and pressing the return key.

Caution: If the new line number is longer than the orig-

inal line number and its following space, you'll have to add spaces to the beginning of the line before you type in the new line number. The original line will automatically return to its original format.

Glenn Davison
Aurora, CO

\$C7 Entering long lines—Entering the 80th character on a C-64 program line (or the 88th on a VIC line) can be mighty frustrating. As soon as you type it in, the cursor jumps down to the next line, where pressing the return key fails to enter what you just typed.

There are two ways around the problem. The first is simply to move your cursor back to the program line, then press the return key. The second is to leave out some character short of the 80th, such as character number 75. Then, after you're done with number 80, the cursor will still be on the line you want. Just move it back to where you left out the character, use the insert key to open up a space and type in the missing character. Then, when you press the return key, the line will be entered perfectly into memory.

Philip J. Ternes
Bismark, ND

\$C8 Flagrant patriotism—Enter this one-liner:

```
1 PRINT "{2 spaces}{CTRL R}{CTRL 1}{11 spaces}{CTRL 8}
{12 spaces}{CTRL 3}{11 spaces}":POKE 53280,1:POKE53281,1:
GOTO1
```

Now run the program, count to ten and press the stop key. Then use your cursor controls and the space bar to wipe out the Break and Ready messages. Press [CTRL 2] and see the flag of Belgium. Anyone for the Union Jack?

R. Rock
Montgomery, AL

\$C9 Binary to decimal converter—This one-liner will handle any length number you wish to input. In addition, if you change the *2↑X in the middle of the line to *8↑X it will handle any length octal number. (To fit the converter on one line, you must abbreviate most of its keywords.)

```
2A=1:FORX=LEN(B$)-1TO1STEP-1:D=D+(VAL(MID$(B$,A,
1)))*2↑XA=A+1:NEXT:D=D+VAL(RIGHT$(B$,1))
```

Adding the following two lines gives you a working routine.

```
1 INPUT"BINAR Y #";B$
3 PRINT D
```

Frank Williams
Tucson, AZ

\$CA Choosing—To allow easy choice of either keyboard or joystick input, you can use the following method. First, insert line 100 during the start of the game.

```
100 P=1: INPUT "JOYSTICK (J) OR KEYBOARD (K)";A$:
IF A$="K" THEN P=2
```

In a single line, you have requested input, limited the value of P to either 1 or 2 and set a default value of P=1 if any key other than K is pressed.

To check for movement, simply insert line 200.

```
200 ON P GOSUB 50,75
```


50,000[†] COMAL USERS!

YOU ARE INVITED TO JOIN THEM

The **ENHANCED** COMAL[†] PAK includes:

- 'LOGO' Turtle Graphics
 - 40 Graphics and Sprite Commands
 - Run-time Compiler
 - FAST Program Execution
 - Print Using/Auto Formatting
 - Program Structures
 - Long Variable Names
 - Local and Global Variables
 - Parameter Passing
 - Auto Line Numbering/Renum
 - Merge Program Segments
 - Stop Key Disable/Enable
- PLUS
- Pocket Reference Card
 - COMAL Information Booklet
 - Many Sample Programs
 - Help Files/Errors File

ALL FOR ONLY \$19.95

For Commodore 64[™] with 1541 disk drive.
Also available: COMAL TODAY newsletter \$14.95 per year • Sample COMAL TODAY \$2 • COMAL Handbook \$18.95 • Beginning COMAL \$19.95 • Foundations in Computer Studies with COMAL \$19.95 • Structured Programming with COMAL \$24.95 • Captain COMAL Gets Organized \$19.95 • A matching disk for each book is \$19.95 each.

—Send check or Money Order plus \$2 handling to: COMAL Users Group, U.S.A., Limited, 5501 Graveland Ter., Madison, WI 53716, phone: (608) 222-4432.

[†] estimated † Version 0.14 includes best of LOGO, best of PASCAL, best of BASIC, all in one.
TRADEMARKS: Commodore 64 of Commodore Electronics Ltd., Captain COMAL of COMAL Users Group U.S.A. Ltd.

Circle 197 on Reader Service card.

64K MEMORY

FOR
C-64
OWNERS



FOR
VIC-20
OWNERS



• NOW YOU CAN HAVE ALL THE POWER OF THIS MEMORY FOR EITHER THE *COMMODORE 64 OR THE *VIC-20. PLUGS DIRECTLY INTO YOUR EXPANSION PORT.

• LETCO HAS ADAPTED THE POPULAR 64KV MEMORY EXPANDED FOR USE ON THE C-64. USE THIS EXTRA MEMORY TO STORE DATA, MACHINE LANGUAGE PROGRAMS, ETC.

64KV FOR THE VIC **\$109.95**
64KC FOR THE C-64 **\$139.95**

ALSO NEWLY RELEASED FROM LETCO

• ROM ACCESSORY FOR OUR 64KV TO MAKE IT EASY TO PROGRAM BASIC TO USE ALL MEMORY AVAILABLE. INSTALLED NEW OR ADDED TO THE LETCO 64KV **\$29.95**

• DELUXE 4-SLOT EXPANSION CHASSIS WITH EXPERIMENTERS SLOT FOR BLOCK ADDRESS CHANGES. SEPARATE POWER SWITCHES, FUSE, AND A RESET BUTTON FOR THE *VIC. **\$39.95**

• CUSTOM PLASTIC CASE TO FIT *VIC'S EXPANSION SLOT. GREAT FOR YOUR CREATIVE HOME PROJECTS. HAS HOLE FOR DIP SWITCH 7/8" x 5/8" x 1/16" (NO BOARD) **\$9.95**

WRITE:

LETCO, DEPT. RM6
LEADER ELECTRONIC TECHNOLOGY CO.
7310 WELLS RD.
PLAIN CITY, OHIO 43064
OR CALL **1-614-873-4410**

WE ACCEPT VISA, MASTERCARD, CHECK OR MONEY ORDER. FOR CHARGE ORDERS PLEASE INCLUDE ACCT. NO., EXP. DATE, AND SIGN.

90 DAY LIMITED WARRANTY ON ALL PRODUCTS
OHIO RESIDENTS ADD 5% SALES TAX

* REG. TM. OF C.B.M. INC.

Here the joystick subroutine lies at line 50 and the keyboard subroutine starts at line 75. Line 200 is an often-overlooked form of branching, yet it uses less space than the usually encountered

```
200 IF P = 1 GOSUB 50
210 IF P = 2 GOSUB 75
```

Note that by placing the invoked subroutines near the beginning of the program, you'll speed up the execution time, which is important for subroutines called as often as these usually are.

Steve Hite
Metairie, LA

\$CB Binary one-liner—This lists the binary number sequence from 0000 to 1111 using nested loops. The number of loops can be changed for the required number of bits, which may increase the number of program lines. The program is:

```
10 FORA = 0TO1:FORB = 0TO1:FORC = 0TO1:FORD = 0TO1:
PRINTA;B;C;D:NEXT:NEXT:NEXT:NEXT
```

Lee G. Halphen
Opelousas, LA

\$CC Operating tip—Write any numbers you use repeatedly on a wee piece of masking tape and stick them to the top of your keyboard. (Now let's see... is it SYS49152 or SYS49512? Let me consult my wee tape!)

Marian Hatch
Las Lunas, NM

\$CD Naming programs—When you write a long program, it's a good idea to use a short name on the disk until you finish the program. It's faster and easier to type in a short program name. You can rename it after you finish the program.

Jimmy Burrows
Cheyenne, OK

\$CE Data file titles—When you search through a cassette using the Verify command, and try to find a certain program or data file, you're unable to differentiate between them because the computer displays each on the screen in the same way. This makes it impossible to know which are programs and which are files.

One solution is to save programs as before, but to write data files with titles in reverse characters. For example:

```
OPEN 1,1,1,“(RVS ON) name of file”
```

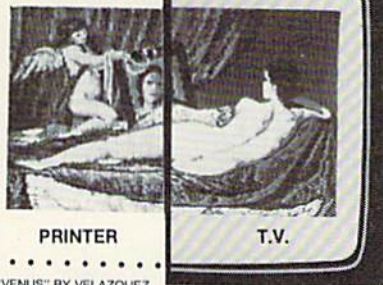
Then, when you search through a cassette, program names are in normal type and data files are in reverse characters.

Jim E. Newton
Mississippi State, MS

\$CF Word trick—In the introduction to this month's column, the sentence following the word “somer-sault” contains a hidden secret. Clues can be found in the *last* sentence of the introduction, as well as in both sentences of this month's word trick.

L.F.S.

KIWISOFT PROGRAMS FOR THE C-64



"VENUS" BY VELAZQUEZ
"There's nothing like it!"

- Paint it with PAINTPIC* \$39.95
16 colors, 160 x 200 screen, CAD
- Print it with PRINTAPIC \$44.95
Most printers, hook rug, "Venus"
- Do both with CADPIC* \$79.95
Combines Paintpic + Printapic
- Puzzle it with PUZZLEPIC* \$49.95
Pictures, mosaics, mazes
- More pictures with PICTUREDISKS \$24.95ea
Space, Cars, Planes, Fantasy, Animals
- More Puzzlepic puzzles: PUZZLEDISKS \$24.95ea
Easy/Medium/Flendishly Difficult!
- Treasure the best of PAINTPIC ART \$89.00
5 original paintings by "D.J.R." on disk
- See our COMPUTER ART PRINTS (3 for \$25) \$8.95ea
20" x 24" "Room" "Storm" "Holy Land"

SEND FOR OUR FREE COLOR BROCHURE
• DEALER ENQUIRIES WELCOME •

Add \$2 p & h. Pay in advance by check or m/o or VISA, M/C.
California, add 8% sales tax.

Programs on diskette from

KIWISOFT PROGRAMS
18003-L Skypark South, Irvine CA 92714.
ph 714 261 5114



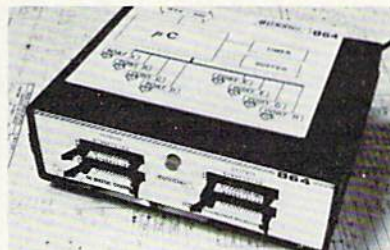
COMPUTER INTERFACES

IEEE - 488

RS - 232

ANALOG AND DIGITAL INPUT/OUTPUT MODULES

The BUSter line of analog and digital products was designed to collect data and to output signals to laboratory and industrial equipment in conjunction with a microcomputer system. These powerful self-contained modules reduce a computer's workload by providing read or write operations to external devices. They are controlled as slave interfaces to real-world physical applications. Control is over an IEEE-488 (GPIB) bus or RS-232 port. BUSter modules are available in several digital and analog configurations. The internal buffer and timer provide flexibility by allowing the BUSter to collect data while the host computer is busy with other tasks.



- BUSter A64**—64 channel digital input module to read 64 digital signals. Built-in buffer **\$495.00**
- BUSter B64**—64 channel digital output module to send 64 digital signals **\$495.00**
- BUSter C64**—64 channel digital input/output module to read 32 and write 32 digital signals. Built-in buffer **\$495.00**
- BUSter D16**—16 channel analog input module to read up to 16 analog signals with 8 bit resolution (1/4%) Built-in buffer **\$495.00**
- BUSter D32**—32 channel version of the D16 **\$595.00**
- BUSter E4**—4 channel analog output module to send 4 analog signals with 12 bit resolution (.06%) **\$495.00**
- BUSter E8**—8 channel version of the E4 **\$595.00**

BUSter E16—16 channel version of the E4 **\$695.00**
Add the suffix -G for IEEE-488 (GPIB) or -R for RS-232.

All prices are USA only. Prices and specifications subject to change without notice.

30 DAY TRIAL—Purchase a BUSter product, use it, and if you are not completely satisfied, return it within 30 days and receive a full refund.

US Dollars Quoted
\$10.00 Shipping & Handling
MASTERCARD/VISA



Connecticut microComputer, Inc.
INSTRUMENT DIVISION

36 Del Mar Drive
Brookfield, Ct. 06804
(203) 775-4595 TWX: 710-456-0052

Let The SMART 64 Terminal

COMMODORE 64*

Do The DRIVING

No matter which direction you wish to travel in, experience the advantage of computer communications with The SMART 64 Terminal. Discover the program that puts you on the Right Road to: Public-Access Networks, University Systems, Private Company Computers and Financial Services.

The SMART 64 Terminal designed with Quality-Bred features, Affordable Pricing. . . And Service.

So why not travel the communications highways the SMART way!

Accessories included:

- Selective Storage of Received Data.
- Alarm Timer.
- 40 or 80 Col. Operation*.
- Auto-Dial.
- Adjustable transmit/receive tables allow custom requirements. These and other features make The SMART 64 Terminal the best choice for grand touring telecommunications.
- User-Defined Function Keys, Screen Colors, Printer and Modem Setting.
- Screen Print.
- Disk Wedge Built-In!
- Formatted Lines.
- Review, Rearrange, Print Files.
- Sends/Receives Programs and Files of ANY SIZE.

*Commodore 64 registered trademark of Commodore Business Machines Inc.

*Supports 80 column cartridge by Data 20 Corporation.

Dealer Availability
Call (203) 389-8383

MICROTECHNIC SOLUTIONS

P.O. BOX 2940, NEW HAVEN, CONN. 06515



Suggested
\$49.95
Retail

Data Base SystemsFor **COMMODORE 64™**

**DISK BASED
SYSTEMS AVAILABLE FOR
\$14.88**

- Home Inventory
- Tax Returns
- Rental Management
- Record/Tape Collections
- Mailing List Set
- Personal Budget/Expenses
- Travel Expenses
- Sports Leagues
 - Baseball • Soccer
 - Basketball • Bowling

SORTS, SEARCHES ON ALL ITEMS

**or Build Your Own
Custom Data Bases**
with **Filer only \$49.88**

Includes extensive manual with tutorial

PRICES INCLUDE SHIPPING

CHECKS, MONEY ORDERS,
VISA & MASTERCARD

215/793-2595

OR WRITE

**Computer People**

P.O. Box 370 Chadds Ford, PA 19317

PA. residents add 6% sales tax.

(from page 29)

```

670 GOTO 280
680 PRINT"{SHFT CLR}{3 CRSR DN}"
690 GOSUB 770
700 PRINTTAB(8)PLAYER$(PLAYER);"WINS!!!{CRSR DN}"
710 PRINTTAB(8)"WITH ";PP(PLAYER);".{2 CRSR DN}"
720 PRINTTAB(10){CTRL 9}{CTRL 6}PLAY AGAIN?{CTRL 7}"
730 GET A$:IF A$="" GOTO 730
740 IF A$="Y" THEN RUN
750 PRINT"{SHFT CLR}"
760 END
770 POKE VOLUME,15
780 POKE 54276,33
790 POKE VCE,40
800 FOR E=1 TO 10:NEXT E
810 POKE VOLUME,15
820 POKE VCE,0
830 RETURN
  
```

Listing 2. Deadline program for the VIC-20.

```

10 REM *****
20 REM *{10 SPACES}*
30 REM * DEADLINE *
40 REM *{10 SPACES}*
50 REM *****
60 PRINT"{SHFT CLR}{2 CRSR DN}"
70 PRINTTAB(6){CTRL 9}{CTRL 4}DEADLINE{CTRL 7}{2 CRSR
DN}"
80 PRINTTAB(1)"TWO PLAYERS WAIT"
90 PRINTTAB(1)"AS LONG AS THEY DARE"
100 PRINTTAB(1)"BEFORE PRESSING KEY."
110 PRINTTAB(1)"CLOSER YOU GET TO"
120 PRINTTAB(1)"THE DEADLINE, THE"
130 PRINTTAB(1)"MORE POINTS YOU GET."
140 PRINT"{3 CRSR DN}";TAB(6){CTRL 9}{CTRL 3}HIT ANY
KEY"
150 PRINTTAB(4){CTRL 9}FOR FIRST ROUND{CTRL 7}"
160 GET A$:IF A$="" GOTO 160
170 PLAYER=1
180 FOR N=1 TO 2
190 PRINT"{SHFT CLR}{2 CRSR DN}"
200 PRINTTAB(1)"ENTER NAME OF"
210 PRINTTAB(1)"PLAYER #";N
220 INPUT PLAYER$(N)
230 NEXT N
240 PRINT"{SHFT CLR}"
250 PRINTTAB(1)"IT IS NOW"
260 PRINTTAB(1)PLAYER$(PLAYER);"'S TURN."
270 PRINT"{3 CRSR DN}";TAB(6){CTRL 9}{CTRL 3}HIT ANY
KEY"
280 PRINTTAB(4){CTRL 9}FOR NEXT ROUND{CTRL 7}"
290 GET A$:IF A$="" GOTO 290
300 PT=INT(RND(1)*500)+100
310 POKE 36878,15
320 FOR N=1 TO PT
330 POKE 36876,255
340 POKE 36876,0
350 GET A$
360 IF A$<>"" GOTO 470
370 PRINTTAB(8)N
380 NEXT N
390 GOSUB 740
400 PRINT"{SHFT CLR}{2 CRSR DN}"
410 PRINTTAB(1)"SORRY, SPORT. TIME{CRSR DN}"
420 PRINTTAB(1)"HAS RUN OUT.YOU LOSE{CRSR DN}"
430 PRINTTAB(1)PT;" POINTS.{2 CRSR DN}"
440 GA=-PT
450 GOTO 570
460 GOTO 570
470 GOSUB 740
  
```

More →

**SUBSCRIPTION
PROBLEM?****MOVING?**

Get help with your subscription
by calling our new toll free
number:

1-800-645-9559*

between 9 a.m. and 5 p.m. EST,
Monday-Friday.

If possible, please have your mailing label
in front of you as well as your cancelled
check or credit card statement if you are
having problems with payment.

If moving, please give both your old and
new address.

*New York State residents call

1-800-732-9119.

Listing 2 continued.

```

48Ø PRINT"{SHFT CLR}"
49Ø IF INT(PT/2)>N THEN PRINTTAB(1)"SORRY, SPORT.{CRSR
DN}"
50Ø PRINTTAB(1)"YOU GOT UP TO{CRSR DN}"
51Ø PRINTTAB(1)N;" AND COULD{CRSR DN}"
52Ø PRINTTAB(1)"HAVE GONE AS FAR AS{CRSR DN}"
53Ø PRINTTAB(1)PT;" . YOU GET SOME{CRSR DN}"
54Ø DF=PT-N
55Ø GA=N-DF
56Ø PRINTTAB(1)GA;"POINTS.{CRSR DN}"
57Ø PP(PLAYER)=PP(PLAYER)+GA
58Ø IF PP(PLAYER)>499 GOTO 66Ø
59Ø PRINTTAB(1)"YOUR SCORE:";PP(PLAYER)
60Ø PRINT"{3 CRSR DNs}";TAB(6)"{CTRL 9}{CTRL 3}HIT ANY
KEY"
61Ø PRINTTAB(4)"{CTRL 9}FOR NEXT ROUND{CTRL 7}"
62Ø GET A$;IF A$="" GOTO 62Ø
63Ø IF PLAYER=1 THEN PLAYER=2:GOTO 24Ø
64Ø PLAYER=1
65Ø GOTO 24Ø
66Ø PRINT"{SHFT CLR}{3 CRSR DNs}"
67Ø GOSUB 81Ø
68Ø PRINTTAB(2)PLAYER$(PLAYER);" WINS!!!{CRSR DN}"
69Ø PRINTTAB(2)"WITH ";PP(PLAYER);" .{2 CRSR DNs}"
70Ø PRINTTAB(4)"{CTRL 9}{CTRL 6}PLAY AGAIN?(CTRL 7)"
71Ø GET A$;IF A$="" GOTO 71Ø
72Ø IF A$="Y" THEN RUN
73Ø PRINT"{SHFT CLR}"
74Ø POKE 36878,15
75Ø FOR L=13Ø TO 254
76Ø POKE 36876,L
77Ø NEXT L
78Ø POKE 36878,Ø

```

```

79Ø POKE 36876,Ø
80Ø RETURN
81Ø POKE 36878,15
82Ø FOR L=1 TO 1Ø
83Ø FOR M=18Ø TO 235 STEP 2
84Ø POKE 36876,M
85Ø FOR N=1 TO 1Ø
86Ø NEXT N
87Ø POKE 36876,Ø
88Ø NEXT L
89Ø POKE 36878,Ø
90Ø RETURN

```

Circle 310 on Reader Service card.

Fiction, Fantasy, and Computer Adventure For the Commodore 64

Rainbow Quest will take your child on a space adventure of the future. The planet Rainbow is a faraway land of events for young readers to discover.

Rainbow Quest is a book-and-software adventure for the **Commodore 64**.

Children read and play along as Molly and Sam meet strange creatures as they make their way across the planet Rainbow. To reach their goal, they must survive on their own and face the challenges they meet. Readers will help Molly and Sam find their way through dark and confusing mazes, solve word and number puzzles, and conquer invaders in arcade-style games. Each obstacle they meet is a program, on the **Rainbow Quest** software, ready to load and run.

Rainbow Quest has 25 programs in all. Book and software are sold together in a protective storage binder with complete instructions. Each **Rainbow Quest** package for the **Commodore 64** is \$24.97.



348B3Q

Rainbow Quest by Richard Ramella. Programs adapted for the **Commodore 64** by Guy Wright. Illustrated by Coni Porter. Cassette BK7401 ISBN 0-88006-069-7. Disk BK7405. ISBN 0-88006-076-X. Wayne Green Books are available at your local bookstore. Dealer inquiries invited.

To order **Rainbow Quest**, call toll-free for credit card orders, 1-800-258-5473. (In New Hampshire, call 924-9471.) Or mail your order with payment or complete credit card information to: **Wayne Green Inc., Book Sales, Peterborough, NH 03458**. Include \$2.00 per package for shipping and handling. Orders payable in U.S. dollars only.

Color my child's imagination! Send me **Rainbow Quest** for the **Commodore 64** at \$24.97 per package. (Include \$2.00 per package for shipping and handling.)

_____ Cassette (BK7401) _____ Disk (BK7405)

Payment Enclosed MasterCard VISA AMEX

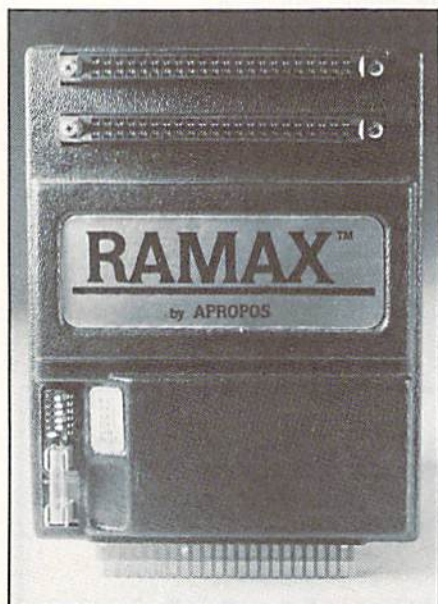
Card # _____ Exp. date _____

Name _____ Signature _____

Address _____

City _____ State _____ Zip _____

Wayne Green Books, Peterborough, NH 03458



Ramax

This 27K Expander Adds Power and Versatility To Your VIC-20

Have you ever been in the process of writing a program and thought that just one more subroutine or a fancy title screen might be just the thing to make it complete, only to find that there is no more room in your VIC-20's memory? While looking through a magazine, have you ever discovered a particular program that would round out your software library, only to find that it requires at least an 8K or 16K expander? Or perhaps, after you've entered the last few pieces of data into a program, everything has come crashing to a halt with that dreaded Out Of Memory error.

If you're a VIC-20 owner, sooner or later you'll start thinking about buying a memory expansion cartridge of some kind, but it may not be an easy choice once you do decide to buy. There are a number of companies that manufacture expansion devices for the VIC; these devices come in all sizes, shapes, prices and memory configurations, from 3K, 8K to 16K. Some companies advertise expanders that offer 64K.

One piece of information that might help you to decide which one of these to buy is the fact that, due to the VIC-20's particular method of internal addressing, the maximum usable memory (that can be accessed at any one time) is 32K. With that in mind, the choices are much easier. If you want to buy the top-of-

the-line in memory expansion devices, you should seriously consider the Ramax memory expansion board, from Apropos Technology.

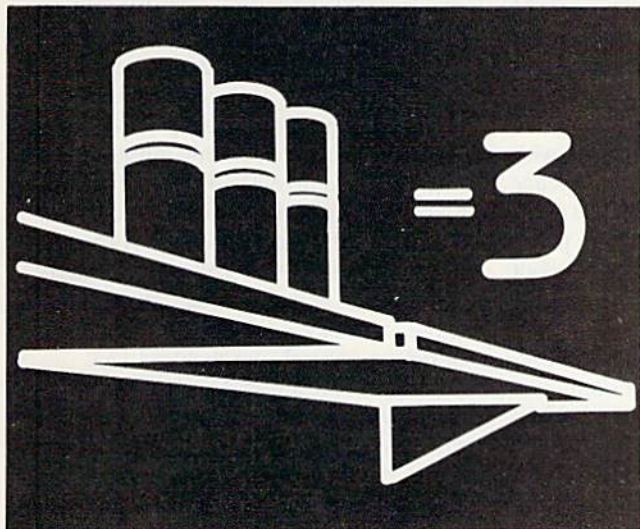
The Ramax expander offers a full 27K of extra usable memory—added to the VIC's 5K, this brings the total up to 32K. The unit has two extension connectors that allow you to connect other VIC cartridges. It also has a built-in reset switch. It is fuse-protected, and it has a six-month parts and labor warranty.

Ramax is totally self-contained, using no external power supply. The gold-plated edge connectors offer more reliability, and the expander may be used with any VIC-20-compatible cartridge. Also, Ramax uses very little power.

The unit is contained in a black case (roughly the size of a paperback book) that plugs into the expansion port. There are no exposed circuits or wires on the unit, but there is a fuse mounted in such a way that it is easy to tell if and when it is blown. Positioned directly above the fuse are six DIP switches (very small switches that you flip with either a ball point pen or your fingernail). These switches control the various memory sections (or blocks), as well as the reset function. Above the row of DIP switches are the two connector slots, where other VIC-20 cartridges can be plugged in.

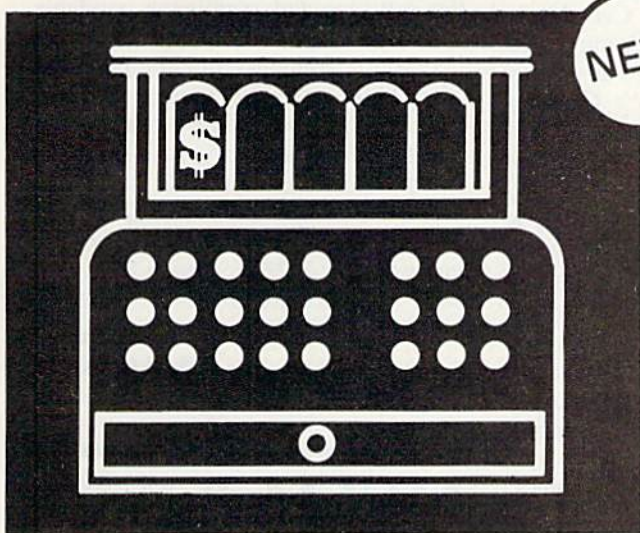
Of course, the main reason for buying a memory expansion device is to gain memory, and with the DIP switches, you can select almost any configuration of RAM without having to unplug the unit or actually go inside it. Switch #5 controls 3K of RAM (addresses 1024 to 4095). Switch #1 controls Block 1, 8K of RAM (addresses 8192 to 16383). Switch #2 controls another 8K (addresses 16384

Software that has the Edge.



INVENTORY MANAGER for Commodore 64 \$69.95

The Inventory Manager from MicroSpec is a powerful tool for managing a dynamic product inventory. The system allows you to keep a close watch on those items that sell and those that don't, when to reorder, and how much to order. The system even helps in taking physical inventory. The Inventory Manager maintains extensive information on each item including part number, description, cost and sell price, quantity on hand and on order, minimum and maximum quantities, YTD and Period figures for units sold and amount sold, and location. With this information, the system also generates an Inventory Status report, Sales reports broken down by manufacturer, Reorder reports, and Shrinkage reports. The Inventory Manager is also simple to use, powerful in its capability, and the best package of its kind available for the Commodore 64.



NEW!

POINT OF SALE SYSTEM for Commodore 64 \$69.95

The Point-Of-Sale system from MicroSpec is a countertop sales register that makes a great complement to the MicroSpec Inventory Manager. With the user entering only item numbers and quantities, the Point-Of-Sale system automatically prints a sales receipt with subtotals, tax, and total amount due. The system will also optionally print customer information and up to three lines of advertising text on each receipt. The P.O.S. system also updates the inventory figures for quantity on hand and amount sold for each item in the transaction, instantly. The entire process takes only a few seconds, allowing quick completion of transactions and automatic update of affected inventory records. The P.O.S. system also generates a series of five sales reports that, when combined with the Inventory Manager, gives you complete control over your important inventory status.

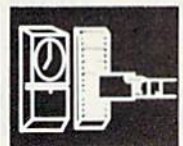
The broadest line of high quality software also includes...



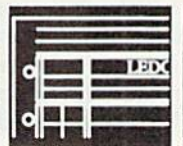
Data Manager II



Maillist Manager



Payroll Manager



General Ledger



Accounts Receivable



Accounts Payable



Property Manager



Checkbook Manager

MICROSPEC

MicroSpec, Inc.
P.O. Box 863085
Plano, Texas 75086
(214) 867-1333

Call or write for
FREE catalog.
Ask about PC software.
Dealer inquiries welcome.

RUN August 1984 / 125

to 24575) and switch #3 controls another 8K (addresses 24576 to 32767). Switch #4 controls block 5, where some cartridges reside (addresses 40960 to 49151). This switch does not contain extra memory—it only allows you to switch Ramax in or out of this area when you are using other cartridges. This means that you can leave game or hardware cartridges plugged in all the time and save wear and tear on your system—you simply throw this switch when you want to activate or deactivate the slot. Switch #6 is the reset switch, which is handy when you want to reset the system without turning everything off and then back on again.

You need not worry that Ramax is only for the hard-core computer nut. Anyone can utilize the device right away. The manual that comes with Ramax is simple and even gives you a short memory test program for the expander. If you never intend to switch banks of memory in or out, you can set the switches once and never touch them again. After you have decided on a configuration, you might even forget that you're using an expander.

The only shortcoming that I have found in the Ramax expander is the size and placement of the reset DIP switch. It is very small, and it tucks in very close to the back of the computer. When the unit is plugged in, it is difficult to turn the switch on and off—but this is a very minor flaw. (Perhaps later models will have a reset button instead of a switch.)

Everything considered, the Ramax memory expander is a well-constructed unit that lives up to its billing. (*Apropos Technology, 1071-A Avenida Acaso, Camarillo, CA 93010. \$79.95.*)

Guy Wright
RUN staff

Commodore 64 Training Tape

Learn About Your C-64
From Commodore Expert
Jim Butterfield

Commodore computers are a common sight in my home. I have a VIC-20

and two C-64s hooked up in my study and an SX-64 in my bedroom. Floppy disks, cassettes, cartridges and photographs of new products are everywhere.

In a household like this, you would expect everyone to be a programming whiz, right? Wrong. The hardware and software are there, but according to my wife and son, a good teacher is still needed. They have had problems with my tutoring style; my lack of patience and my assumptions that they are technically well-versed are the main problems. They like our Commodores, but they don't care for me to indoctrinate or instruct them.

As if in answer to their prayers, a package arrived the other day that contained something very special. It was a videotape cassette of Jim Butterfield giving instruction on the Commodore 64.

The tape runs approximately two hours, and it's packed with useful information about the C-64.

Butterfield, a native of Canada, is possibly the best-known Commodore personality in the world. He's an associate editor of *COMPUTE!'s Gazette*, and he has taught at Commodore's summer computer camps. He's a genuinely likeable man who really knows his stuff, and he does an excellent job of telling it like it is in the 14 segments of the tape.

Butterfield covers everything from unpacking the C-64 and hooking it up, all the way up to computer games and simulations. He gives lucid explanations of what a C-64 is, how to get started, how to run programs and much more. He explores topics such as telecommunications, optional languages, graphics, music, games and other uses and features of the machine.

His relaxed style puts you at ease as he covers the gamut of information about the C-64. He rarely speaks in complex technical terms, and when he does, he always clarifies things in everyday English. The videotape format allows you to absorb the information at your own pace—it's easy to rewind the tape and replay a segment.

This tape is not a programming tutorial, so don't expect to be able to spew forth top-notch programs after viewing it. It is, however, an excellent orientation to the numerous features and applications of the Commodore 64. It gives you a light treatise about what's going on inside the computer while it's performing a task.

The aesthetic aspects of the cassette aren't what could be called the Hollywood standard, but the quality is good—the lighting, video and audio are all more than adequate, and the content is excellent.

One of the more endearing features of this tutorial is that, on a few occasions during the lessons, Butterfield proves that he, too, is only human. One such instance involves his trying to load a program from disk, only to find that he hasn't turned the drive on! Although these scenes could have been easily edited out and re-taped, the editors chose to leave them in, giving the tutorial a natural, unrehearsed feel.

I highly recommend this videotape to the new C-64 owner. It imparts a lot of the knowledge found in the user's manual in a clear, concise style. By viewing this tape, the new owner will get a much clearer and more dramatic idea of the computer's capabilities, as well as the software and peripherals available for it.

If you're contemplating the purchase of a C-64, consider buying the videotape at the same time—it makes an excellent first accessory that will give you pointers on what other items you may want to buy for your computer before you go out and shop. (*PF Communications, 2727 N. Grove Industrial Drive #101, Fresno, CA 93727. \$39.95.*)

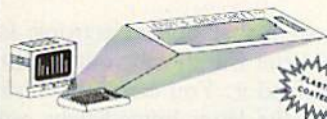
Tom Benford
Bricktown, NJ

MCI Mail

This Electronic Mail Service
Could Be the Postal System
Of the Future

You need to get a letter out *right now*. You have to make arrangements to attend an important job interview in New York City, but you don't have a phone number, or it's the weekend and you won't get through in time. Or maybe you want to congratulate someone and you want the letter to look special. Or perhaps you've finally found the information you've been looking for, and your associates, who are a thousand miles away, need the data immediately.

LEROY'S CHEATSHEET™ KEYBOARD OVERLAYS



FOR COMMODORE 64
(VIC-20 also available)

LEROY'S CHEATSHEETS™ are plastic laminated keyboard overlays designed for use with popular software and hardware for Commodore's VIC-20 & C-64 computers.

These cut-it-out yourself overlays are designed to fit over the keyboard surrounding the keys with commands and controls grouped together for easy references.

LEROY'S CHEATSHEETS™
make life easier for you

only
\$3.95
each

LANGUAGES & UTILITIES

- BASIC
- HESMON 64
- PLOT (COM)

SPREADSHEETS

- CALC RESULT (ADVANCED)
- CALC RESULT (EASY)
- EASY CALC
- HES/MICRO SOFT MULTI PLAN
- PRACTICALG 64/PLUS

WORD PROCESSORS

- EASY SCRIPT
- HES WRITER
- PAPER CLIP
- BROWN FOX SCRIPT 64
- WORDPRO 3/PLUS

MICELLANEOUS

- BLANKS (3 ea NOT laminated)
- PRINTER (IBM) 1525, MPS-801
- PRINTER (IBM) 1526
- PRINTER (EPSON) RX-80
- SPRITES ONLY
- TERM 64

Qty. X \$3.95 \$

Shipping & handling \$ 1.00

6% sales tax \$
(PA residents only)

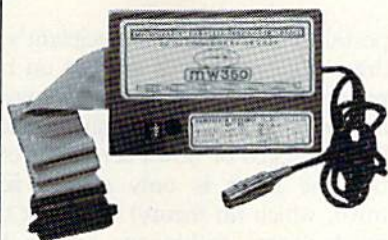
TOTAL \$

Dealer inquiries welcome

Name _____
Address _____
City _____ State _____ Zip _____

CHEATSHEET PRODUCTS™
PO Box 8299 Pittsburgh PA. 15218 (412)731-9806

NEW! Universal Parallel Graphics Interface



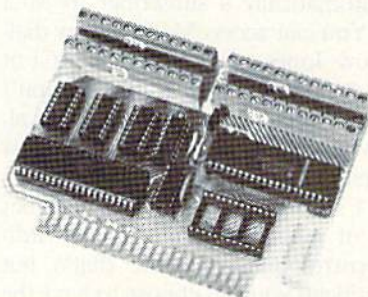
- Built-in self-test with status report
- Optional RAM printer buffer
- Provides virtually total emulation of Commodore printers for compatibility with popular software
- ASCII conversion, total test, Emulate & transparent mode
- Fully intelligent interface that plugs into standard Commodore printer socket
- Exclusive graphic key-match function

Micrografix MW-350 \$129.00
MW-302C Printer Interface also available at \$79.95

Universal Input/Output Board for VIC-20/64

- 16 channel 8-bit A/D converter with 100 micro-second sampling time.
- 1 D/A output.
- 16 high voltage/high current discrete outputs.
- 1 EROM socket.
- Use multiple boards for additional channels up to 6 boards

VIC-20 uses MW-311V \$205.00
CBM-64 uses MW-311C \$225.00



Dealer Inquiries invited

Micro World Electronix, Inc.

(303) 987-9532
or 987-2671



3333 S. Wadsworth Blvd., # C105,
Lakewood, CO 80227

PROFESSIONAL HANDICAPPING SYSTEMS



by Prof. Jones

NEW

GOLD EDITION

EVALUATES FROM RACING FORM!

Age	Gender	Post (Today)
Class	Jockey (Today)	Post (Last)
Condition	Jockey (Last)	Speed
Consistency	Length	Trainer
Earnings	Time of Year	Workouts

And gives you **GRAPHIC REPRESENTATION** of finish

ADAPTS TO ANY TRACK IN THE WORLD

Quickly and easily be changing data statements relating to local track records/jockeys and trainers.
COMPLETE INSTRUCTIONS INCLUDED

TH. Master Thoroughbred Handicapper™

A "Full Featured" Thoroughbred Program for the professional and serious novice. A menu driven program that deals with "all" relevant variables found on the RACING FORM.
MEM 32K \$99⁹⁵

QH. Master Quarterhorse Program™

Complete Quarterhorse analysis designed for the "close" finishes involved in this type of race. This program is designed around intricate "Speed" ratings but includes all handicapping variables. Complete with instructions.
MEM 32K \$99⁹⁵

MB. Master Better™

A compliment to ALL Master Handicapper programs, includes: 1) Win/Place/Show 2) Quinella 3) Exacta 4) Trifecta 5) Pick Six 6) Daily Double 7) Money Management 8) Odds Analysis 9) and Much More. A perfect program designed to use results from all Master Programs to generate "best bet"
MEM 16K \$59⁹⁵
Apple™ is the trademark of Apple Computer, Inc.

GLD. ENHANCED "GOLD" EDITION™

The ultimate analysis system including everything on Program TH™ plus:

- 1) Daily Track Variance
 - 2) Expanded instructions
 - 3) Enhanced Error Trapping
 - 4) Distance range 3 furlongs to 2 1/4 miles (1 mi. 70 yds.)
 - 5) ++ More
- \$159⁹⁵

GD. "Gold Dog Analysis"™

The only professional dog handicapper on the market, includes:

- 1) Speed
- 2) Post Today
- 3) Kennel
- 4) Post Lane
- 5) Distance
- 6) Condition
- 7) Running Style
- 8) Weight
- 9) all new internal weighting
- 10) NEW class indicator

If you are near a greyhound track, you can't afford not to use this program.
MEM 32K \$149.95 Complete \$199.95 w/integrated Master Better™

Professor Jones' Football Predictor, Prof. Pix

This complete football analysis will predict:

- 1) Overlays
- 2) Point Spreads
- 3) "Superplays"
- 4) "Over/Under" Bets.

For NFL/USFL/College. Specity Mod I/III

Track Management™

A revolutionary data base program designed to keep records on "ALL" horses or dogs running at a track. Can also be used to expand Jockey/Trainer stats in all Master Handicapper™ programs. **A MUST FOR THE SERIOUS HANDICAPPER.**
(48K, Disk Only) \$24⁹⁵ NEW \$69⁹⁵

Dear Customer,

These are truly the only Professional Handicapping Systems on the market.

I am dedicated to providing software that will give you the advantage at the track.

I am here everyday to answer your questions before and after your purchase, so please call today and ask for the professor.

Prof Jones

NEW DELUXE TROTTER/PACER™

Includes ALL VARIABLES involved with Professional Handicapping. Trotter/Pacer

\$159.95 complete

\$199.95 with integrated better program

IBM/TRS-80 APPLE/COMMODORE

Send check / money order / VISA / Mastercharge (Include expiration date) to:

Prof. Jones
1114 N. 24th St.
Boise, ID 83702

48 HOUR SHIPPING
Call 208-342-6939
M-F 8-7 MST



TERMS: FREE SHIPPING ALL SOFTWARE. Add \$6.00 hardware / C.O.D. Add \$6.00 / Add 3 weeks personal checks / Add 4.5% ID residents / Add \$6.00 outside U.S.A. / Prices subject to change.

"NEVER LOSE AGAIN!"

DEALER INQUIRIES INVITED

If you have a Commodore (or another model computer), a modem and MCI Mail, you can mail your letter out in a matter of minutes. MCI Mail, billing itself as the nation's new postal system, can receive and transmit your correspondence anywhere in the country through your computer. If you ever need to get a letter or message out right away, then MCI Mail might be for you.

How do you get a subscription to MCI Mail? If you are already a member of Dow Jones News Retrieval, then you are automatically a subscriber to MCI Mail. You can access MCI Mail by dialing Dow Jones and entering //MCI at the first on-line prompt. If you don't belong to Dow Jones News Retrieval, then you can call 1-800-MCI-2255 for information about joining MCI Mail.

MCI Mail combines several different kinds of message exchange. For ordinary correspondence (one that's not time-critical) you can choose to have the message delivered through the U.S. Mail. When you mail your MCI letter, the message is sent to a regional MCI

postal center near the recipient's address. The message is printed on bond paper, put in an MCI window envelope and placed in the U.S. Mail. Instead of being trucked or flown across the country, the letter is only mailed across town, which (in theory) will get it there much faster—within one or two business days, promises MCI.

There are a few things to remember when you compose a letter to be sent through MCI Mail. Letters typed into MCI Mail aren't formatted for you—you need to do that yourself. For instance, if you type 40 columns across your screen when entering your letter, that's how your finished letter will look. If you don't put in any blank lines to break up paragraphs or salutations, your letter will have a solid block of text in the upper-left corner of the page. A new Format command on the Edit menu will help with this.

If the recipient of your message also belongs to MCI Mail, the letter can be sent to his "electronic mailbox." Each subscriber to MCI Mail has a mailbox

in the system that holds electronic letters. The letter will stay in your mailbox until you read it. You can then choose to answer the letter immediately, with an electronic or paper MCI letter, or you can keep the letter on file for a storage fee. (Messages will stay on file with no charge for 24 hours after they are read.)

Obviously, if a person uses MCI Mail regularly, this can be a very fast and efficient way to send messages. If the addressee doesn't check his electronic mailbox very often, you may choose to send a conventional letter instead.

If you have important correspondence that needs to be sent and received in a matter of a day or even a few hours, MCI Mail can handle that, too. MCI can deliver an overnight letter to over 20,000 locations within the continental United States, or a hand-delivered, four-hour letter to hundreds of zip codes within 15 major metropolitan areas.

As the desired delivery speed of your letter increases, the fewer and fewer

Circle 158 on Reader Service card.

YORK 10[®] CASSETTES

COMPUTER GRADE
• DATA TRAC •
BLANK CASSETTES

C-05, C-06, C-10, C-12, C-20, C-24, C-32

From the leading supplier of Computer Cassettes, new, longer length C-12's (6 minutes per side) provide the extra few feet needed for some 16K programs.

- BASF-LHD (DPS) world standard tape.
- Premium 5 screw shell with leader.
- Internationally acclaimed. Thousands of repeat users.
- Error Free • Money back guarantee.

Call: 818/700-0330
FOR IMMEDIATE DELIVERY
on Credit Card Orders.

BUY THE BEST, AT FACTORY-DIRECT PRICES

* 500 C-12's or C-10's — 38¢ each w/labels, add 4¢ • Shipping \$17/500
500 Boxes 13¢ ea. • Shipping \$10/500
(free Caddy offer does not apply)

TRACTOR FEED • DIE-CUT
BLANK CASSETTE LABELS
WHITE \$3.00/100 \$20.00/1000
NEW COLORED LABELS • Pastels -
Red, Blue, Green, Yellow, Lavender
\$4.00/100 \$30.00/1000

CASSETTE STORAGE CADDY
Holds 12 cassettes \$2.95
w/9 boxes
Includes edge labels
and index card

FREE
1 CADDY WITH EVERY
4 DOZ. CASSETTES PURCHASED
(does not apply to 500 quantity offer)

ORDER NOW... MAIL TO -
9525 Vassar Ave.
Chatsworth, CA 91311

ORDER FORM

Each cassette includes 2 labels only. Boxes sold separately. In Continental U.S. shipment by U.P.S. If Parcel Post preferred, check here.

Check or M.O. enclosed Send Quantity Discounts
Charge to credit card: VISA MASTERCARD

Card No. _____ Exp. _____
Name _____
Address _____
City _____ State/Zip _____
Signature _____ Phone _____

ITEM	1 DOZEN	2 DOZEN	TOTAL
C-05	<input type="checkbox"/> 7.00	<input type="checkbox"/> 13.00	
C-06	<input type="checkbox"/> 7.00	<input type="checkbox"/> 13.00	
C-10	<input type="checkbox"/> 7.50	<input type="checkbox"/> 14.00	
C-12	<input type="checkbox"/> 7.50	<input type="checkbox"/> 14.00	
C-20	<input type="checkbox"/> 8.75	<input type="checkbox"/> 16.50	
C-24	<input type="checkbox"/> 9.00	<input type="checkbox"/> 17.00	
C-32	<input type="checkbox"/> 11.00	<input type="checkbox"/> 21.00	
Hard Box	<input type="checkbox"/> 2.50	<input type="checkbox"/> 4.00	
Whc. Labels	<input type="checkbox"/> 3.00/100	<input type="checkbox"/> 20.00/1000	
Color Labels	<input type="checkbox"/> 4.00/100	<input type="checkbox"/> 30.00/1000	
Color			
Storage Caddy @ 2.95 ea. Qty			
SUB TOTAL			
Shipping/handling			3.50
Outside 48 Continental States — Additional \$1 per caddy, per doz. cassettes or boxes			
TOTAL			

Call residents add sales tax.



The Handicapper

Now available for the Commodore 64 and TI99/4A! Use the power of your computer to improve your performance at the track! The Handicapper is two separate programs for thoroughbred and harness horses that apply sound handicapping techniques to rank the horses in each race. Factors include speed, distance, class, track condition, post position, past performance, jockey or driver ability and other attributes. Handicap a race in just a few minutes or a whole card in less than an hour—even if you've never handicapped before! The Handicapper uses information readily available from the thoroughbred Racing Form or harness track program. Our diagrams even show you where to find the data you need. Easy enough for the beginner, sophisticated enough for the veteran horseplayer. Complete instructions and betting guide. State computer type when ordering. Thoroughbred or Harness Handicapper, \$29.95 each on tape. Both programs only \$44.95

Circle 84 on Reader Service card.

Federal Hill Software
825 William St.
Baltimore, MD 21230
301-685-6254




places your letter can go. Overnight and four-hour delivery is perfect for businessmen sending messages between large cities or suburban areas, but you won't be able to get a letter hand-delivered within four hours if you live a hundred miles from a large city. MCI can't hand-deliver these letters to post office boxes, and a zip code is a must.

If you plan to use MCI Mail for important business correspondence, you can take advantage of a few advanced features of the system. You can register your company or personal letterhead with MCI Mail and, at your option, your letters will be printed with your letterhead. You can even register a signature with MCI Mail, so the letters you send will have your laser-printed signature at the bottom! For an extra monthly charge, letters sent to your electronic mailbox can be stored and recalled for future reference or mailing.

There are no basic monthly charges and no connect fees with MCI Mail, and if you access MCI Mail through Dow Jones News Retrieval, there are no

DJNS connect fees, either. Mailing fees range from \$1 for an electronic letter sent to another MCI Mail subscriber, to \$25 for a four-hour, hand-delivered letter. The price is based upon an MCI Mail "ounce," which is equal to 7500 characters or 3-5 typewritten pages. The service is very competitive with similar telegram or telex services, and you can access MCI Mail quickly and easily from your home or office.

You can use your telecommunications and word-processing software to create MCI letters off-line, and then upload the letter to MCI Mail. This can be a real advantage, especially if you're calling MCI Mail or Dow Jones via

This service is very competitive with similar telegram or telex services, and you can access it easily from your home or office.

long-distance, since you could spend a long time editing and formatting a letter on MCI Mail. MCI Mail will automatically disconnect itself if you don't input anything after a few minutes. Luckily, your unfinished letter will be retained for you for no charge until you finish it and send it.

If you find that you have a need for fast, professional-looking correspondence with a minimum of effort and expense, look into MCI Mail. You could be using the postal system of the future—today! (MCI Mail, 2000 M St., N.W., Washington, DC 20036.)

Dale F. Brown
Rancho Cordova, CA

Circle 231 on Reader Service card.

Hot off the Press!

COMMODORE 64 INTERFACING BLUE BOOK

Similar to the VIC edition below but expanded to over 30 projects specifically for the 64. \$16.95.

VIC 20 INTERFACING BLUE BOOK

Did you know that your VIC can be used to control a 99c toy motor so effectively that it runs like a precision machine? Or that you can build an accurate digital thermometer using the VIC and four other parts costing less than \$5?

These and other 28 interfacing projects selected for usefulness, ease of construction and low cost are detailed in the VIC-20 Interfacing Blue Book, a veritable gold mine of practical information on how to build a variety of interfaces for your computer.

Projects include: Connecting VIC to your stereo; Pickproof digital lock; Capacitance meter; Liquid level sensor; Telephone dialer; Voice output; 8K/16K RAM/ROM expansion; 128K RAM expansion; 8-bit precision D/A; 8-bit A/D converter; MX-80 printer interface; Universal cassette adapter; RS-232C interface; EPROM programmer for MICROMON; Allophone speech synthesizer; Light pen; Uninterruptible power supply; Force transducer; AC power control and more.

Written by a college professor in a friendly and informative style, the Blue Book gives you theory of operation, schematics, program listings, parts list, construction hints and sources of materials for each one of the 30 projects.

Price is \$14.95 postpaid.

Foreign orders add \$3 for AIR MAIL shipping.

NEW! VOICE INPUT FOR THE VIC 20

Now there is a new way to enter data and commands to your VIC. You can talk to it! The VIVIC speech recognition peripheral from MICROSIGNAL enables your computer to understand and respond to your spoken commands. Just imagine the possibilities!

You can train VIVIC to recognize up to 32 words or short phrases of your choice, by simply saying each word three times under the prompting of the VIC. Once VIVIC is trained, it will respond to your voice when you say a word that is in the vocabulary you have chosen.

Adding voice input to your programs is as easy as adding a line of BASIC. The manual gives you step by step instructions on how to do it.

VIVIC is a complete system including hardware that plugs into the user port, quality microphone, cassette with software and manual. It requires a VIC 20 with at least 16K of additional RAM.

Order your VIVIC today and start talking with your VIC! Send us a check (allow 3 weeks to clear) or money order for \$99 (we pay postage in the US, foreign add \$10) to the address below:

microsignal
Dept. E, P.O. BOX 22
MILLWOOD, NY 10546

Circle 158 on Reader Service card.

YORK 10 DISKETTES

BRAND NAME QUALITY "DOUBLE DENSITY" "Plain Wrap" AT DISCOUNT PRICES! \$159* ea.

Certified 100% Error-free • 5 YEAR WARRANTY

BASF \$219* ea. | **Dysan \$269* ea.**

qualimetric * 5 1/4" SSDD, Soft sector, price per disk. 100 pak.

TRACTOR FEED DISKETTE LABELS 2¢ EACH
1 7/16 x 5" 1000 QUANT.

FLIP "N" FILE "15" \$795
for 5 1/4" Diskettes
"25," \$21.95 "50," \$31.95

Call: 818/700-0330
FOR IMMEDIATE DELIVERY on Credit Card Orders.

ORDER NOW... MAIL TO -
YORK 10 9525 Vassar Ave. #R2
Chatsworth, CA 91311

ORDER FORM

PLEASE INDICATE QUANTITIES DESIRED				TOTAL
SIZE	Plain Wrap	BASF	Dysan	
5 1/4" SSDD	17.90	24.90	29.90	
	159.00	219.00	269.00	
5 1/4" DSDD	20.70	33.90	41.30	
	182.00	299.00	363.00	
5 1/4" DS96pk	47.90	421.00	461.00	
8" SSDD	30.90	35.70	35.70	
	274.00	274.00	314.00	
8" DSDD	38.60	39.00	41.30	
	339.00	339.00	363.00	
DISKETTE LABELS \$3.00/100 - \$20.00/1,000				
FLIP "N" FILE 5 1/4" "15" \$7.95 qty. 25, \$21.95 qty. 50, \$31.95 qty. 100				
SUB TOTAL				
Calif. residents add sales tax				
Shipping/handling (vary quantity)				3.50
Outside 48 Continental States, Additional \$1 per 100 pak. per lot				
TOTAL				

All Diskettes are soft sector, unformatted. #R2
In Continental U.S., shipments by U.P.S.
If Parcel Post preferred, check here

Check or M.O. enclosed Send Quantity Discounts
Charge to credit card: VISA MASTERCARD

Card No. _____ Exp. _____

Name _____

Address _____

City _____ State/Zip _____

Signature _____ Phone _____

For Multilinguists

I am a subscriber to *RUN*. We have a C-64, which I use to program, to store information with my database programs and to play games (I admit). My daughters (ages 7 and 10) use it for game-playing, learning Basic programming, Logo and Comal.

Why don't you have any Logo or Comal programs or articles? These languages are so much better for teaching children programming. Also, I am not familiar with the Pilot language, but why also don't you have any Pilot programs? I feel this is a serious deficit on your part, otherwise, we love your magazine.

Thomas Trocco
Dalton, MA

Watch for our October issue, which will feature introductory articles on programming languages, other than Basic, that you can use on your Commodore.

Editors

Improve the 64

I am very happy with my Commodore 64. Now Commodore Business Machines (CBM) is pretending to introduce two new home computers: the 264 and the 364, with enormous memory banks, built-in programs and many more goodies.

There is only one little problem: None of my 400 programs will run on those computers. (I am glad to read that CBM is reconsidering those computers.) Do you believe I will go out and peel \$500 to buy one of those computers? If you do, you're out of your mind!

What I want to see is an improved Commodore 64, with the wedge as a permanent resident, so I can control and access my disk drive with ease. Maybe a better wedge.

I would like to see a built-in word processor, like Easy Script, that I can access with a flip of a switch, and a spreadsheet like Practicalc, powerful but easy to use.

There are many ways to improve the

C-64. How about a numeric key pad at the right of the board? That would be a great help when we work with the spreadsheet.

How about a built-in modem with jacks for the telephone and the phone lines, and a program in residence so we can switch from word processing to modem in one second?

I believe CBM wasted a lot of time and money working on the new models instead of trying to improve and launch a better 64. If I saw an improved 64 on the market, I wouldn't hesitate to peel \$500, or maybe more, and get me one hell of a personal computer.

Albert H. Coya
Miami, FL

That's Service!

A few months ago our school bought Cardco's Card?+g for our VIC-20 computers. This was my first experience with an interface, but this company has made it most painless, indeed!

When I had some questions, I called the number listed in their manual and talked to a very patient advisor. Then, two weeks ago one of the connectors broke, and our efforts to fix it ruined it completely. I called their company, which sent me two new connectors, free of charge, within a week!

We hear so much about poor documentation and service, I thought you might like to hear about a company that seems to go out of its way to make sure its customers are "up and running." I wish companies in other fields were so cooperative.

Sandra Smith
Sequim, WA

Protection Against Protection

I use my C-64 to help manage and promote my small organ and piano service business. I also have a little ten-month-old girl who tries to help daddy with the computer.

When you combine a little girl and a computer, the first thing that comes to mind is backup copies of important

programs on disk. I have found that protected software seems to be a common practice with software producers. This is all right up to a point, but business programs and data need to be copyable. I will not buy a protected business program, only to wait three months for a \$5 replacement because my daughter ate my inventory control.

I have tried one of the new copy programs, only to find that the disk it comes on is so protected that it's either impossible to copy or not worth the hours of effort.

If a software maker feels that his program is so darn valuable, he should put it on a cartridge. This way, we users will have instant loading and won't have to wait for ten minutes for the program to load while the protection scheme beats the heck out of our disk drives.

Tom Niderost
Talmage, CA

Reason to Go Ape

I have only one word—great! I thank you, and the Commodore people should thank you, too. Because of *RUN*, my interest in computers has been renewed, and I recently upgraded my VIC-20 to a C-64 with printer and disk drive.

I have used several programs from your magazine, but really went ape over "Database Deluxe" (February 1984). Thanks, Mr. Stilwell.

I'm looking forward to spending many more years with *RUN*. Keep up the good work!

Dale Lindeau
Axle, TX

Better Late Than Never

Even though *RUN* gets to me two or three months late here in Sydney, it still stands head-and-shoulders above the Australian magazines published here.

Congratulations particularly on the Magic column, as it is packed with useful hints and tricks.

Paul Samaras
Sydney, Australia

LEARN MACHINE LANGUAGE

- Write Fast-action Arcade-style graphics
- Fully use the Music synthesizer
- Completely understand the Computer
- Develop your skills inventory

Learn with the Tutorial that comes complete with a Full set of professional quality development tools.

DEVELOP-64 4.0 IS NOW FAST!!!

Assembles 2500 lines of code in under 20 seconds!

- Full Macro and conditional assembly capacity • 2600 lines of code in memory. Expandable to 17,000 on disk
- Assemble direct to disk or memory • Co-resident full-screen editor (with search, replace, copy, move) and Debugger and Decoder • Decoder disassembles programs on disk or in memory • Built-in disk wedge • Program trace single step, execute • Set 10 breakpoints and/or go-points
- Full-screen memory display and modify

PLUS the Machine Language Programmer's Bible: "Inside the Commodore 64"

\$69⁹⁵

Plus \$3.00 postage and handling.
(Minn residents add 6%)

*French
Silk*

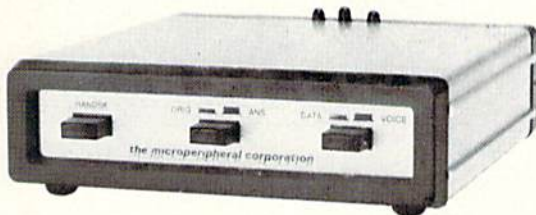
P.O. Box 7096 Minneapolis, MN 55407

Call Toll-Free 1-800-328-0145

or in Minnesota call: (612) 871-4505



AutoPrint Microconnection Modem Model APV—for Commodore 64/Vic 20[®] Computer



300 baud autodial, autoanswer modem with centronics compatible printer interface.

Cables supplied for computer, printer, and telephone connection. Terminal program supplied on cassette — easily transferred to disk.

Compatible with EASY SCRIPT[®] for word processing on the Commodore 64.

\$179.95 with cassette and printer cable.

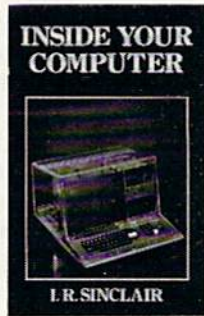
Functions as printer interface for Atari using DOS Dealer Inquiries Welcome.

©Commodore Business Machines.

the microp^{er}ipheral corporation

2565 - 152nd Avenue NE, Redmond, WA 98052
(206) 881-7544

BOOKS



*Wayne
Green
Books*



Nanos System Reference Cards for the VIC-20, C-64, and 6502

No more flipping through the Commodore manuals to find information you need. Nanos System Reference cards are pocket-sized summaries for your quick, easy reference. Find BASIC commands and instructions, ROM routines, reserved words, I/O instructions, hex conversions, screen line layout, and more.

VIC-20	FC1015	\$5.95
6502	FC1016	\$4.95
C-64	FC1017	\$5.95

Inside Your Computer

Find out what goes on inside your VIC-20 or C-64. Inside Your Computer explains microcomputer circuits and how they work. Topics include chips, interpreters, circuits, machine language, binary numbers, algorithms, ASCII code, software, and what they all mean to the computer. Includes many photographs and schematics.

\$12.97 BK7390 108 pp.

Rainbow Quest for the Commodore 64

A computer fantasy for young C-64 users. Rainbow Quest is an adventure that combines fiction and programs. Readers must cross the planet Rainbow and master a series of challenges to succeed on the Quest. Each challenge is a program on cassette. Included are arcade games, puzzles, and mazes. Book and cassette sold together.

\$24.97 BK7401 128 pp.

The Selectric™ Interface

You can turn an IBM Selectric I/O writer into a letter-quality printer for your VIC-20. The Selectric Interface gives you the programs and step-by-step instructions you need for Selectric models 2740, 2980, and Dura 1041. With slight modification, the instructions will also work for the C-64.

\$12.97 BK7388 124 pp.

For credit card orders, call toll-free, 1-800-258-5473. Or send your order on a separate piece of paper to: Wayne Green Books, Retail Sales, Peterborough, NH 03458. Be sure to include the book title, order number, and price. Postage and handling is \$1.50 for the first book, \$1.00 for each additional book. Check, money order, or complete credit card information must also accompany your order. If you have questions about your order, write customer service at the above address. Wayne Green Books are also available in local bookstores. Orders payable in US dollars only. Dealer inquiries invited. Please allow 4-6 weeks for delivery.

Book Gallery

Compiled by Shawn Laflamme

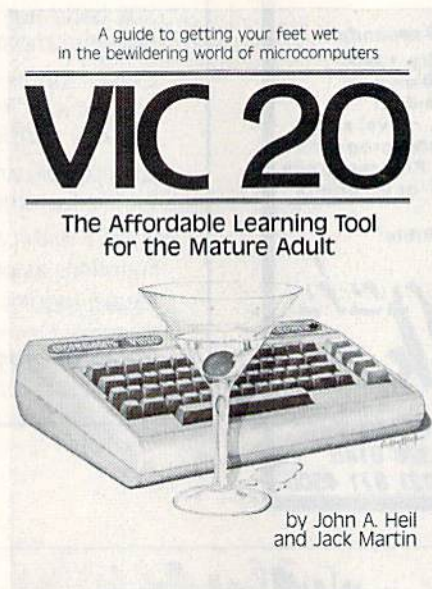
VIC-20: The Affordable Learning Tool For the Mature Adult

John A. Heil and Jack Martin
Banbury Books, Inc.
353 W. Lancaster Ave.
Wayne, PA 19087
Softcover, 201 pp., \$14.95

This past year has seen a veritable flood of programming books for the VIC-20, but unfortunately most of these use a juvenile approach. You know the type of book I'm thinking of—dragons, elves and pixies dance through its pages. While some very young children might be motivated by fantasy to learn about computers, the fact remains that a large percentage of VIC-20 users are adults and young adults. This audience doesn't need to be persuaded to learn about their computers—they already want to, and no amount of gremlins, dwarves, ogres or magic is needed to persuade them further. All they need is a book written in a clear, logical, coherent fashion, without the frivolity. If you're a part of this crowd, then *VIC-20: The Affordable Learning Tool for the Mature Adult* is for you.

Although the title is a bit ostentatious, the idea of the book is a good one. Authors Heil and Martin introduce the VIC-20 novice to the rudiments of Basic programming without being condescending. They assume that the reader is an intelligent, curious person who desires to learn more about computers in general and the VIC-20 in particular. I like this style. It doesn't try to entertain you with goofy cartoon creatures, and yet it gets to the point without being dry.

The first two chapters show you how to hook up the VIC-20 and start entering commands that make sense. All the



things that are "too obvious" to mention are mentioned! Topics such as syntax for arithmetic statements and the idiosyncrasies of variables are treated in some detail.

By the time you have mastered these fundamentals, you're ready to move on to the first principles of programming, which are introduced in chapter three. The Data statement is mentioned early on, the idea being to get you used to the notion of the VIC-20 (or any computer) as an information handler.

Input, If/Then, GOTO and For/Next are treated in the next four chapters. A number of hints and tips are given along the way, such as error trapping, working with integers and keeping track of time.

Rather than dwelling on games and simple amusements, as so many computer books do, *The Affordable Learning Tool* shows you how to put your new knowledge to work in useful ways. In fact, these early chapters eventually lead to the construction of a simple database program, and you can't get much more practical than that!

Chapters eight and nine tackle the concepts of nested loops and subroutines. In this way, you are led to appreciate some of the basic principles of structured programming.

The next two chapters describe several other Basic commands, and the techniques of flowcharting are presented. Chapter twelve discusses the concept of sorting, explaining why it's important and how it's done with a VIC-20.

Chapter thirteen ties everything together with a complete address-book program that uses the concepts covered in the previous chapters.

Heil and Martin deliberately stick to commands that most other microcomputers have. It's not the particular computer you use that's important here, but rather how you go about talking to it. After completing this book, you should feel confident enough to take up a conversation with just about any computer that "speaks" Basic. Though a knowledge of a dozen commands can hardly be considered mastery, you would be surprised with what you can do with this small set of commands!

Old pros will find nothing new in this book, especially since it unveils only a dozen or so Basic commands and keeps strictly away from graphics, sound and animation. Beginners who wish to do something useful will derive the most benefit from it. This could be a very handy book to have around when a friend or relative asks, "But what's a VIC-20 good for?"

One thing that bothers me about this book is the authors' negative attitude toward mathematics. (Actually, they tend to confuse arithmetic with mathematics, which makes one a little suspicious.) Boolean algebra is described as "impenetrable by normal minds." This isn't true. Boole's own work on the subject is quite straightforward—a high

school education is about all it takes. The authors shouldn't close doors for the reader.

Despite this, I still recommend the book. It makes clear the rudiments of programming and introduces an adult to the world of computers with one of the most affordable tools around.

**Thomas Henry
Mankato, MN**

Commodore 64 Programs For the Home

**Charles D. Sternberg
Hayden Book Company, Inc.
10 Mulholland Drive
Hasbrouck Heights, NJ 07604
Softcover, 170 pp., \$14.95**

Charles Sternberg's *Commodore 64 Programs for the Home* contains a whole library of useful programs. There are no space-battle games or futuristic adventures here, but you will find programs for budgets, mortgage payments, meal planning, auto maintenance and trip planning, to name a few. The book contains a grand total of 40 home-aid programs.

Need help with the household budget? Would you like a meal-planning program or telephone directory program? How about some help with the kids' school work? If you answered yes to any of these, then Sternberg has included something for you.

Novices will appreciate Sternberg's care in explaining what each program will do and how it will do it. A test run is also included for each program.

The test run is a real blessing for inexperienced users. It's frustrating when you're not sure if your program is working correctly, after laboring over the listing. The test run removes the mystery and misery. If you input the same data in the example and receive the same results, you know your copy is correct.

Sternberg also includes a table after each listing, explaining what the program's major variables represent. This should help the beginner to visualize the flow of the program and aid in any modification, if desired.

Each program is introduced with a short description of what it will do, followed by instructions. Likely problems are noted and solutions to them are

specified.

The last instructions given before the listings are modification procedures. Again, Sternberg is very kind to the novice. He points out where modifications can easily be made and suggests what they might be. Many people, after entering a listing, want to customize the program to meet their exact needs. This might involve dropping never-used loops or inserting others to make one program do the work of several. Sternberg foresaw this desire.

Most of the listings are very short, averaging 40 or 50 lines each. There are no fancy title screens, no sound effects and no sprites. The listings are cut to the bone, easy to follow, and therefore, easy to modify.

If it isn't needed to get the job done,

*If you want some useful
home application programs,
this book may be just
what you're looking for.*

Sternberg leaves it out. The novice should appreciate this. Half the fun is changing the listing, adding printout options, sounds and other finishing touches.

Most of the programs are written in straight Basic. There are no graphics symbols included in the listings, which is another blessing for the novice. Anyone who has ever tried to decode illegible Commodore symbols from a dot-matrix printer will appreciate their absence. Most of the programs would translate to almost any other 40-column computer.

I had hoped the book would use the disk drive as a storage device instead of Data lines. In a few programs, the cassette is used with instructions for translation to disk, but these use only sequential files. If you want to learn about relative or random access files, you'll have to consult another text.

If you're just learning about programming the C-64 and want some useful home application programs, then this book may be just what you're looking for. The more advanced programmer may be interested in an earlier book by Sternberg, *Basic Computer Pro-*

grams for the Home, also published by Hayden.

**Gary V. Fields
Asheville, NC**

Music and Sound for the Commodore 64

**Bill L. Behrendt
Micro Text Publications, Inc.
Prentice-Hall, Inc.
Englewood Cliffs, NJ 07632
Softcover, 180 pp., \$14.95,
\$29.95 with disk**

Music and Sound for the Commodore 64 is a wonderful book, but it is definitely not for everyone.

If you just want to learn how to get a few notes out of your C-64, then you would be better served by another text. However, if you want to know about the physics of sound, the ins and outs of electronic music synthesis, obtain a firm grounding in music theory and squeeze every possible sound out of your C-64, then this book is for you.

Author Bill Behrendt begins with a brief tour of the Commodore 64, then jumps right into the physics of sound with discussions of things such as harmonic waveforms; a few pages later, you're introduced to the voltage-control oscillator. Music theory—from staff to scales and chords—is covered in concise detail.

If you don't really want to know all that, you can skim the material and get to the programs. Appendix A, which occupies nearly half the book, consists of programs and explanations. You can use the programs without learning all the science behind sound generation. The text guides you through the use of each program, similar to documentation for a software package.

Music and Sound comes in two versions: book alone, or book and disk. If you value your time (and your sanity), get the disk version! The listings are long and tedious, with indecipherable graphics symbols in the Print statements.

Anyone who bought the C-64 because of its SID chip and was later disappointed by the difficulty of accessing it will appreciate the thoroughness of this book. It may very well be more than enough to suit your needs.

**Sharon Aker
Sussex, NJ**



(from p. 6)

will then put you back into the Basic Command mode, ending the color program.

This program violates most of the tenets of good programming that I have adopted and come to appreciate over the years. It was created simply as an answer to the challenge of being as short as possible.

Michael Broussard
Woodbridge, VA

The Text-Character-Code Award

```
1 FORS=0TO15:PRINT"(SHFT CLR){3 CRSR DNs}":POKE53281,S:
  FORL=0TO15:READX:PRINTCHR$(X),"BKGD="S,
2 PRINT"TEXT="L:NEXT:FORB=0TO15:POKE53280,B:FORL=1TO999
  :NEXT:WAIT653,1,1:NEXT
3 RESTORE:NEXT:DATA144,5,28,159,156,30,31,158,129,149,1
  50,151,152,153,154,155
```

This program displays all 16 text colors simultaneously for comparison, and holding down one of the shift keys or pressing the shift-lock key will freeze the display. The timing loop for the border flash can be adjusted to suit the user.

Roy B. Graff
Sheridan, WY

The Why-Didn't-I-Think-of-This?/Brute Force Award

```
1 INPUT"BO";A:POKE53280,A:INPUT"BA";B:POKE53281,B:INPUT
  "T";C:POKE646,C:GOTO1
```

Simply input numbers 0-15 from your color chart when prompted.

David Gaulden
Columbus, OH

Random-Solution Award

```
10 X=INT(RND(1)*255)+1:PRINT"(SHFT CLR){CTRL 9}"X:POKE3
  6879,X:FORT=1TO450:NEXT:RUN
```

This is the simplest way that I know of to display all of the screen and border colors on my VIC-20. Also, in the upper left-hand corner of the screen, the Poke value is given.

Bill Moffatt
Bartow, FL

Editor's Note: *All?*

Most-Persistent-Programming Award

```
1 A(1)=53280:A(2)=53281:A(3)=646:FORN=0TO15:POKEA(K),N:
  INPUTK:NEXT:GOTO1
```

I previously sent you two versions of this challenge. This is the one to use—I promise not to send any more versions.

Run the program. Type 1 for border, 2 for background or 3 for print, then press the return key repeatedly until the color is right. Then press the next number (to choose border, background or print) and continue. When all colors are right, type 11 and press the return key to exit the program. It will print BAD SUBSCRIPT ERROR in 1 and then stop.

Getting fewer than six lines was not too hard. Anyone out there ready to try for half a line?

Don Wilkins
Burke, VA

The-Only-Person-to-Use-DEFFN Award

```
10 DEFFNC(X)=PEEK(X)+1+16*((PEEK(X)AND15)=15):PRINT"(SH
  FT CLR)1=BORDER 2=BACKGND 3=TEXT
20 GETA$:IFA$<CHR$(49)ORA$>CHR$(51)THEN20
30 A=ASC(A$)-48:IFA<3THENX=53279+A:POKEX,FNC(X):GOTO20
40 POKE646,FNC(646):GOTO10
```

A simple way of exiting this routine can be accomplished by adding another line to detect a Return.

Chris Hebert
Sunnyvale, CA

The Hi-Res Award

```
1 C=55304:R=56333:POKE56576,148:POKE53265,59:POKE53272,
  61:POKER,127:POKE1,51
2 A=52224:B=57344:FORT=0TO15:X=A+40*I:Y=B+320*I:FORJ=0T
  O15:POKEX+J,16*J+I:NEXT
3 K=0:FORJ=0TO127:POKEY+J,PEEK(C+K):K=K+1:NEXT:NEXT:POK
  E1,55:POKER,129
```

This is a three-line Basic program that uses the C-64's hires bitmapped Graphics mode to display the 256 color combinations in a 16 × 16 matrix.

Barry G. Adams
Fredericton, New Brunswick
Canada

Father-and-Son Award

```
10 T=ABS(S=15):S=S*ABS(S<15)-(S<15):S=S*ABS(S<16):B=B
  +T:B=B*ABS(B<16)
20 POKE53281,S:POKE53280,B:PRINT"(SHFT CLR)":FORT=0TO15
  :POKE646,T:PRINT"{4 SPACES}BORDER:"B;
30 PRINT"{2 SPACES}SCREEN:"S;"{2 SPACES}TEXT:"T:NEXTT:
  FORD=1TO1000:NEXTD:GOTO10
```

All the combinations of color for the border, background and text are displayed, along with the color codes used to produce each color, to help you duplicate these results in original programs. I rejected the temptation to submit an even shorter version of this routine, as its usefulness (the only justification for such a program) would be minimal.

Jerry E. Shepherd
West Valley City, UT

```
10 ?"(SHFT CLR)":FORB=0TO15:FORS=0TO15:?"(HOME)":FORT=0
  TO15:P(SHFT O)53281,S:P(SHFT O)53280,B:P(SHFT O)646,
  T
20 PRINT"BORDER:"B;"SCREEN:"S;"{CRSR LF} TEXT:"T;"{CRSR
  LF} ":NEXT:FORD=0TO1200:NEXT:NEXT:NEXT
```

My father submitted a three- and four-line routine to answer your challenge. After sending *his* in, he challenged *me* to come up with something using fewer lines than his. I created this two-line routine, and since it uses fewer lines, accomplishes the same purpose and uses logic that is easier to understand, my father suggested I send it in.

Jerry E. Shepherd, Jr.
West Valley City, UT

RUN Amok

Item: In June's Commodore Clinic, there was an error in the answer to John Bryer's question (p. 12, col. 2). The second line of the listing near the top of the page should read PRINT#15..., not PRINT#5.

Item: Many readers have had trouble typing 64 Joystick Artist (June 1984, p. 90) into their C-64s, which is not too surprising, considering how many data statements there are. We have checked and rechecked the listing and can assure you that there are no errors. However, since so many people have called and written us about the program, we went through it and devised a way to help you detect typing errors.

It is a bit involved, but should help those of you who have had a problem. If followed carefully, the following steps should help locate errors in the data statements.

1. In each line that contains a READD:POKET,D:NEXT, change the end of the line so that it reads

```
READD:B = B + D:NEXT:PRINTB
```

For example, in line 100 change the end of the line so that it reads:

```
100 FORT = 49152TO49456:READD:B = B + D:NEXT:PRINTB
```

The lines that need to be changed are: 100, 310, 410, 470, 730, 820, 880, 970 and 1060.

2. In each line that contains a READA:POKET,A:NEXT, you must also change the end of the line so that it reads:

```
READA:B = B + A:NEXT:PRINTB
```

For example, in line 1160 change the end of the line so that it reads:

```
1160 FORT = 52224TO52283:READA:B = B + A:NEXT:PRINTB
```

The lines that need to be changed are: 1160, 1220, 1250, 1350, 1400, 1450 and 1480.

3. Insert a line:

```
1495 END
```

4. Type RUN 100. You should get a printed list of 16 numbers on the screen (a checksum) corresponding to each section of the data. The list *should* read: 31629, 47432, 55564, 102727, 117533, 124841, 138935, 154222, 167024, 169983, 173537, 191775, 197100, 202425, 204396, 206122.

If you didn't get these numbers, then you've made a mistake somewhere in typing your data statements. Where your list deviates from this list is the area of your program that you should check. If, for example, the first four numbers match but the rest are off, then go to the fifth instance of READD:B = B + D:NEXT:PRINTB that you changed (line 730) and check the data statements that follow (lines 740-810). If everything was fine up until the tenth number, but those from the eleventh onward were wrong, go to the eleventh "READ :B = B + " line that you changed (line 1220) and check the data statements after it (lines 1230-1240).

Be especially careful about numbers that are broken at the end of a line (if there's no comma, the number carries to the next line). Also watch for periods in place of commas and the very first number after the word DATA (sometimes that number can be easily overlooked). Another trick is to try to get a friend to read the listing out loud while you check each number.

5. When you get all the numbers to match ours, change the lines back to the way they first appeared and delete line 1495. The program should then work the way it was intended. Good luck and happy hunting.

Item: If you dialed Robert Shannon's bulletin board number as listed in the July Commodore Clinic column, then you dialed the wrong number. The correct number is 707-964-7114.

Item: The price of the Doodle! program was incorrectly listed in the July Software Gallery column. The correct cost of the program is \$39.95.

How to type listings from RUN

Typing in listings can be difficult enough without having to worry about strange graphics characters, charts or tables. That's why we decided to make it easy to enter listings from RUN by translating everything we thought might be confusing in any program.

When you see something between the curly brackets, all you have to do is press the keys indicated. For example:

{SHIFT L}—means hold down the shift key and press the L key at the same time.

{COMD J}—means hold down the Commodore key (it is on the lower left side of the keyboard) and press the J key at the same time.

{SHIFT CLR}—hold down the shift key and press the CLR/HOME key.

{HOME}—press the CLR/HOME key without shifting.

{CTRL 6}—hold down the control key and press the 6 key.

{FUNCT 2}—function 2 (in this case, you hold down the shift key and press the function 1 key).

{CRSR UP} {CRSR DN} {CRSR LF} {CRSR RT}—these are the four cursor directions.

{UP ARROW}—means the arrow key (the one with the pi sign under it).

{LB.}—the British pound sign (£).

{PI}—the pi sign key (π); (shift and press the up arrow key).

In some instances, when a large number of characters or spaces are repeated in a listing, we will represent them this way: {22 spaces} or {17 CRSR LFs}.

Print vs Print#

RUN readers should be aware of difficulties that may arise when entering listings that contain the PRINT and PRINT# commands.

These two commands may look very similar, but they are different. If, for example, you use a question mark (?) to abbreviate PRINT in a line such as 10 PRINT#4,AS, then you are signaling to the Commodore computer that you are trying to print the variable #4, which is not a legal variable name.

The command PRINT#4 actually means "print to device number 4." You can abbreviate PRINT# by hitting the P key and the shift and R keys at the same time and then entering the device number. But *do not* abbreviate PRINT# with a question mark.

If you think of PRINT as one command and PRINT# as an entirely different command, then you should have no problems.

Clubs

Commodore Convention

MARCA (Mid-Atlantic Regional Commodore Association) is a confederation of user groups in Pennsylvania, Maryland, Virginia and New Jersey, currently representing more than 3000 Commodore users. The group's main purpose is to facilitate information-sharing among Commodore users in the region.

MARCA is sponsoring a Commodore Convention on Saturday and Sunday, July 28 and 29, in Hershey, PA. There will be two days of speakers (including Jim Butterfield, the Strasmas and Len Lindsay) and workshops. Some of the best and newest in Commodore hardware, software, peripherals and so on, will be on display.

For more information, call Mindy Skelton, 717-486-3274 or write MARCA, PO Box 76, Mt. Holly Springs, PA 17065.

Nebraska

All Commodore owners who live in the Nebraska panhandle area are invited to attend meetings of the Alliance Commodore Computer Club. The 25-member group, which is new and very informal, meets on the third Wednesday of each month for a short tutorial

on both the VIC-20 and C-64, followed by an open forum for questions.

For more information, contact Marilyn Sallee, 1629 Boise, Alliance, NE 69301.

Brandon, FL

The Brandon User's Group promotes and educates the general public in the use of the VIC-20 and C-64. The group holds meetings on the second and fourth Fridays of the month, from 7-10 PM, at the Brandon Civic Center, Sadie St., Brandon, FL. Meetings offer guest speakers, as well as members teaching Basic, intermediate and advanced programming, machine language, computer math and science and telecommunications.

Knoxville, TN

Meeting on the second Thursday of each month is the Metro-Knoxville Commodore User Club (MKCUC), from 6:30-9:00 PM, at the Deane Hill Recreation Center in Knoxville. The group will also be holding jam sessions on various Saturdays, so that members can copy the extensive library of public domain software (more than 4.2 megabytes of software).

For more information, contact Ed

Pritchard (Club President), 7405 Oxmoor Rd., Knoxville, TN 37931, 615-938-3773.

Portland, ME

So. ME 64, a Commodore user's group in the southern Maine area, meets on the second Saturday and the last Wednesday of the month. The group offers its members a newsletter, a library and computer education.

For information, contact So. ME 64, c/o Edward Moore, 10 Walker St., Portland, ME 04102, 207-761-1626.

Wilmington, NC

There are two sections of the Wilmington Commodore User's Group (WCUG). The first meets on the second Tuesday of the month, the other on the third Wednesday of the month.

The group, which has associate memberships available, offers members a large public domain library, and is interested in exchanging information and public domain software with other user's groups.

For more information, contact Terry Brown (Club President), 409 R.L. Honeycutt Drive, Wilmington, NC 28403, 919-799-5041.

Coming Next Month

Just in Time for School—*RUN* will focus on education in the September issue. The lead article, written by a noted figure in the education field, will review over 50 commercially available educational packages for children from pre-school age (about 4-6 years) through the last year of elementary school (around 13 years). The article will examine the impact that software can have on a child's growth and success in school.

In Keeping with the Theme—*RUN* will also publish original programs that readers can type into their Commodore systems to teach their youngsters math and spelling.

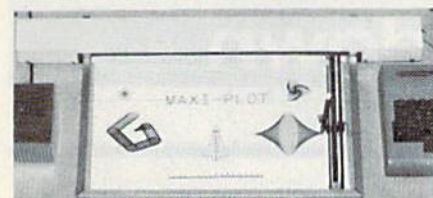
Non-Academically Speaking—The September issue will feature reviews of eight major terminal communications packages (the software used with the Commodore computer, modem and telephone to communicate with fellow computerists across town or across the country). Noted Commodore author, Jim Strasma, explains what terminal communications software is, how it works, how to use it and what to look for when purchasing it for your system.

The Cop and the Computer—Here's an intriguing human-interest story and an unusual application of the Com-

modore 64: Randy Mooseles, 29, is a police detective for the city of Melbourne, FL. Tired of playing games with his computer, he came up with a more practical and arresting application for his C-64. Evil-doers, beware! Randy and his C-64 may be hot on your trail.

Mystery Revealed—The WEDGE has been called one of the C-64's most potentially useful programs. But because of sketchy documentation, many computerists are unable to make full use of all its functions. This article lifts the shroud of mystery surrounding this all-important program.

Also—The September issue will feature utilities, applications, reviews and regular columns to help the reader get the most out of his Commodore computer system. Regular features will include the popular MAGIC (hints and tips for Commodore owners) and Commodore Clinic (answers to readers' questions) columns, as well as Software Gallery (reviews of commercially available Commodore programs) and New Products RUNdown (announcements of the latest software and hardware products available for your Commodore system).



MAXI-PLOT

IS A FLAT BED PLOTTER FOR THE COMMODORE 64. MAXI-PLOT HAS THE FEATURES OF PLOTTERS COSTING OVER 1,000 DOLLARS AND SOME OTHERS THAT ARE UNIQUE TO MAXI-PLOT. CHECK THESE POINTS:

- 1) .004 IN. PER STEP RESOLUTION
- 2) LINEAR AND CIRCULAR INTERPOLATION
- 3) 16 IN. X 9 IN. ACTUAL PLOTTING AREA
- 4) NO LIMIT ON THE SIZE OF THE SHEET
- 5) PLOTS AT 2.7 IN. PER SECOND
- 6) USES MOST TYPES OF PENS AND MARKERS
- 7) PROGRAMABLE IN BASIC WITH ONLY 7 NEW COMMANDS TO LEARN (ADDED TO BASIC)
- 8) ABSOLUTE OR RELATIVE MOVES (RESETTABLE ABSOLUTE ZERO)
- 9) CONTINUOUSLY UPDATED READOUT OF X AND Y REGISTERS AT THE TOP OF THE SCREEN
- 10) NO INTERFACE REQUIRED, PLUGS DIRECTLY INTO THE USER PORT
- 11) USE THE C-64 FUNCTION KEYS TO MOVE THE PEN MANUALLY IN ALL DIRECTIONS

INCLUDES DISK OR TAPE (SPECIFY) WITH SEVERAL SAMPLE PROGRAMS
 INTRODUCTORY PRICE \$249.00 + \$9.00 SHIPPING
 SEND CHECK OR MONEY ORDER TO:
 MAXI-PLOT
 839 SEA FOAM
 HOUSTON, TEXAS 77062

THIS ENTIRE AD HAS BEEN MADE IN A MAXI-PLOT PLOTTER AND PHOTOGRAPHED

INVESTORS

StockTrender™

SOFTWARE FOR TECHNICAL ANALYSIS AND BETTER STOCK SELECTION AND PORTFOLIO MANAGEMENT

- Stores 53 weekly prices/stock (data input by user)
- 100 stocks /disk. Calculates mean fractional price change, annualized yield, variance, std. deviation, Beta & Alpha & contributions to yield, correlation coefficient, variance explained
- Automatic calculation of all stocks on disk w/ranked summary in 6 categories, graphics, calculation ranges set visually or by date
- Graphs reproduced on most printers
- File handling includes: add, delete, list, correct, rename, splits and more
- Data backup program includes: alpha-betaizing, sort, selective search and copy
- Printer configuration program to allow use of almost any printer

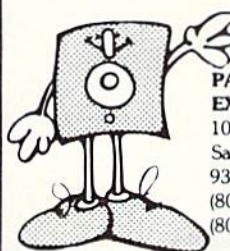
PRICE: \$75 (Pa. add 6%) check or M.O.

Order Now for: Commodore 64 w/disk T199/4A w/32K & disk (Printer Optional)

J.B. Horton Company
 P.O. Box 2426
 Bethlehem, PA 18017
 (215) 691-1147

MEMOREX FLEXIBLE DISCS

WE WILL NOT BE UNDER-SOLD! Call Free (800)235-4137 for prices and information. Dealer inquiries invited and C.O.D.'s accepted.



PACIFIC EXCHANGES

100 Foothill Blvd.
 San Luis Obispo, CA
 93401. In Cal. call
 (800)592-5935 or
 (805)543-1037

WE'LL BACK YOU UP!

ATTENTION COMMODORE 64 OWNERS

If you own a disk drive then you'll need "The Clone Machine". Take control of your 1541 drive.

NEW IMPROVED WITH UNGUARD.*

Package includes:

- 1.) Complete and thorough users manual
- 2.) Copy with one or two drives
- 3.) Investigate and back-up many "PROTECTED" disks
- 4.) Copy all file types including relative types
- 5.) Edit and view track/block in Hex or ASCII
- 6.) Display full contents of directory and print
- 7.) Change program names, add/delete files with single keystroke
- 8.) Easy disk initialization
- 9.) Supports up to four drives

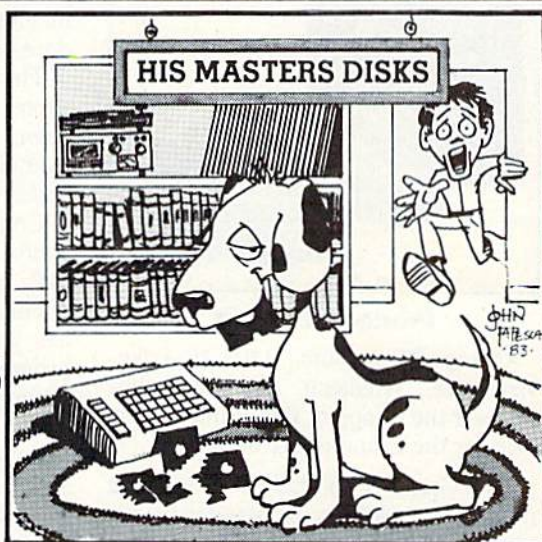
MasterCard VISA
\$49⁹⁵

***UNGUARD** Now allows you to read, write and verify bad sectors and errors on your disk making it easy to back-up most protected software.

Dealers & Distributors
 Inquiries Invited

CALL (201) 838-9027

MICRO-W.D.I.
 1342 B Rt. 23
 Butler, N.J. 07405



"Should've made a back-up with the Clone Machine."

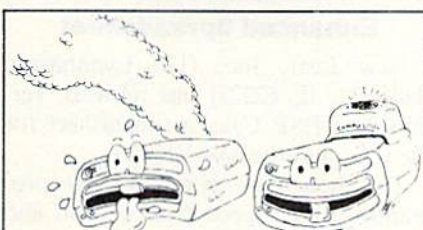


**FOREIGN COMPUTER STORES
 MAGAZINE DEALERS**

You have a large technical audience that speaks English and is in need of the kind of microcomputer information the Wayne Green Publications group provides.

Provide your audience with the magazine they need and make money at the same time. For details on selling **Microcomputing**, **80 Micro**, **InCider**, **Hot CoCo**, **RUN**, **jr.** and **Wayne Green Books** contact:

Sandra Joseph
 World Wide Media
 386 Park Ave. South
 New York, N.Y. 10016
 Phone—(212) 686-1520
 Telex—620430



ISN'T IT TIME you cooled off your 1540/41 disk drive?

Compu-Cool is a *filtered* cooling system that will eliminate those problems associated with heat in your disk drive.

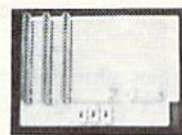
Compu-Cool mounts directly on your disk drive without any hardware.

Send \$39.95 (plus \$2 shipping) to:

ADINC

P. O. Box 12094, Dept. R
 San Antonio, TX 78212

(Texas residents add \$2.40 tax)



**VIC-20
 QUALITY
 EXPANSION
 BOARD
 ONLY
 \$31.95**

- UP TO 3 GAMES OR UTILITY CARTRIDGES.
- 3 LARGE SLIDE SWITCHES. NOT SMALL DIP SWITCHES
- RESET BUTTON. NO NEED TO TURN COMPUTER OFF BETWEEN GAMES.
- FUSED TO PROTECT VIC.
- HIGH QUALITY GOLD PLATED EDGE CONNECTOR AND NICKEL PLATED BOARD.
- SOLID RUBBER FEET SUPPORTS BOARD WHEN INSERTING CARTRIDGES.
- INSTRUCTIONS AND HINTS.

TO ORDER
 SEND CHECK
 ALLOW 3
 WEEKS!
 OR MONEY
 ORDER

MESI
 P.O. BOX
 51544
 NEW OR-
 LEANS, LA
 70151

ADD \$2.00
 POSTAGE &
 HANDLING
 LA RESI-
 DENTS ADD
 3% TAX

VIC 20 IS A TRADEMARK OF CBM, INC.

New Products RUNdown

Compiled by Shawn Laflamme



Printer Interface

Orange Micro, Inc. (1400 N. Lakeview Ave., Anaheim, CA 92807) has released the Grappler CD Printer Interface for the Commodore 64.

The Grappler CD has four operating modes. In addition to standard code conversion, the Grappler CD contains a Commodore 1525 Emulation mode that enables your printer to create characters as they would appear on the C-1525. Graphics and special characters can be printed by Epson, Star, Okidata, Pro-writer, NEC and other dot-matrix printers.

Screen dump routines allow the printing of hi-res and block graphics with a variety of options. Special screen dumps for Epson FX/RX aspect ratios are also included. Text formatting features include margin and page length setting.

The Grappler CD includes all required cables. Power is drawn from the expansion port to eliminate extra wiring. It has its own serial and expansion ports to accommodate other Commodore peripherals. Retail price of the Grappler CD is \$139.

Check Reader Service number 428.

Sprite Utility

SpryteByter is a sprite creation and manipulation program for the Commodore 64.

The program lets you create up to 128 sprites in a single file, in either monochrome or multicolor. Menus provide over 60 commands, such as shift, rotate and invert/obvert.

Continuous display of your working sprite is provided in all four modes: normal, expanded-x, expanded-y and expanded-xy. The Game Maker feature lets you insert sprites into your Basic programs. You can control sprite definition from the keyboard or with a joystick.

SpryteByter is available on disk for \$34.95. Microtechnic Solutions, Inc., PO Box 2940, New Haven, CT 06515.

Check Reader Service number 430.

Enhanced Spreadsheet

New Leaf, Inc. (120 Lynnhaven, Belleville, IL 62223) has released Version 2 of ESP Calc, a spreadsheet for the C-64 and the 24K VIC-20.

The new disk contains two programs—a high-speed C-64 version and a standard version for both the C-64 and the 24K VIC-20.

With the high-speed C-64 version, loading of models is up to four times faster than the original version, and calculating a spreadsheet is up to eight times faster. There is also 16% more data cell and calculation space.

ESP Calc Version 2 is available for \$47.50. Owners of Version 1 can purchase the new disk for \$10.

Check Reader Service number 403.



Data Cassette Recorder From Cardco

Cardco, Inc. (300 S. Topeka, Wichita, KS 67202) has released the Cardcorder DC/1, a data cassette player/recorder for the C-64 and the VIC-20.

The Cardcorder is capable of handling up to 120 minutes of tape (60 min. per side), including prerecorded commercial tapes and personal data tapes. It has the features of a standard cassette player, with record, play, rewind, fast forward, stop/eject and pause functions.

Retail price of the Cardcorder DC/1 is \$59.95.

Check Reader Service number 425.

Challenge the Luftwaffe!

Infinity Software (536 Curie Drive, San Jose, CA 95123) has released Bandits at 4 O'Clock, a World War II battle game for the Commodore 64.

As the tail gunner of a B-36 bomber, you must defend your plane from fast, deadly enemy fighters. Skill and reflexes are needed to prevent destruction of your aircraft by your enemies.

Bandits at 4 O'Clock is available on disk and cassette for \$29.

Check Reader Service number 416.

awesome autumn assortment!

call toll free:
1-800-343-8019

COMMODORE 64

TITLE	COST
ACCESS	
Neutral Zone (T/D)	\$27.95
Beach Head (D or T)	27.95
BARRONS	
Computer SAT (D)	63.95
BATTERIES INCLUDED	
The Consultant (D)	79.95
Paper Clip Spell Pack (D)	96.00
Spell Pack (D)	39.95
Buscard II (D)	159.95
Home Inventory (D)	23.95
Recipes (D)	23.95
Stamps (D)	23.95
BRODERBUND	
Mask of Sun (D)	29.95
Matchboxes (D)	21.95
Operation Whirlwind (D)	29.95
CBS	
Coast-to-Coast America (D)	39.95
Murder by the Dozen (D)	27.95
Big Bird's Special Delivery (D)	32.95
CITY SOFTWARE	
Doodle (D)	29.95
CONTINENTAL SOFTWARE	
The Home Accountant (D)	56.95
Filing, Classify, Mailing (D)	39.95
CREATIVE SOFTWARE	
Household Finance (D)	29.95
Home Inventory (D)	16.95
I AM the 64 Vol. 1-3 (D)	
I AM the 64 Vol. 4-6 (D)	
Both for	23.95
CYMBAL	
Mathematics (D)	39.95
English/Spanish (D)	39.95
Science (D)	39.95
C Z SOFTWARE	
OddsMaker (D)	35.95
DATAMOST	
Aztec (D)	29.95
Dallas Quest (D) (NEW)	27.95

WE HAVE ELECTRONIC ARTS

TITLE	COST
EPYX	
Temple of Apshai (D)	29.95
Upper Reaches of Apshai (D)	14.95
Curse of Ra (D)	14.95
Jumpman (D)	29.95
Jumpman Jr. (C)	29.95
Pit Stop (C)	29.95
Gateway to Apshai (C)	29.95
Dragonriders of Pern (D)	29.95
Summer Games (D) (Great)	29.95
World's Greatest Baseball Games (D)	27.95
FUTUREHOUSE	
Complete Personal Accountant (D)	56.95
HAYDEN	
www.commodore.ca	27.95

TITLE	COST
HES	
Multiplan (D)	\$79.95
Omni Writer & Speller (D)	55.95
Minnesota Fats' Pool Challenge (C)	23.95
Super Zaxxon (coming soon)	29.95
INFOCOM	
Infidel (D)	37.95
Enchanter (D)	37.95
Witness (D)	37.95
Planetfall (D)	37.95
Sorcerer (D)	37.95
INFODESIGNS	
Accts. Rec./Billing (D)	63.95
Accts. Pay./Checkwriting (D)	63.95
General Ledger (D)	63.95
Inventory Management (D)	63.95
Payroll (D)	63.95
KOALA	
Koala Pad w/Micro Illus (D)	79.95
Koala Pad w/Micro Illus (C)	87.95
Spider Eater (D)	23.95
Programmers Guide (D)	15.95
Logo Design (D)	31.95
LIGHTNING SOFTWARE	
Master Type (D/C)	29.95
MICRO LABS	
Death in the Caribbean (D)	27.95
MICRO SOFTWARE INTERNATIONAL	
PractiCalc 64 (D)	43.95
PractiCalc 64 (T)	39.95
PractiFile (D)	43.95
P.S. (Program Spreadsheet)	63.95
ODESTA	
Chess 7.0 (D)	55.95
Checkers (D)	39.95
Odin (D)	39.95
How About A Game of Chess? (D)	23.95
ORIGIN	
Ultima III (D)	47.95
PRECISION SOFTWARE	
Superbase 64 (D)	79.95
PRENTICE HALL	
Miner 2049'r (C)	29.95
PROFESSIONAL SOFTWARE	
Word Pro 3 Plus Spell (D)	79.95
SCARBURG	
Songwriter (D)	31.95
SCREENPLAY	
Pogo Joe (D)	19.95
Dunzhin (D)	23.95
Kaiv (D)	23.95
Wyld (D)	23.95
Ziggurat (D)	23.95
Ken Uston's Prof. Blackjack (D)	55.95
SIERRA/ON LINE	
Homeword (W.P.) (D)	39.95
Ultima II (D)	47.95

TITLE	COST
Home Word Speller (D) (NEW)	\$39.95
Championship Boxing (D)	23.95
Quest for Tires (D)	27.95
Quest for Tires (C)	29.95
SPINNAKER	
In Search of The Most Amazing Thing (D)	31.95
Snooper Troops 1 (D)	31.95
Snooper Troops 2 (D)	31.95
Trains (D)	31.95
Aerobics (D)	35.95
Bubbleburst (D) (NEW)	29.95
All In Color Caves (D)	29.95
Juke Box (C)	29.95
Kidwriter (D)	27.95
STRATEGIC SIMULATIONS INC.	
Knights of the Desert (D)	29.95
Combat Leader (D)	29.95
Ringside Seat (D)	29.95
Pro TourGolf (D)	29.95
SUBLOGIC	
Night Mission Pinball (D)	29.95
Night Mission Pinball (T)	23.95
Flight Simulator (D)	37.95
SYNAPSE	
Fort Apocalypse (D/T)	26.95
Survivor (D)	26.95
Blue Max (T)	27.95
Pharaoh's Curse (T)	27.95
Drelbs (D)	27.95
Necromancer (D)	27.95
New York City (T)	27.95
Rainbow Walker (D)	27.95
Sentinal (D)	27.95

TITLE	COST
Zaxxon (D/T)	\$27.95
Zeppelin (D/T)	27.95
TIMWORKS	
Money Manager (D/T)	18.95
Data Manager (T/D)	18.95
Data Manager II (D)	39.95
Word Writer (D)	39.95
TOTL	
Totl Text 2.6 (D)	38.95
Totl Label (D)	21.95
Time Manager (D)	33.95
Research Assistant (D)	33.95
Totl Business (D)	79.95
Totl Speller (D)	27.95
InfoMaster (D)	40.00
WAVE FORMS	
Music Calc I (D)	39.95
Music Calc II (D)	27.95
Music Calc III (D)	27.95
Music Calc Template I (D)	19.95
Music Calc Template II (D)	19.95
Music Calc Template Pro (D)	120.00
Hit Disk (D)	8.00
HARDWARE	
PRINTERS	
Printer (Letter Quality)	650.00
CARDCO	
Cardprint G	74.95
Cardboard 5 Slot	56.95
Printer Utility Pkg. (D)	23.95
Write Now (C)	39.95
Cardprint B	47.95
BOOKS	
InfoCom's Shortcut Through Adventureland	7.95

TO ORDER: Send Certified checks, money orders, or use your Master or Visa Card and CALL 1-800-343-8019. From inside New Hampshire call (603) 542-6175. Personal or company checks require two to three weeks to clear. All prices are subject to change without notice. SHIPPING CHARGES: U.S. orders please add \$2.00 (for 1-100 pcs.) For C.O.D. add \$4.00 CANADIAN ORDERS: \$5.00. ALL OTHER COUNTRIES: 15% of total sale. Air Mail only. ALL ORDERS OVER \$100.00 MUST BE INSURED @ .85* per \$100.00. Customer must pay all duty taxes.

Hours: Monday thru Saturday 8:00 to 10:00 Eastern Time.



**UNIVERSAL
SOFTWARE**

The Best Software for Less
P.O. Box 955
Claremont, N.H. 03743

NEVER UNDERSOLD

—Leader Since 1980—

COMPUSETTE.

at
Manufacturer Prices

Industries Finest



AGFA PE 611

	Retail	Your Cost
C-05	99c	55c
C-10	\$1.29	59c
C-20	\$1.59	69c
C-30	\$1.89	89c
Cases	49c	21c

Packed 24 Per Pack
UPS \$3.00 Per Pack 48 States

Circle 87 on Reader Service card.

Micro-80™ INC.

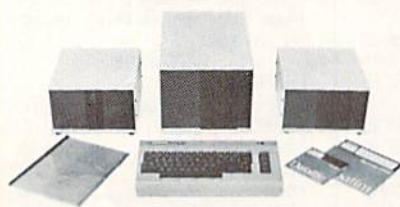
2665 Busby Route Rd.
Oak Harbor, Wash., 98277



**IMMEDIATE
SHIPPING
(206) 675-6143**

Circle 86 on Reader Service card.

CP/M®
FOR YOUR COMMODORE® C-64



- Run All CPM® Formatted Software
- Supports 5 1/4" or 8" Disk Drives
- Z-80, Disk and DMA Controller on Interface Card
- Plugs into the Commodore 64® Expansion Port
- Uses Soft Sektored IBM 5 1/4" and 8" Format Disk Drives

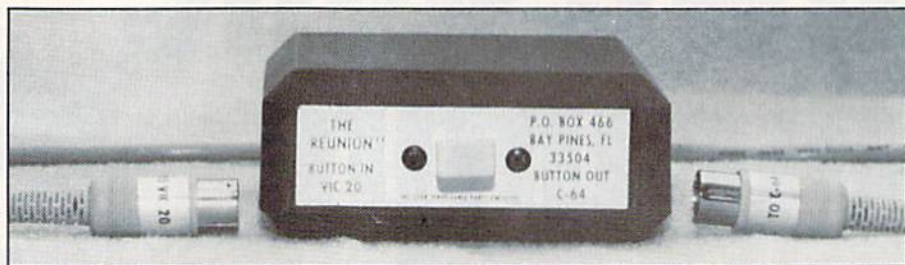
Interface Card with 8" Disk Drive	700 ⁰⁰
Interface Card with 5 1/4" Disk Drive	600 ⁰⁰
Interface Card without Disk Drive	349 ⁰⁰

* Commodore 64 is a registered trademark of Commodore Business Machines, Inc.
* CP/M is a registered trademark of Digital Research, Inc.

estes
ELECTRONICS, INC.

To Order
Phone (913) 827-0629
825 N. 5th Street
Salina, Kansas 67401

New Products RUNdown



Bring Your Commodore Family Together

The Reunion, from HyTech (PO Box 466, Bay Pines, FL 33504), connects your disk drive and/or printer to both the VIC-20 and the C-64, providing instant use of either system.

The unit allows you to save and load VIC and C-64 programs on the same disk, thereby eliminating the need for disk swapping. Anything attached to either computer, such as a modem or expansion board, is not affected by The Reunion.

The Reunion is available in two models: Model A interfaces the VIC and C-64 to the disk drive and/or printer; Model B interfaces the VIC and C-64 to the Datassette recorder. The price of each model is \$29.95.

Check Reader Service number 426.

Computer-Aided Design For the C-64

Kiwisoft Programs (18003-L Sky-park South, Irvine, CA 92714) has released Cadpic, a picture-design package combining two programs for painting and printing.

Paintpic is a painting program that allows you to paint with 16 different colors on a 160 x 200 dot screen. Block operations include save, copy, double, halve, 90° rotate and mirror. Drawing and painting are done with the keyboard or a joystick.

Printapic provides a true-proportion, five gray-scale, dot-graphic printout of Paintpic pictures on most printers. Character printers are also supported.

No special hardware is required, although an MPS-801 graphics printer and Micron Technology's Microneye camera are recommended.

Cadpic is available on disk for the Commodore 64. It retails for \$79.95. Paintpic and Printapic can be purchased separately for \$39.95 and \$44.95, respectively.

Check Reader Service number 400.

New Word Processor From HES

Human Engineered Software (150 North Hill Drive, Brisbane, CA 94005) has released OmniWriter & OmniSpell, a two-program package for the Commodore 64.

OmniWriter is a word processing program with features including: indentation and centering; headings and footings; mail merge for names, addresses and labels; underlining and boldfacing; scrolling capabilities and global search and replace.

OmniWriter is fully integrated with OmniSpell, a spelling checker with a 30,000-word dictionary. You can expand the dictionary to include the terminology used in your profession.

Through a conversion command, files from Microsoft's Multiplan (also published by Human Engineered Software) can be transferred to OmniWriter for inclusion in reports and documents.

The OmniWriter & OmniSpell package includes the program disk, a quick reference card, a keyboard overlay and a reference manual. It retails for \$69.95.

Check Reader Service number 406.

Whodunit?

Epyx, Inc. (1043 Kiel Court, Sunnyvale, CA 94089) has released Robots of Dawn, a futuristic murder mystery based upon Isaac Asimov's recent best-selling novel.

The game puts you in the role of Elijah Baley, Earth's most famous detective. You must question the inhabitants of far-flung cultures and piece together elusive clues to determine who's lying, who's telling the truth and who is trying to murder you.

Robots of Dawn is available on disk for the Commodore 64.

Check Reader Service number 419.

We Help Bring Your Family Together

6 Types of Charts and Sheets
Indices
User Fields
Notes, Footnotes and Sources
No Limits
Adapts to Your Hardware
Comprehensive
Easy to Use
And Much, Much More

Send for brochure and sample printouts.
Family Roots includes detailed manual and 2 full diskettes of programs for your Apple II, IBM PC, Commodore 64 and CP/M.*
Other genealogy software also available.
Price \$185 plus \$3.50 postage. Satisfaction Guaranteed.
American Express, Visa & Mastercard Accepted

* Trademarks for Apple Computer, Inc., International



Business Machines, CBM, Inc., & Digital Research

QUINSEPT, INC.

P.O. Box 216, Lexington, MA 02173
(617) 862-0404

Discovery Reading Works

Gladstone Electronics, Inc. (1585 Kenmore Ave., Buffalo, NY 14217) has released the Discovery Reading Works, a series of four C-64 software packages designed to help children increase their reading ability and thus improve their schoolwork.

The programs use an arcade game format with animated graphics, color and sound. Two of the programs, The Alphabet Factory and Match-Up, are designed for children aged three to eight. The other two, The Word Bird and Time Zone, are for ages six to twelve.

The four packages are available on disk for \$29.95 each.

Check Reader Service number 402.



Meet Your C-64

I Am the C-64 is a tutorial that gives the new computer user a step-by-step introduction to the capabilities and functions of the Commodore 64.

The tutorial is available in two parts. The Introductory Series overviews the C-64 by presenting demonstrations and introducing programming terminology. The Advanced Series teaches Basic programming, including the commands that produce graphics and sound.

Each series is available on disk for \$34.95. Creative Software, 230 East Caribbean Drive, Sunnyvale, CA 94086.

Check Reader Service number 408.

B & B MICROLABS
C64 more for your 64! C64

ECONO-ASSEMBLER
DECIMAL-HEX LISTINGS MAKE DEBUGGING EASIER
Cassette \$14.95 Diskette \$19.95

ROM BOMB
PROGRAM THE POPULAR 2700 SERIES EPROMS
Assembled and tested \$69.95

CAN OPENER
CIRCUIT BOARD ALLOWS YOU TO DOWNLOAD AND EXAMINE CARTRIDGE FIRMWARE
Assembled and tested \$39.95

CAD FLOWCHART
DRAW, EDIT, SAVE, PRINT HI RES FLOWCHARTS
Cassette \$24.95 Diskette \$29.95

PRINTER INTERFACE
SCHEMATICS AND FIRMWARE LISTING
Complete set of plans \$14.95

TERMS: We accept VISA, M/C, CHECK, MO, and COD.
Add \$2.50 for shipping and handling.
Add \$2.00 extra for COD.

B & B MICROLABS 2217 FANCY GAP
(512) 445-0164 AUSTIN, TX 78745

INTERNATIONAL SOFTWARE 2000 CORP.

GPI.- GENERAL PACKAGE I - This package contains 125 ready to run programs (in basic). It includes application programs for business, games, educational, financial, mathematics, statistics, home, etc. \$95.00

GPII.- GENERAL PACKAGE II - This is another great package containing 125 ready to run programs (in basic), different from those found in GPI. This package is a great complement of the General Package I. \$95.00

BPI.- BUSINESS PACKAGE I - This package contains 103 ready to run General Business Programs (in basic). It's a great package to help you make the business and financial decisions you need. This package is a compilation of the GPI and GPII programs. For the people interested in General Business Programs only. 78.50

HPI.- HOME PACKAGE I - This package contains 75 programs (in basic). Useful for home applications. It is packed with educational, games, facts, records, and many other programs. There is something to be used by every member of the house. \$58.00

Cassette Version: TRS-80 Model I, III, IV, 100, MC-10, Color Computer, Commodore 64, VIC-20
Disk Version: TRS-80 Model I (formatted disk for Ver. 2-7, 2-8), III (formatted disk), IV (formatted disk for Ver. 6-0), Apple II, II+, IIe.

ALL PRICES INCLUDES POSTAGE AND HANDLING

Send Check or Money Order To: For More Information
International Software 2000 Corp. Call: (305) 672-2238
10567 N.W. 8th Lane Please Specify Computer
Miami, FL 33172 Model, Disk/Cassette

TRS-80 is a trade mark of Tandy Corp. Apple is a trade mark of Apple Computers, Inc. Commodore is a trade mark of Commodore Electronics LTD.

This publication is available in microform.

University Microfilms International

300 North Zeeb Road
Dept. P.R.
Ann Arbor, Mi. 48106
U.S.A.

30-32 Mortimer Street
Dept. P.R.
London WIN 7RA
England



Color Graphics Package

Flying Colors is a new color graphics package designed for use with a standard joystick.

A screen menu lets you choose functions for drawing. Choices include thick and thin lines, automatic circles and boxes of any size, erasures and filling enclosed areas with color.

You can adjust your drawing speed for detailed work and paint with a variety of different colors and brush sizes. Text can be added anywhere on the screen. You can then save your pictures on disk.

Flying Colors also includes a Slide Projector program, allowing you to create your own slide shows.

Flying Colors is available on disk for the C-64. It retails for \$39.95. The Computer Colorworks, 3030 Bridge-way, Sausalito, CA 94965.

Check Reader Service number 411.

One with the Universe

Zenji is a mystical game of intuition with an Eastern theme. Your task is to connect a glowing maze of elements (the Many) to the pulsating source (the One) to create Zenji, a single, unified green image.

The strategic and intellectual demands of the maze grow increasingly difficult as you proceed, and you must avoid deadly Flames of Desire and the illusions that they emit.

Zenji is available for the Commodore 64. It retails for \$34.95 on disk and \$39.95 on cartridge. Activision, Inc., 2350 Bayshore Frontage Road, Mountain View, CA 94043.

Check Reader Service number 418.

Eliminate Interference

Bytes & Pieces, Inc. (550 N. 68th St., Wauwatosa, WI 53213) has released an interference filter kit for the Commodore 64.

Many of the older Commodore 64s have rf interference problems due to rf emissions from the computer unit. The interference filter kit is designed to eliminate these interference problems.

The kit requires opening the computer and making three solder connections. Detailed instructions for installation are included. Retail price of the kit is \$15.95.

Check Reader Service number 423.

Play the Horses

Horses OTB is a thoroughbred horse race handicapping program that can be used for offtrack betting (OTB).

The program asks questions about each horse in the race, which you must answer with information from your Daily Racing Form. The program then suggests horses to bet on.

No judgement or comparison of odds is necessary, and you do not need to know the track odds.

Horses OTB is available on disk for the C-64. It retails for \$34.95. 3G Company, Inc., Rt. 3, PO Box 28a, Gaston, OR 97119.

Check Reader Service number 412.

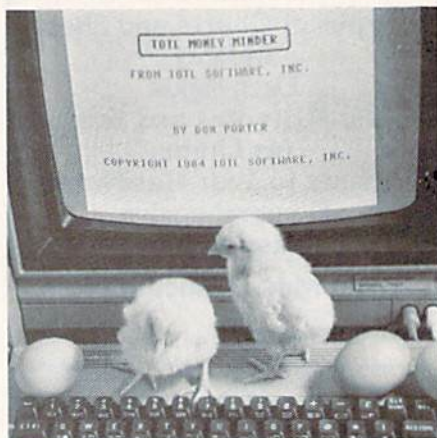
Futuristic Freedom Fighter

In Skramble, it is the year 2184. After years of constant bombardment, Earth has been conquered by Cobrons, who have now departed. They have left the government of Earth in the hands of a super-intelligent command module.

Your mission is to destroy the command module base, but the defenders of the base are formidable. A steady hand and accurate control are needed to guide your fighter plane on this suicidal mission.

Skramble is available on disk and cassette for the Commodore 64. It retails for \$19.95. Advantage Computer Accessories, 1020 Meyerside Drive, Unit 8, Mississauga, Ontario L5T 1K7, Canada.

Check Reader Service number 417.



Money Management Software

Totl Software, Inc. (1555 Third Ave., Walnut Creek, CA 94596) has added Totl.Moneyminder to its line of small business and home productivity software for the Commodore 64.

Totl.Moneyminder is a home accounting system that allows you to define up to 110 accounts for expenses, checking, income, charge accounts and more. The program has monthly budgeting capabilities, and it provides a monthly reminder of all bills due.

The system will record up to 8400 transactions per year. It can report net worth and print or display actual versus budgeted expenses, with reports on the status of each account.

A report is generated at the year's end, showing all income and expenses. The program is compatible with Totl's word processing, mailing list and database management software.

Totl.Moneyminder is available on disk for \$39.95.

Check Reader Service number 413.

C-64 Expander

Apropos Technology (1071-A Avenida Acaso, Camarillo, CA 93010) has released Aprospand-64, a 4-connector expander for the Commodore 64.

Aprospand-64 allows you to plug in up to four cartridges and access any one, or a combination of them, by switching. It has a system reset button and a fuse to protect the C-64.

The unit is enclosed in a plastic housing. A one-year warranty and an instruction booklet are included. Retail price is \$39.95.

Check Reader Service number 424.

Playful Professor

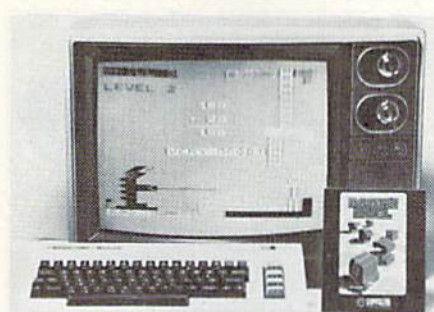
Screenplay (PO Box 3558, Chapel Hill, NC 27514) has released Playful Professor, a math tutorial program for ages five through twelve.

The program teaches addition, subtraction, multiplication and division in a game format. The game features a magic castle with a rollicking ghost who dances from room to room while holding a golden key. Each player is presented with a math problem. After a correct answer is given, the player has the opportunity to move closer to the key. The player who successfully escapes from the castle by unlocking the door is the winner.

When an incorrect answer is given, the professor provides an explanation of the problem on his chalkboard. The program includes several skill levels; as the child's abilities improve, the professor advances to more difficult exercises.

Playful Professor is available on disk or cassette for the Commodore 64. It retails for \$29.95.

Check Reader Service number 409.



Math Duel

PractiCorp (44 Oak St., The Silk Mill, Newton Upper Falls, MA 02164) has released Math Duel, a new educational program for the VIC-20.

Math Duel is designed for students in grades one through six. The program teaches the fundamentals of addition, subtraction, multiplication and division by pitting the student against a dragon in a den. The three difficulty levels accommodate students of various ages and skills.

Math Duel is available on cassette for \$19.95.

Check Reader Service number 405.

Build a Fortress

Strategic Simulations, Inc. (883 Stierlin Road, Bldg. A-200, Mountain View, CA 94043) has released Fortress, a game of strategy, power and conquest.

Your object is to occupy a location, fortify it and dominate the surrounding countryside. You can lay siege to your opponent's fortresses, or better still, outflank him.

There are options for one or two players. The solitary game provides five different computer opponents, all with names to match their particular style of play: Genghis Khan, Count Vauban, Lord Maginot, Sir Galahad and the Squire. Each time they face you, your computer opponents improve by studying your strengths and weaknesses.

Fortress is available on disk for the Commodore 64. It retails for \$34.95.

Check Reader Service number 415.

Circle 170 on Reader Service card.

COMMODORE
64™

SOFTWARE LINK

COMMODORE
64™

★★ FORMALLY COMPU-SOFT ★★

	LIST	NOW		
SCRIPT 64™ WITH SCRATCHPAD	99 ⁹⁵	79 ⁹⁵	SCRIPT-64	15 ⁰⁰
40/80 COLUMN MODE, BUILT IN DICTIONARY, DICTIONARY EXPANDABLE TO 20,000 WORDS. SCRATCHPAD IS A SORTABLE MAIL LIST DATABASE, INTERACTIVE WITH SCRIPT 64 OR STAND ALONE. 2 PROGRAMS FOR THE PRICE OF ONE.			DICTIONARY WITH 20,000 WORDS, EXPANDABLE TO 40,000 WORDS	
SUPERCOPY 64™	39 ⁹⁵	32 ⁹⁵	DOODLE	33 ⁹⁵
DISK BACKUP IN 7 MINUTES, ON SINGLE DRIVE PATTERN MATCH, HEADER, BACKUP, COPY, SCRATCH, CATALOG, RENAME, ALPHABETIZE OR REAR. RANGE FILES, 1 OR 2 DRIVES.			GRAPHICS PROGRAM DRAW, COLOR, CIRCLES, BOX, LETTERS. PRINT ON DOT-MATRIX PRINTER (EXCEPT 1526)	
TYMAC CONNECTION	119 ⁹⁵	Call	FLEXFILE 2.2	65 ⁰⁰
GRAPPLER CD INTERFACE WITH SCREEN DUMP	139 ⁰⁰	Call	DELPHI ORACLE	90 ⁰⁰
INSTASPEED - COMPILER FLOATING POINT & INTERGER BASIC	123 ⁰⁰	99 ⁹⁵	PAPERCLIP W/SPELLCHECKER	99 ⁰⁰
SYSRES - BASIC EDITOR COMPLETE RENUMBERING DEFINE KEYS, FUNCTIONS, SCREEN DUMP, FINDS, CHANGES, RELOCATABLE, WORKS EVEN AFTER RESET.	95 ⁰⁰	80 ⁰⁰	SPELLCHECKER ONLY	39 ⁰⁰
			BUSCARD II	160 ⁰⁰
			SUPERBASE PROGRAMMABLE DATA BASE	80 ⁰⁰
			C-64 LINK IEEE, 4.0 BASIC, MONITOR	125 ⁰⁰
			COMPATABILITY BOARD FOR C-LINK	Call

To order: CALL or WRITE, **914-683-2512**
SOFTWARE LINK
P.O. Box 391 White Plains, N.Y. 10602



NO EXTRA CHARGE



WE SUPPORT MANUFACTURER WARRANTIES

TERMS: Send check or money order for total purchase price, plus \$2.75 for shipping via UPS, \$4.00 for shipping non UPS. Personal checks (Allow 10 days to clear)
NY RESIDENTS ADD APPLICABLE TAXES

SOFTWARE LINK
283 Mamaroneck Ave.
White Plains, NY
914-683-2512
(retail outlet)

Successful Delivery!
Chromazone's New Arrival!

BRIN& JIN&

Maneuver through the mazes to
make a million . . . if you dare!

Graphics for C-64, disk only, joystick required.

Send \$29.95 in check or money order to:

Chromazone Software
P.O. Box 7325
San Jose, CA 95150-7325
CA residents add \$1.95 tax

Circle 240 on Reader Service card.

FOR THE VIC-20*



- Four 8-Bit Input Ports
- Interrupt Capability
- Four 8-Bit Output Ports
- Watch Dog Timer

1010 CONTROL INTERFACE BOARD

The 1010 Control Interface is a small board which plugs into the VIC-20's expansion port and provides 32 input bits and 32 output bits. It allows the VIC to interface with the real world for measurement and control applications.

The 1010 Interface allows very cost effective systems to be configured for data acquisition, energy measurement & control, automated test, and laboratory automation. The VIC, with the 1010 Interface, can now be used to automate many tasks that were previously cost prohibited.

Order yours today!

*VIC-20 is a registered trademark of Commodore Business Machines Inc.

1010 Control Interface	\$169.00
1901 Double Ended 36" Cable	\$7.50
1902 Single Ended 36" Cable	\$5.00

Terms: Check, MO, VISA, or MC. In US and Canada add \$4 per order for shipping. Others add \$8 per order. US funds only. TX add 5% tax. Shipped from stock to two weeks.


INNOVATIVE TECHNOLOGY
 510 Oxford Park
 Garland, TX 75043 (214) 270-8393

Circle 126 on Reader Service card.

MAIL-BASE
the missing Link

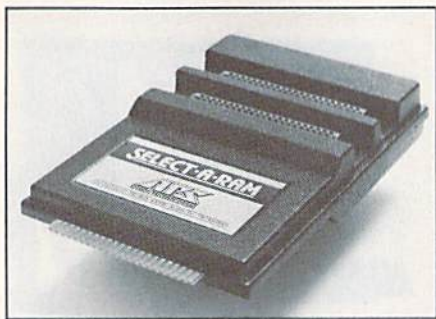


From **MICRO-SOURCE** for the **COMMODORE 64**, a file manager handling 500 records per disk. Its advantages over other files is the linking feature. Linking makes searching and maintaining records possible at the speed of **RAM HARD DISK SPEED!** Not quite, but very impressive for the system cost involved. Mail-Base prints in several formats and allows unlimited expansion and retrieval of data.

© Tutorial disk, system disk and documentation.
INTRODUCTORY OFFER \$79.95
Send check or money order to

MICRO-SOURCE

P.O. BOX 993/KANSAS CITY, MO 64141 / 816/322-0276
COMMODORE 64 is a registered trademark of Commodore Business Machines, Inc.



VIC Memory Expander

Advanced Processor Systems (PO Box 43006, Austin, TX 78745) has released Select-a-RAM, a memory expansion cartridge for the VIC-20.

Select-a-RAM adds 64K of random access memory (RAM) to the VIC-20. More memory can be added as the need arises. The cartridge has two expansion slots that will accept any amount of memory from 3K to 128K.

Select-a-RAM's features also include a system reset switch, memory write protection, provisions for optional external power and advanced programmable control. It is compatible with all VIC-20 hardware and software. Retail price is \$169.

Check Reader Service number 427.

Save the Kingdom

Interphase Technologies, Inc. (6391-F Westminster Hwy., Richmond, BC V7C 4V4 Canada) has released Viking Raider, an adventure game with animated graphics and interactive text.

In the beginning, the Kingdom of Navay was usurped by Smoth, an evil ogre. Leif, a true patriotic Viking, must attempt to slay Smoth and save the kingdom.

Leif must first acquire sufficient wealth in order to fight. As he travels through the countryside in search of lost treasure, he encounters obstacles such as the militia, trolls and a fire-breathing dragon. Once he has amassed enough wealth, Leif must find the Golden Key to enter the castle for a confrontation with Smoth.

Viking Raider is available in a cartridge/disk combination for the Commodore 64. It retails for \$44.95.

Check Reader Service number 421.

Home Management System

Ultraplan is a home management system for the Commodore 64, combining the features of a spreadsheet with a graphics and plotting utility.

Ultraplan's features include independent column widths, help screens and the ability to link spreadsheets. The program's plotting features allow you to produce bar and line graphs and pie charts.

Ultraplan is available on disk for \$59.95. Datasoft, Inc., 19808 Nordhoff Place, Chatsworth, CA 91311.

Check Reader Service number 407.

Terminal Program with Built-in Editor

Oak Ridge Microcomputers (1948 Oak Ridge Turnpike, Oak Ridge, TN 37830) has released Omni Comm-II, a terminal program for the C-64.

Omni Comm-II allows you to send, receive and edit information from remote computer systems. You can store or retrieve information on tape or disk, and you can also edit information with the program's built-in editor. Omni Comm-II's text files are compatible with word processors that use sequential files.

The program provides an on-line disk directory, limited help facilities and the ability to print files using the VIC-1525 printer.

Omni Comm-II is available on disk for \$49.95.

Check Reader Service number 410.

The Math Teacher

The Math Teacher is a math tutorial program that drills students on the fundamentals of addition, subtraction, multiplication and division. It is designed for students in grades one through eight.

The student selects one of the four math operations, the number of math problems desired and one of four skill levels. The student's score is displayed at the end of each session.


The Math Teacher is available on cassette for the Commodore 64. It costs \$29.95. Computer Technology Company, PO Box 7000-309, Redondo Beach, CA 90277.

Check Reader Service number 401.

Circle 291 on Reader Service card.

NEW: VIC 20 & C 64 INTERFACE CIRCUIT BOARD

- 12 Isolated Inputs
- 4 Output Relays
- 2 Output Photo-Darlington
- Expansion Port - 4 Outputs
- 2K / 4K Eprom Socket
- Interrupt Capability



VIC/011 INTERFACE BOARD

It's time to unleash the power of your VIC-20 and C-64. Give your computer the "muscle" it needs to interface to the real world. The output relays can handle high power loads up to 1A @ 120V ac. Connect the inputs to just about any kind of electrical signal; the computer is protected by the input optoisolators.

With the optional EPROM based software, easily configure a control system for your application.

VIC/011 Interface Board \$134.95
 VIC/012 Relay (4) Expansion \$ 64.95
 VIC/013 EPROM Control Software . \$ 29.95
 Kits are available starting at \$ 39.95

Deluxe, tailored dust covers are available for all the COMMODORE computers & peripherals.

Dust Cover prices start at \$ 5.95

TERMS: Check or Money Order, plus \$4 shipping. PA. residents add 6% sales tax.

FJC PRODUCTS P.O. Box 98021
 Pittsburgh, Pa. 15227
 (DEALER INQUIRIES INVITED) Call: (412) 884-8298

Circle 268 on Reader Service card.

VIC 20/C64

"THE REUNION"

(Brings the Commodore family together again)

"THE REUNION" simultaneously interfaces your *VIC 20 and *C/64 (including *Datasette, modem, etc) to your Commodore disk drive and/or printer providing 2 computer systems. Use either instantly.

*Simply select "VIC 20" or "C-64" on "THE REUNION", and your disk drive and/or printer is instantly connected to the Selected Computer.

SAVE and LOAD VIC 20 and C/64 programs on same disk. Ends switching disks, cables, and wear. Plug-in installation, 1 year warranty.

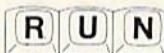


Send \$29.95 (U.S. \$, Check or M.O. plus \$2.00 shipping. Canadian: \$4.00). FL. res. add 5% tax to:
 HyTech
 P.O. Box 466
 Bay Pines, FL 33504
 *Reg. T.M. of Commodore Bus. Mach. ©HyTech

Subscription Problem?

RUN does not keep subscription records on the premises, therefore calling us only adds time and doesn't solve the problem.

Please send a description of the problem and your most recent address label to:



Subscription Dept.
 PO Box 954
 Farmingdale, NY 11737

Thank you and enjoy your subscription.

Program Development Tool

Computer Alliance (10730 White Oak Ave., Granada Hills, CA 91344) has released the Basic Compiler and Assembler (BASM), a program development tool for the Commodore 64.

BASM is designed to give you the advantages of both Basic and assembly language. It assembles standard 6502 assembly language and compiles Basic in the same program. Basic and assembly language can be mixed on the same line, and BASM will automatically distinguish one from the other.

BASM uses a dialect of Basic adapted to the assembly language environment. Basic statements are translated directly into assembly language.

BASM is available on disk with a retail price of \$99.95.

Check Reader Service number 429.



Infiltrate the Fuehrer's Lair!

Muse Software (347 N. Charles St., Baltimore, MD 21201) has released a sequel to Castle Wolfenstein, a World War II action game where the player is a GI who must escape from Nazi interrogators.

In Beyond Castle Wolfenstein, your new mission takes you behind enemy lines. You must infiltrate Hitler's bunker in Berlin for an attempt on the Fuehrer's life.

Beyond Castle Wolfenstein is a stand-alone game that can be played without knowledge of the original Wolfenstein release. It is available on disk for the Commodore 64, with a retail price of \$34.95.

Check Reader Service number 420.

Circle 128 on Reader Service card.

LIMITED Time Offer!

Software Special
80% Discount
 Unbelievable! Valid with this coupon only

Check Boxes That Apply:	Regular Price	Sale Price
<input type="checkbox"/> 10 Practical Programming Utilities	29.95	\$ 9.95
<input type="checkbox"/> 10 Good Home Management Programs	29.95	\$ 9.95
<input type="checkbox"/> 10 Super Game Programs	29.95	\$ 9.95
<input type="checkbox"/> Super Special-All 30 Above	89.95	\$19.95

Please specify computer type: C-64 Vic-20
 Please indicate tape or disk: Tape Disk

We have 100's of other programs at discount prices. Send us the type or kind of software you are looking for with a self-addressed stamped envelope and we will send you a listing of the programs available.

Order from: SATELLITE TECHNOLOGY
 4955 Monterey
 Arcata, CA 95521

Shipping Charges: Add \$1.50 shipping and handling (\$3.50 for C.O.D.). If California resident, add 6% Sales Tax.

NAME _____
 STREET ADDRESS _____
 CITY/STATE _____ ZIP _____
 If C.O.D., Check Here

Circle 288 on Reader Service card.

FREE BIORHYTHM PROGRAM FOR C-64

HOME FINANCE

- Checkbook Planning
- Budget Planning
- Loan Analysis
- Investment Planning
- Mortgage Analysis
- IRA Management
- Retirement Planning
- Savings Management

\$15.95 Diskette - \$14.50 Cassette

GAMES I
 Adventure • Simulations • Arcade Style
 \$12.95 Diskette - \$12.50 Cassette

SPECIAL OFFER
 Both Packages ONLY
 \$24.95 Diskette - \$24.50 Cassette
 And receive a FREE Biorhythm program.

SMS
 P.O. Box E, Nampa, ID 83653

Software Marketing Service

Circle 243 on Reader Service card.

VIC-20 COMMODORE 64 THE RECIPE BOX

Now you can easily store and recall your favorite recipes on your Commodore computer. THE RECIPE BOX is a complete menu-driven disk system that comes with these additional features:

SEARCH BY INGREDIENT — Only have a pound of hamburger in the freezer? Let THE RECIPE BOX show you all the recipes that you have on file that use hamburger or any other ingredient you choose.

SEARCH BY CATEGORY — Code your recipes as to breakfast, lunch, dinner, snacks, etc.

SEARCH BY CATEGORY INGREDIENT — Any combination of the above.

AUTOMATIC MEASUREMENT — THE RECIPE BOX will automatically scale up or down the amount of ingredients you need according to how many servings you want.

SCREEN OR PRINTED OUTPUT — Have printed copies to use in the kitchen or give to friends.

THE RECIPE BOX requires one disk drive and will run on a 5K VIC-20, Commodore 64. Please specify. Send check or money order for \$19.95 to:

Aries Marketing Co.
 P.O. Box 4196
 4200 Shannon Drive
 Baltimore, Md. 21205
 Md. residents add 5% sales tax

List of Advertisers

Reader Service	Page	Reader Service	Page	Reader Service	Page
412	3G Company, Inc.	142	291	F.J.C. Products	145
94	3R Imports & Exports	25	84	Federal Hill Software	128
8	Abacus Software	77	*	French Silk	131
39	Abby's Software	71	74	Frogg House/Prof. Jones	127
18	Academy Software	75	402	Gladstone Electronics	141
418	Activision, Inc.	142	9	H & E Computronics	9
427	Advanced Processor Systems	144	406	Human Engineered Software	140
417	Advantage Computer Accessories	142	268	HyTech	145
*	ANDIC	137	426	HyTech	140
*	Apropos Technology	33	416	Infinity Software	138
424	Apropos Technology	142	102	Info Designs, Inc.	31
243	Aries Marketing Company	145	240	Innovative Technology	144
237	B & B Microlabs	141	286	International Software 2000 Corp.	141
103	Basic Byte, Inc.	61	421	Interphase Technologies, Inc.	144
101	Batteries Included	17, 18	299	J.B. Horton Company	137
112	Bible Research Systems	107	179	Jameco Electronics	39
82	Bill Cole Enterprises	105	*	jr Subscriptions	95
198	Blaine-Ann Engraving, Inc.	117	200	K.T. Software	110
175	Bytes & Pieces	117	36	Kiwisoft Ltd.	121
423	Bytes & Pieces	142	400	Kiwisoft Ltd.	140
85	Cardco, Inc.	CIII	*	LBA Computer Products	101
425	Cardco, Inc.	138	197	Letco	120
192	Cardinal Software	41	122	Lynn Computer Service	43
225	Cheatsheet Products	127	173	M & M Software	60
71	Chromazone Software	144	283	Maxiplot Inc	137
109	City Software	62	247	MESI	137
285	Clearview Software	93	248	MFJ Enterprises	69
*	Comal Users Group	120	73	Micca Soft	41
16	Commander Electronic Systems	55	87	Micro-80, Inc.	140
*	Commodore Business Machines	CIV	29	Micro Management Systems	111
429	Computer Alliance	145	194	Micro Peripheral Corporation	131
411	Computer Colorworks, The	142	231	Micro Signal	129
278	Computer People	122	177	Micro World Electronix	127
401	Computer Technology Co.	144	126	Micro-Source	144
182	Connecticut Microcomputer	121	47	MicroSpec	125
408	Creative Software	141	212	Micro-Sys	115
407	Datasoft, Inc.	144	181	Micro-W.D.I.	76
*	Digital Audio	85	172	Micro-W.D.I.	137
187	Door to Door Software	75	91	Microlog Corporation	68
147	Double-E Electronics	94	27	Microtechnic Solutions Inc.	121
14	Eastcoast Software	83	430	Microtechnic Solutions Inc.	138
50	Eastern House Software	93	20	Mirage Concepts, Inc.	11
50	Eastern House Software	75	253	MSD, Inc.	46, 47
11	Elcomp Publishing	63	420	Muse Software	145
419	Epyx, Inc.	140	150	Nanosec Corporation	CII, 3
86	Estes Electronics	140	280	New Leaf	109
			403	New Leaf	138
			79	Northwest Software	CIII
410	Oak Ridge Microcomputers	144			
60	Omnitronix	113			
195	Orange Micro	27			
428	Orange Micro	138			
26	Orbyte Software	7			
235	Pacific Exchanges	137			
208	Parsec Research	113			
199	Personal Peripheral Products	103			
405	PractiCorp	143			
15	Protecto Enterprises	86, 87, 88, 89, 91			
23	Public Domain Inc.	74			
204	Quality Computer	103			
136	Quality Input	113			
220	Quincept Inc.	141			
*	RUN				
	Dealers Sell	103			
	Foreign Dealers	116, 137			
	Mailing List	111			
	Moving	110, 122			
	ReRUN	67			
	RUN Subscriptions	35			
	Subscription Problem	145			
	Toll Free Number	110			
	University Micros	116			
128	Satellite Technology	145			
67	Schnedler Systems	117			
409	Screenplay	143			
69	Skylight Software	93			
233	Software Connection	141			
48	Software Design, Inc.	51			
187	Software Kingdom	75			
175	Software Link	143			
288	Software Marketing	145			
281	Software Masters	41			
63	Starpoint Software	32			
415	Strategic Simulations	143			
40	SubLogic Corp.	13			
70	Totl Software	101			
413	Totl Software	142			
*	T.P.U.G.	101			
*	Ultrabyte Inc.	110			
272	Ultra Soft, Inc.	116			
35	Universal Software	139			
154	Victory Software Corp.	26			
310	Wayne Green Books	131			
310	Rainbow Quest	123, 131			
96	Xetec Inc.	42, 106			
158	York 10 Ltd.	128, 129			

For further information from our advertisers, circle the corresponding Reader Service number on the Reader Service card.

*This advertiser prefers to be contacted directly.

Advertising Sales: (603) 924-7138 or (800) 441-4403

Harold Stephens, Louise O'Sullivan

West Coast Sales office: (415) 328-3470

Giorgio Saluti, Allison Walsh, Karen Letendre

CYBERPHOBIA:

We have the cure.



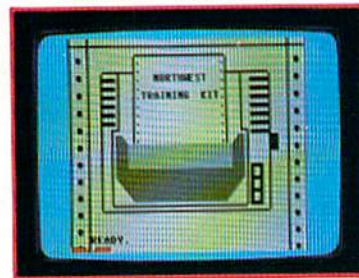
THE KEYBOARD



FILE HANDLING



MEMORY CONCEPTS



THE PRINTER

Millions of new computer owners suffer from *cyberphobia*, the fear of computers. We at Northwest Software believe that the cure for such fear is knowledge. With this in mind, we designed a Training Kit that will make you comfortable with your computer — not frustrated by it.

The Training Kit gives you “hands on” experience through the use of interactive simulations (like those shown on the left of this page) which demonstrate how your computer works.

Just like a flight simulator teaches you how to fly a plane without the risk of crashing it, the Training Kit gives you a chance to operate a computer in an “error-proof” environment.

Included with the program is an illustrated 44 page workbook which includes helpful charts, graphs and references.



NORTHWEST SOFTWARE

Northwest Software • 621 Minna Street • San Francisco, CA • 94103

Circle 79 on Reader Service card.

www.Commodore.ca
May Not Reproduce Without Permission

The Training Kit is available for the Commodore 64 and Apple IIe/IIc computers at computer retailers across North America. Call Northwest Software at 800/521-5321 for the name of the dealer nearest to you. (In California call 800/255-9039.)

HOW TO BECOME COMPUTER LITERATE.

FEATURES	COMMODORE 64™	APPLE IIe™	IBM PC jr™	ATARI 800XL™
Price*	\$219	\$699	\$669	\$299
Built-in Memory	64K	64K	64K	64K
Typewriter Keyboard	YES (66 Keys)	YES (62 Keys)	"CHICKLET" (62 Keys)	YES (61 Keys)
Upper/Lower Case	YES	YES	YES	YES
Programmable Function Keys	YES	NO	YES	NO
AUDIO				
Polyphonic Tones	YES	NO	YES	YES
Music Synthesizer	YES	NO	NO	NO
Hi-Fi Output	YES	NO	YES	YES
VIDEO				
TV Output	YES	EXTRA COST	EXTRA COST	YES
Video Monitor Output	YES	YES	EXTRA COST	YES
INPUT/OUTPUT				
Intelligent I/O Bus	YES	NO	NO	YES
RS-232 Communications	YES**	EXTRA COST	YES**	EXTRA COST
"Smart" Peripherals	YES	NO	NO	YES

*Prices shown are common retail and may vary slightly in different markets.
**Requires an adapter to operate.

First you need the right input.
Like \$219. That's what the
Commodore 64™ costs. It's about one third
the price of the Apple IIe™ or the IBM® PCjr.™
And 64K. That's how much memory
the Commodore 64 has. It's also how much
memory Apple IIe and the IBM PCjr have.
This computer lesson is brought to you
as a public service by Commodore (certainly
not by Apple or IBM), the only computer
company that can afford to show you a chart
like the one above.
But what you can't see above are the



thousands of software programs that make
the Commodore 64 fully capable of doing
anything any "triple the price" computer can
do; for fun or profit, for every member of the
family; anything from soccer to spread
sheets to space exploration.

Because the Commodore is so
affordable, you can load up on Commodore
peripherals. Like a disk drive, a printer or a
telephone modem. All together they cost just
a tad more than an IBM PCjr by itself. With
no peripherals.

No wonder Commodore sells more
computers than Apple and IBM combined.

commodore
COMPUTERS
IT'S NOT HOW LITTLE IT COSTS,
IT'S HOW MUCH YOU GET.