0 74470 12426 05

$2.95
U.S. FUNDS

MAY 1983 VOL. 1 ISSUE 6

COMMANDER

The Monthly Journal for Commodore Computer Users

INSIDE:

Game Reviews

Telecommander

Peek and Poke

Living with Quick Brown Fox

©TARKAS 83

Tired of chasing your tail?

If you're looking for Commodore 64® or VIC-20® software, look no further than Synapse!

THE PHARAOH'S CURSE
A fortune—yours for the taking. But can you avoid the ghost of Rama and the evil mummy? Are you nimble enough to leap the chasms and avoid the booby traps standing between you and freedom?

SURVIVOR
The first multi-player cooperative space adventure. Alone or with your hand-picked crew (1 to 4 players) you must out-maneuver the Xenogryph fleet and destroy their space fortresses. Can you train yourself and/or your crew to survive?

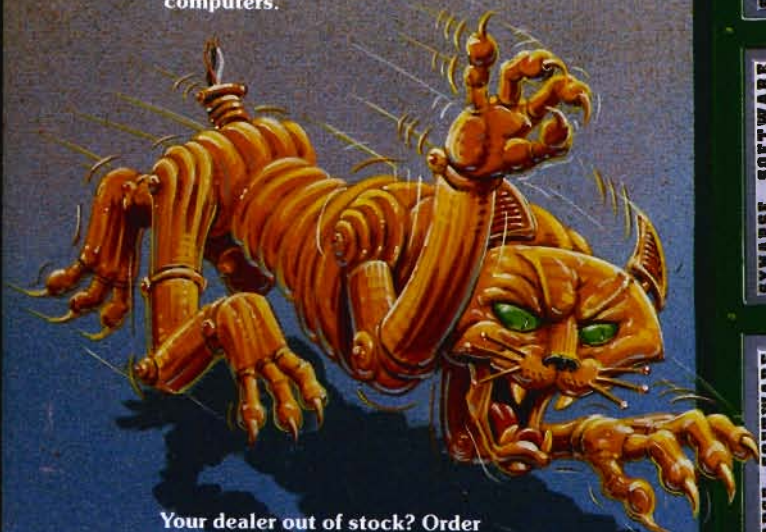
SHAMUS
The odor tells you the Shadow's there—in one of four levels of 32 rooms, each bristling with danger. You know it won't be a high school prom, but there's no turning back. Shamus—the sleuth adventure classic.

FT. APOCALYPSE
Your mission—fly your helicopter to capture fuel and weapons from the Kraalthan lords of inner Earth, free the enslaved masses and destroy the fortress itself. Will you triumph or be crushed by its fiendish defenses? Encounter Fort Apocalypse!

PROTECTOR II
You are the last hope! The Fraxullan Slimehordes are attacking your cities and carrying off their citizens. Can you get your people to safety as volcanoes erupt and enemy forces conspire to thwart your every effort?

For Commodore 64® in disk or cassette: $34.95. Also available—Slam Ball and Drelbs for the Commodore 64®, and Astro Patrol, Squeeze and Harrier for the VIC-20®. Cartridge versions available soon.

Other titles available for the Atari 400/800® computers.



Your dealer out of stock? Order direct—send your check or money order including $2 for shipping and handling. Or join the Synapse Elite! Write for free membership!

synapse

5221 Central Avenue, Richmond, CA 94804 · (415) 527-7751

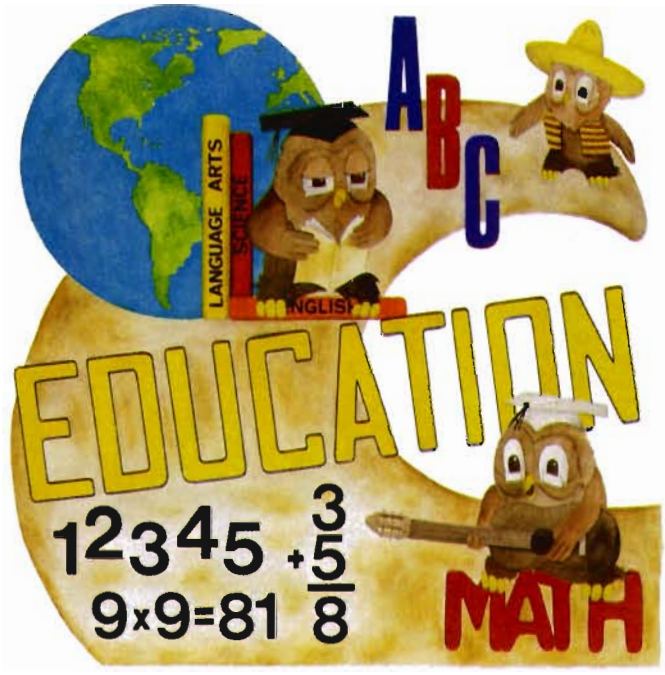
COMM*DATA SOFTWARE

GUIDES YOU AND YOUR VIC 20® DOWN ROADS OF ADVENTURE WITH:

- Maelstrom*
- Escape MCP*
- Gator Chase*
- Astro Command
- Caves of Annod
- Capture the Beast
- Whirlwind Rescue*
- Street Maze
- The Market
- Chivalry

THROUGH TRAILS OF CREATIVITY WITH:

- Sketch and Paint



ALONG THE PATH TO KNOWLEDGE WITH:

- Wordspot
- Math Tutor Series
- Alphabet Tutor
- Conversion
- Gotcha Math
- English Invaders
- Math Invaders Series

ASK FOR COMM*DATA COMPUTER HOUSE SOFTWARE AT YOUR LOCAL DEALER.

Or Send for FREE Catalog:

COMM*DATA COMPUTER HOUSE
320 Summit Avenue
Milford, Michigan 48042
(313) 685-0113

Dealer Inquiries Welcome.

Quality software also available
for Pet and Commodore 64 computers

MasterCard

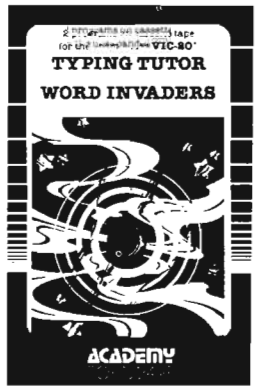
VIC 20 is a Registered Trademark of Commodore Business Machines, Inc.
*High Res Full Machine Code Arcade Style Games.

VISA

Circle No. 7

FOR THE VIC 20™

JOIN THE COMPUTER REVOLUTION WITH A MASTERY OF THE KEYBOARD!



In the age of the computer, *everyone* from the school child to the Chairman of the Board should be at home at the computer keyboard. Soon there will be a computer terminal on every desk and in every home. Learn how to use it right ...and have some fun at the same time!

Rated THE BEST educational program for the VIC 20™ by Creative Computing Magazine

TYPING TUTOR PLUS WORD INVADERS — $21.95
(2 programs on one cassette tape for the unexpanded VIC 20™)

Typing Tutor plus Word Invaders makes learning the keyboard easy and fun! Typing Tutor teaches the keyboard in easy steps. Word Invaders makes typing practice an entertaining game. Highly praised by customers:

"Typing Tutor is great!", "Fantastic", "Excellent", High quality", "A source of great joy and learning for our children", "Even my little sister likes it", "Word Invaders is sensational!"

Customer comment says it all . . .

". . . and it was everything you advertised it would be. In three weeks, my 13 year old son, who had never typed before, was typing 35 w.p.m. I had improved my typing speed 15 w.p.m. and my husband was able to keep up with his college typing class by practicing at home."

FOR THE COMMODORE 64™

SPECIAL VERSION OF TYPING TUTOR PLUS WORD INVADERS NOW AVAILABLE FOR THE COMMODORE 64™...$21.95 *(Tape)*

All of the features of the VIC 20™ Version and more

SPECIAL!

SPRITE DESIGNER

by Dr. Lee T. Hill

$16.95 *(Tape)* $21.95 *(Disk)*

Create and then transform sprites automatically. We have the other sprite making programs, but this is the one *we use* to make sprites. The automatic transformations are great!

VISA MasterCard

Shipping and handling $1.00 per order. California residents add 6% sales tax. VISA and Mastercard orders must include full name as shown on card, card number, and expiration date. Free catalog sent with order and on request.

ACADEMY SOFTWARE

P.O. Box 9403, San Rafael, CA 94912 (415) 499-0850

Programmers: Write to our New Program Manager concerning any exceptional VIC 20™ or Commodore 64™ game or other program you have developed.

Circle No. 2

Call for Clubs and Newsletters Directory

To be included in the first edition of the Commander Clubs and Newsletters Directory, your club or publication must supply the following information:

1. *name of organization or publication*
2. *mailing address*
3. *contact person and telephone number*
4. *name of newsletter or publication*
5. *special interests*

Send your information to Clubs and Newsletters Directory, Commander, P.O. Box 98827, Tacoma, Washington 98498.

Commander—The Monthly Journal for Commodore Computer Users is published monthly by Micro Systems Specialties, P.O. Box 98827, Tacoma, WA 98498. Domestic Subscriptions, 12 issues, $22.00. Second Class Postage pending at Tacoma, WA 98143 and additional mailing offices. Postmaster: Send address changes to: **Commander—The Monthly Journal for Commodore Computer Users; P.O. Box 98827, Tacoma, WA 98498.** Entire contents copyright © 1982 by Micro Systems Specialties. All Rights Reserved.

GROW WITH US.

VIC 20™ and Commodore 64™ expansion products from Micro Systems Development.

A The Interbus Series. Three interfaces for the VIC 20 and Commodore 64: one for IEEE 488, one for RS 232 and one for Parallel.

The VIE and CIE are IEEE 488 interfaces for the VIC 20. When plugged into the expansion port, the cartridge is "transparent," that is, the user can still attach other peripherals without any interference. Devices such as 4040, 8050, 2031, 2032, 4022 and 8023 can be controlled. The IEEE software can be called by using the 'SYS' command, even in the middle of a BASIC program.

The V232 and C232 are serial interface cartridges which allow connection of various input/output devices such as printers, modems, plotters, etc. to VIC 20 or Commodore 64 computers. Features include: positive and negative voltage swings to meet full EIA standards, straps and jumpers to allow reconfiguration to meet pinouts for any RS232 device, and software selectable reconfiguration such as baud rate, parity, and duplex mode.

The VPI and CPI are parallel interfaces for the VIC 20 and Commodore 64. These interfaces provide direct BASIC use of the parallel printer bus and give "invisible" access to the bus. The VPI can be used only on the VIC 20 and uses the expansion port. The CPI will work with both the VIC 20 and Commodore 64 and does not use the expansion port. The CPI also has switches for setting insertion or deletion of line feed, conversion of Commodore ASCII into standard ASCII or visa versa, addresses printer to device 4, 5, 6 or 7, and allows normally unprintable Commodore characters to be printed in a recognizable form.

B Expandoport Series. Expandoport 3 and Expandoport 6 are three- and six-slot expansion boards for the VIC 20. Each slot on the Expandoport 6 has a switch for controlling power to that connector. The switch allows the use of cartridges which respond to the same memory space. The Expandoport 6 also has a fuse and reset switch. The fuse prevents excessive current drain from the VIC 20 and protects it from 'shorts'. The reset switch allows the user to 'Restart' the VIC 20 without turning power off. This feature allows RAM, which is located in the ROM expansion area, to be protected during 'Restart'.

Expandoport 4 is a four port expansion board for the Commodore 64. It has the same features as the Expandoport 6 and even allows for the use of varying width cartridges.

C Terminal Pak Series. The VTE 40 Terminal Emulator (VTE 40) is a hardware and software package which converts the VIC 20 into a 40-column communications terminal. The VTE 40 cartridge is complete. Various set-up parameters such as baud rate, parity, duplex, and bits per character can be selected through a 'menu' format. VTE 40 features are: 40 x 25 text display, user definable communication specs, smooth or normal scroll, print information to printer or disk, generation of control codes, selective omission of data, continuous status line.

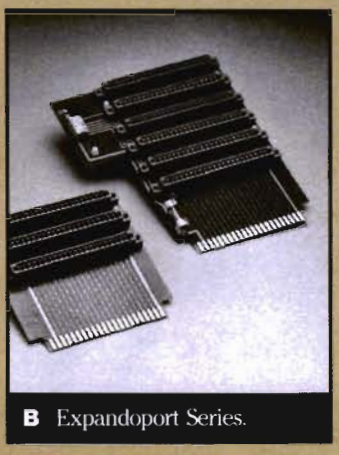
The CTE/VTE Terminal Emulator (CTE/VTE) is a software program which converts the VIC 20 or Commodore 64 into a terminal. The user can 'software select' the baud rate compatible with the modem used. Full upper and lower case characters are supported.

D Audio Link. An audio cassette adapter interface for the VIC 20. Features include: use of regular cassette recorders, conversion of VIC 20 digital data to audio and visa versa, normal and inverted cassette signal, remote on/off control and control of external devices.

E VRAM. These memory expansion modules are designed to provide additional user programming space for the VIC 20 system. VRAM plugs into the memory expansion port and requires no additional power or modification to the VIC 20 system. The units are packaged as 3K, 8K, 16K and 24K modules. Strapping is provided for mapping 8K blocks of memory into the various available memory blocks.

VIC 20™ and Commodore 64™, CBM™ and PET™ are registered trademarks of Commodore Business Machines.
Expandoport, Audio Link, Interbus, Terminal Pak, VRAM and Monitor-Link are copywrited by Micro Systems Development, Inc.

A Interbus Series.



B Expandoport Series.

C Terminal Pak Series.

D Audio Link.

E VRAM.

Call toll free for nearest dealer

1-800-527-5285

Lifetime warranty available upon return of Product warranty card

MSD

MICRO SYSTEMS DEVELOPMENT, INC.

11105 SHADY TRAIL • SUITE 104 • DALLAS, TEXAS 75229

Table of Contents

STAFF

Publisher
THOMAS L. ROSENBAUM

Editor
ALICIA A. LINDEN

Dealer/Distributor/Manager
DEBBIE GABBARD

Sales Manager
TERILYN M. FLOYD

Advertising/Article Manager
LINDA L. LINDEN

Typesetting
GRANGE PRINTING

Consultant
EDWIN SUND
GEORGE R. GAUKEL
JOHN GABBARD

Production Artists
MIKE BRIGHENTI
BRIAN D. THOMPSON
JON WONG

Printed By
GRANGE PRINTING

COMMANDER is published monthly by:
MICRO SYSTEMS SPECIALTIES, PO Box 98827,
Tacoma, Washington 98498

Subscription Rates (U.S. Funds)	*Per Year*
U.S.	$22.00
Canadian, Mexican	$26.00
Surface Rates	$37.00
Air Mail	$54.00

For back issues, subscriptions, change of address or other information, write to:
COMMANDER
PO Box 98827
Tacoma, Washington 98498
(206) 584-6757
BACK ISSUES—
2 months old-$4.50

Copyright© 1983 by MICRO SYSTEMS SPECIALTIES
All Rights Reserved

COVER BY:
Randy "Tarkas" Hoar

6 TELECOMMANDER
by Donald L. Stoner

10 LOGIC GATES: A Light Technical View:
by Howard Rotenberg

14 UNIVERSAL ROLL PAPER HOLDER
by Louis F. Sander

15 LIVING WITH QUICK BROWN FOX
by Colin Thompson

37 PACKING ARRAYS INTO RELATIVE FILES
by Paul Donato

20 AN INTRODUCTION TO ASSEMBLY Language Programming on the VIC-20: Part V: Branches and Comparisons
by Eric Giguere

59 PEEK and POKE—A Users Instruction Sheet
by George Gaukel

40 ARRAY ASSIGNMENT SORT
by David Steffes &
Art Dudley

43 BUILD YOUR OWN COMPUTER TABLE
by Spike Bickel

44 FORMATTING AND ERROR CHECKING
By Tony Lamartina

54 QUANDRA ROM: A Product Review
By Howard Rotenberg

56 PEDISK II FLOPPY DISK SYSTEM:
A Product Review
by Louis F. Sander

58 IN MY OPINION
by Fred Dart

DEPARTMENTS

75 New Products
61 News Releases
52 Product Reviews
50 Game Reviews
71 Bits & Pieces
46 Game Contest
89 Users Clubs
82 Dealers
88 Distributors
90 Advertisers Index

AARDVARK — THE ADVENTURE PLACE

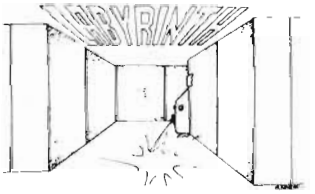
TRS-80 COLOR COMMODORE 24 VIC-20 SINCLAIR/TIMEX TI99

WE CARRY MORE THAN ADVENTURES!!

MAXI-PROS WORD PROCESSING NEW

The easiest to use word processor that I know of. Has all the features of a major word processor (right and left margin justification, page numbering, global and line editing, single, double, triple spacing, text centering, etc.) at a very cheap price because we wrote it in BASIC. Includes 40 page manual and learning guide. Easily modified to handle almost any printer combination. Available on disk or tape for VIC20, COMMODORE64, and TRS-80 COLOR computer. Requires 13k RAM on Vic, 16k EXTENDED on TRS-80 COLOR. $19.95 on tape $24.95 on disk. NEW

GENERAL LEDGER — Complete bookkeeping for a small business. Disk required. For Vic20 (13k), Commodore64, TRS-80 COLOR (16k EXTENDED). $69.95 (Send $1.00 for manual before ordering.)



LABYRINTH — 16K EXTENDED COLOR BASIC — With amazing 3D graphics, you fight your way through a maze facing real time monsters. The graphics are real enough to cause claustrophobia.

Similar game for Timex/Sinclair 16k - hunting treasure instead of monsters $14.95.

ADVENTURE WRITING/DEATHSHIP by Rodger Olsen — This is a data sheet showing how we do it. It is about 14 pages of detailed instructions how to write your own adventures. It contains the entire text of Deathship. Data sheet - $3.95. NOTE: Owners of TI99, TRS-80, TRS-80 Color, and Vic 20 computers can also get Deathship on tape for an additional $5.00.

Dealers—We have the best deal going for you. Good discounts, exchange programs, and factory support. Send for Dealer Information.

Authors—Aardvark pays the highest commissions in the industry and gives programs the widest possible advertising coverage. Send a Self Addressed Stamped Envelope for our Authors Information Package.

ADVENTURES — Adventures are a unique form of computer game. They let you spend 30 to 70 hours exploring and conquering a world you have never seen before. There is little or no luck in Adventuring. The rewards are for creative thinking, courage, and wise gambling — not fast reflexes.

In Adventuring, the computer speaks and listens to plain English. No prior knowledge of computers, special controls, or games is required so everyone enjoys them—even people who do not like computers.

Except for Quest, itself unique among Adventure games, Adventures are non-graphic. Adventures are more like a novel than a comic book or arcade game. It is like reading a particular exciting book where you are the main character.

All of the Adventures in this ad are in Basic. They are full featured, fully plotted adventures that will take a minimum of thirty hours (in several sittings) to play.

Adventuring requires 16k on Sinclair, TRS-80, and TRS-80 Color. They require 8k on OSI and 13k on VIC-20. Sinclair requires extended BASIC. Now available for TI99.

TREK ADVENTURE by Bob Retelle — This one takes place aboard a familiar starship and is a must for trekkies. The problem is a familiar one — The ship is in a "decaying orbit" (the Captain never could learn to park!) and the engines are out (You would think that in all those years, they would have learned to build some that didn't die once a week). Your options are to start the engine, save the ship, get off the ship, or die. Good Luck.

Authors note to players — I wrote this one with a concordance in hand. It is very accurate — and a lot of fun. It was nice to wander around the ship instead of watching it on T.V.

DERELICT by Rodger Olsen and Bob Anderson — For Wealth and Glory, you have to ransack a thousand year old space ship. You'll have to learn to speak their language and operate the machinery they left behind. The hardest problem of all is to live through it.

Authors note to players — This adventure is the new winner in the "Toughest Adventure at Aardvark Sweepstakes". Our most difficult problem in writing the adventure was to keep it logical and realistic. There are no irrational traps and sudden senseless deaths in Derelict. This ship was designed to be perfectly safe for its' builders. It just happens to be deadly to alien invaders like you.

Dungeons of Death — Just for the 16k TRS-80 COLOR, this is the first D&D type game good enough to qualify at Aardvark. This is serious D&D that allows 1 to 6 players to go on a Dragon Hunting, Monster Killing, Dungeon Exploring Quest. Played on an on-screen map, you get a choice of race and character (Human, Dwarf, Soldier, Wizard, etc.), a chance to grow from game to game, and a 15 page manual. At the normal price for an Adventure ($14.95 tape, $19.95 disk), this is a giveaway.

PYRAMID by Rodger Olsen — This is one of our toughest Adventures. Average time through the Pyramid is 50 to 70 hours. The old boys who built this Pyramid did not mean for it to be ransacked by people like you.

Authors note to players — This is a very entertaining and very tough adventure. I left clues everywhere but came up with some ingenous problems. This one has captivated people so much that I get calls daily from as far away as New Zealand and France from bleary eyed people who are stuck in the Pyramid and desperate for more clues.

MARS by Rodger Olsen — Your ship crashed on the Red Planet and you have to get home. You will have to explore a Martian city, repair your ship and deal with possibly hostile aliens to get home again.

Authors note to players — This is highly recommended as a first adventure. It is in no way simple—playing time normally runs from 30 to 50 hours — but it is constructed in a more "open" manner to let you try out adventuring and get used to the game before you hit the really tough problems.

QUEST by Bob Retelle and Rodger Olsen — THIS IS DIFFERENT FROM ALL THE OTHER GAMES OF ADVENTURE!!!! It is played on a computer generated map of Alesia. You lead a small band of adventurers on a mission to conquer the Citadel of Moorlock. You have to build an army and then arm and feed them by combat, bargaining, exploration of ruins and temples, and outright banditry. The game takes 2 to 5 hours to play and is different each time. The TRS-80 Color version has nice visual effects and sound. Not available on OSI. This is the most popular game we have ever published.

32K TRS 80 COLOR Version $24.95.

Adds a second level with dungeons and more Questing.

PRICE AND AVAILABILITY:

All adventures are $14.95 on tape. Disk versions are available on VIC/COMMODORE and TRS-80 Color for $2.00 additional. $2.00 shipping charge on each order.

Please specify system on all orders

ALSO FROM AARDVARK — **This is only a partial list of what we carry. We have a lot of other games (particularly for the TRS-80 Color and OSI), business programs, blank tapes and disks and hardware. Send $1.00 for our complete catalog.**

AARDVARK

2352 S. Commerce, Walled Lake, MI 48088 / (313) 669-3110

Phone Orders Accepted 8:00 a.m. to 4:00 p.m. EST. Mon.-Fri.

TRS-80 COLOR TIMEX/SINCLAIR COMMODORE 64 VIC-20

$2.00 shipping on each order

Circle No. 1

Telecommander

by Donald L. Stoner
Mercer Island, WA

After the novelty wears off and you've typed in the simple programs in the user guide, what do you do with your new computer? You can (and should) study the commands and learn how they relate to the programs you've entered. In a very short time, you'll acquire a very respectable knowledge of BASIC and how it operates.

However, if you are a typical new VIC or C-64 owner, "byte boredom" takes over at some point. Few newcomers realize it, but the acquisition of a computer can unlock the door to an exciting new world. I am not referring to programming or playing computer games.

Rather, the "new frontier" is telecommunications. In other words, connecting your computer, by means of the telephone network, to another computer. You can interact with tens of thousands of others just like yourself. The craze is sweeping the country just like CB did a few years ago (in fact, there are some remarkable similarities). You can communicate with another "good buddy," clear across the country simply by making a local telephone call. There are also free dial-up bulletin boards and inexpensive national data bases (collections of information) at the other end of your telephone wire. More about these later.

My command of the English language is simply inadequate to convey the thrill of computer-to-computer communications. While I consider myself a jaded computerist, I still get a "kick" out of keyboarding and trading programs with someone thousands of miles away. If you have any doubt about whether computer telecommunications is for you, locate someone who is already "telecommunicating" and ask for a demonstration. I have yet to find anyone who doesn't like to show off his communications setup. Check with your user group or local computer store. They will refer you to someone who will be glad to get you "hooked."

How Does Computer Telecommunications Work?

To explore this exciting new world, you will require two items. The first is called a modem. This device is used to interface your computer to the telephone line. The word is a contraction of the terms modulator and demodulator.

The purpose of the modem is to slow down and convert the data bits racing around inside your computer to a form that can be sent over the telephone line. This is accomplished by converting the ones and zeros into standardized tone pairs, similar to what you hear when you press the keys on your telephone.

The telephone spectrum (300 to 3000 cycles) is divided up into two sections in order to keep your tones separated from those of the computer you are talking to. One pair has a frequency of 2225 cycles (a one) and 2025 cycles (a zero). A second pair is established at 1270 cycles (a one) and 1070 cycles (a zero). Thus, you send one pair of tones, while the computer you are "talking" to sends the opposite pair. The electronic circuitry to convert the ones and zeros to tones is called the modulator. If you haven't already guessed, the circuit to convert the incoming tones back into ones and zeros is called the demodulator. The box which combines both these circuits is called a modulator-demodulator or modem.

There are two principal types of modems presently in use. The older type is called an acoustic coupler. As the name implies, the incoming and outgoing tones are coupled into the telephone line acoustically. This is done by placing the telephone handset into little rubber cups. Below the cups (inside the black box) is another microphone and earphone very similar to the ones inside your telephone. While they are now obsolete, acoustic couplers were quite popular. They do not connect to the telephone line and, therefore, did not require approval of the Federal Communication Commission.

Because they use acoustics, these modems are extremely noisy. You can always hear the whistles and in a quiet room, the noise is very distracting. Further, they pick up noise (such as a clacking typewriter) which produces "garbage" in the transmission.

The shortcomings of the acoustic coupler were overcome with a more modern type called a direct connect modem. This device couples to the telephone line electronically and does not depend on sound waves. Direct connect modems are far more sensitive and reliable than the acoustic type. Fortunately either type uses the same tone frequencies as those just discussed. Thus, if you have a direct connect modem, you can still communicate with someone using a "whistle box." As long as both modems are Bell 103 (or 113) specification compatible, they can communicate with each other.

There is another technical detail that you should be familiar with. If you are telecommunicating with a friend, you must use the proper tone pairs. For example, if you both send on the high band pair, the signals will "butt heads" and no communications will result. One modem must send the 1270/1070 pair and receive the 2225/2025 pair. A modem sending and receiving these

pairs is said to be in the "originate mode." The other modem must send the 2225/2025 pair, while receiving the 1270/1070 pair and is therefore in the "answer" mode. The terms have nothing to do with who originates or answers the telephone call. The data bases you call will usually be in the answer mode. Most of the time you will leave your modem in the originate mode.

Incidentally, I should point out that when one is able to transmit and receive data at the same time, he is considered to be operating in the full duplex mode. There are some universities and colleges that utilize the half duplex mode (only one way at a time). While these are rapidly being replaced, the modem user must be aware of what type of system he or she is "talking" to.

Another term that you may have heard of is called the baud rate, or you may have seen advertisements describing 300 baud modems. All Bell 103/113 modems operate at 300 baud. While the definition of the term baud is somewhat complex for the beginner, it is sufficient to say that it is approximately equal to a transmission speed of 30 characters per second. Obviously you cannot type this fast. However, if you were to transfer programs from say a disk file, this is how fast the characters would transfer over the telephone line. Most good readers can follow a 300 baud transmission without slowing it down or pausing the transmission.

What Do I Need For Telecommunications?

The Commodore Modem—Obviously you will need a modem. Presently, the Commodore modem provides the best price performance ratio for your money. For approximately the cost of 2-3 game cartridges, you can purchase the Commodore modem. Their little brown box lacks the "bells and whistles" that are found on other modems and it could use a bit more sensitivity. However, at a discounted price of approximately $89, it is a real bargain. The folks with more "pricey" computers pay two to six times as much for a modem. Personally, I feel that $89 is a small price to pay for the key that opens the door to the exciting new world of telecommunications.

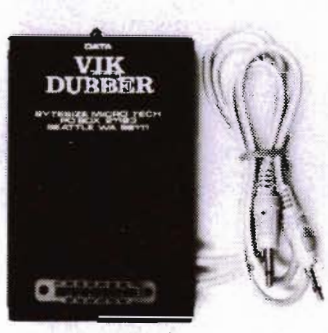
Software—Earlier, I mentioned that you will need two items in order to connect your computer to the telephone network. The second item you will require is, of course, the software to make the modem function properly. You can pay anywhere from $10.00 to $150.00 or more for communications software. However, to permit you to keep your communications below $100, I've included a "dumb" terminal program along with this month's column. The term "dumb" means that you can only communicate from your keyboard to another computer. There is no provision for transferring files or programs. This type of software is called a "smart" terminal program.

How Do I Get On-Line?

Making The Connection—Interfacing your computer to the telephone network is called going "on-line." Connecting the modem to your VIC or C-64 is extremely simple. The device plugs into the user port card edge connector at the left rear corner of your computer. The interface to the telephone line is made by unplugging the cord from the handset. The procedure is to dial the computer with which you wish to communicate. When you hear their high pitch whistle, unplug the cord from the handset and plug the free end into the modem. At this point the little red light should illuminate, indicating you are receiving the carrier from the other computer. Generally, you will want to be in the "originate" mode, since the majority of computers you "call up" are in the answer mode.

Adapters—A word of caution is in order. If you are in the General Telephone system, or are serviced by one of the independents, you may have a problem using the Commodore modem. Many telephone handsets have the cords "hardwired" and they are not removable. If this is the case in your home, you will need to purchase an adapter that allows you to interface the modem directly with the telephone line.

SAVE MONEY ON YOUR VIC20 & C64
ELIMINATE THE VIC/C64 RECORDER



The **VIK DUBBER** is an interface which allows you to connect any standard cassette recorder to the VIC-20 or C64. The **VIK DUBBER** contains circuitry which filters and enhances the data coming in from the cassette, providing the most optimum load possible. **The VIK DUBBER also allows you to connect two cassette recorders together to allow you to make backup copies of any VIC-20 or C-64 program.** No battery required. $34.95 postpaid. Add $2.50 for shipping outside the US, Canada, or Mexico. VISA or MASTERCARD welcome.

FOR CHARGE OR C.O.D. ORDERS

1-800-227-3000 TOLL FREE
1-800-792-0990 IN CALIFORNIA
ASK FOR OPERATOR 225

For check order, additional information or service, call or write:

BYTESIZE MICRO TECHNOLOGY
PO BOX 21123 - DEPT. A - SEATTLE, WA 98111
(206) 236-BYTE

DEALER INQUIRIES WANTED

Circle No. 4

By the way, if you would like to use another type of modem, you can buy an adapter for this too. You may want a more elegant modem than the Commodore device or, better yet, may be able to "scrounge" one from a friend or pick up a bargain acoustic type at a computer "flea market." Bytesize Micro Tech (Box 21123, Seattle, WA 98111, telephone (206) 236-BYTE) makes an adapter that plugs into the user port and interfaces with most modems. The adapter provides the necessary level shifting and polarity changes to make most modems compatible with the VIC or C-64. It also supports the autodial-autoanswer functions of the MicroConnection modem made by The MicroPeripheral Corp. of Redmond, Wa.

The Dumb Terminal

In order to make your Commodore work properly in conjunction with the modem, you will require software or, as it is commonly called, a terminal program. The listing in Figure 1 is about as simple as the program can be made. You should be able to enter it on your keyboard and save it on cassette in approximately 5-10 minutes.

Line 10 opens the communications channel to the modem. The 38 sets the baud rate at 300, while the 224 selects a seven bit word, even parity and one stop bit. The 14 in line 20 switches to upper/lower case and the 147 clears the screen and homes the cursor. To keep the program simple, I did not optimize the screen color. If you would like to experiment, you can add a POKE 36879,137 on this line. Try other numbers instead of the 137 for different arrangements.

The GOSUB in line 40 branches off to the input/output buffer setup routine between lines 1000 and 1060. Commodore does not use the standard ASCII computer code and it is necessary to establish translation tables to convert Commodore to ASCII (output) and ASCII to Commodore (input). Line 1045 is rather important and you should understand its significance. The CONTROL key on the VIC-20 does not permit sending control characters as one might expect. These characters are very important when communicating with various data bases. Line 1045 redefines function keys F1 through F4 to transmit Control C (03), S (19), Q (17) and P (16). Next month, when we discuss one of the popular information services, you'll see why these keys are so important. You can add additional control characters for the F5-F8 keys. For example, if you wanted to make the F5 key send a bell character (Control G), you would simply add O%(137) = O7.

Once the tables are established, the screen again clears and prints the ready indication. The terminal portion of the program is contained between lines 210 and 320. Line 210 checks the modem to see if there is an incoming character. If none is found, the program branches to 300 and checks the keyboard to see if you want to send a character. If none is found, the program bounces back to 210. If a modem character is found, it is printed by line 220. If a keyboard character is found, it is printed by line 310.

Note that the CHR$(187) in lines 200 and 220 determine the cursor character. This number can be changed if you would prefer a different type of cursor. By the way, the program will leave a cursor marker each time a line feed is received.

I've used more than my allocated space this month and it's time to shut down the word processor. Next month, we'll take a guided tour through CompuServe Information Service, one of the nation's largest information utilities.□

```
10
OPEN2,2,3,CHR$(38)+CHR
$(224)
20
PRINTCHR$(14),CHR$(147)
30        PRINT"LOADING
DATA"
40 GOSUB1000
200
PRINTCHR$(147)+CHR$(13
)+"  READY  TO  GO  ON
LINE":PRINTCHR$(187);
210
GET#2,A$:IFA$=""THEN30
0
220
PRINTCHR$(157);CHR$(I%
(ASC(A$)));CHR$(187);:
IFI%(ASC(A$))=34THENPO
KE212,0
230 GOTO210
300
GETA$:IFA$=""THEN210
310
PRINT#2,CHR$(O%(ASC(A$
)));
320 GOTO210
1000
DIMI%(255),O%(255)
1020
FORZ=32TO64:O%(Z)=Z:NE
XT:O%(13)=13:O%(20)=8:
O%(160)=32
1030
FORZ=65TO90:Y=Z+32:O%(
Z)=Y:NEXT:FORZ=91TO95:
O%(Z)=Z:NEXT
1040
FORZ=193TO218:Y=Z-128:
O%(Z)=Y:NEXT
1045
O%(133)=03:O%(134)=19:
O%(135)=17:O%(136)=16
1050
FORZ=0TO255:Y=O%(Z):IF
Y<>0THENI%(Y)=Z
1060 NEXT:RETURN
```


VIC-20 ALSO!

Get More From Your PET/CBM!

NEW! • DISK-O-MATE™ (Write for Price)
A must for 2040/4040 disk owners. Write protect indicators switches, power indicator and error beeper.

• "Real World" SOFTWARE ($17 - $25)
Word Processor, Mailing List, Catalog, Ham Radio Frequency Counter

"OLD" 8K PETs

• 2114 - TO - 6550 RAM ADAPTER ($12 - $25)
Replace 6550 RAMs with low cost 2114s. Hundreds Sold!

• 4K MEMORY EXPANSION ($16 - $62)
Low cost memory expansion using 2114s for bigger programs

Write for FREE Catalog!

OPTIMIZED DATA SYSTEMS
Dept. O, P.O. Box 595 · Placentia, CA 92670

DISK O-MATE trademark Optimized Data Systems · PET/CBM trademark Commodore

VIC-20 ALSO!

Circle No. 31

COMPU SENSE

CS1	**Quick Brown Fox** The Word Processor of this decade!	$55.00

COMMODORE SOFTWARE

VIC-1211A **VIC-20 Super Expander** $55.00
Everything Commodore could pack into one cartridge - 3K RAM memory expansion, high resolution graphics plotting, color, paint and sound commands. Graphic, text, multicolor and music modes. 1024x1024 dot screen plotting. All commands may be typed as new BASIC commands or accessed by hitting one of the VIC's special function keys. Includes tutorial instruction book. Excellent for all programming levels.

VIC-1212 **Programmer's Aid Cartridge** $45.99
More than 20 new BASIC commands help new and experienced programmers renumber, trace and edit BASIC programs. Trace any program line-by-line as it executes, pause to edit. Special KEY command lets programmers redefine function keys as BASIC commands, subroutines or new commands.

VIC-1213 **VICMON Machine Language Monitor** $48.99
Helps machine code programmers write fast, efficient 6502 assembly language programs. Includes one line assembler/disassembler.

GAMES FOR YOUR VIC-20®

CSN	**Snackman** - Better than Packman	$16.95
CC500	**Intruder-Scrambler** - In your bomber, invade the defending scramble system, dodging rockets, to blow up enemy posts, etc	17.95
CS1	**Flags of Nations** - A game that challenges players to identify flags of various widely-known nations of the world.	10.95
CS2	**Flags of Nations** - Second Edition - A field of 34 flags of lesser known nations of the world	10.95
CS3	**Cities and States** - A game that draws a map of a state or states and asks players to name key cities in those states	10.95
CS4	**Cities of the World** - Deals with important cities of nations throughout the world	10.95
CS5	**Mountains and Rivers** - Draws large geographical area maps. You identify major mountain ranges, rivers & bodies of water.	10.95
CF1	**Galactic Blitz**	22.95
CF3	**Sidewinder**	25.95
CS3	**Centipod**	17.95
CV108	**Bomber**	8.95
	Hangman	8.95

NEW GAMES FOR YOUR C-64

Tank Arcade (Also for VIC-20) - Pre-determine how many hits it will take to wipe out your opponent. Then, on with the battle! Battlefield changes $13.95

Roadracer - Choose the type of track & a time or lap race. Use steady control at speeds of 50 to 200 miles per hour. Hit the wall & lose valuable time 13.95

Shootout at the OK Galaxy (Also for VIC-20) - 30 alien warships have entered your war zone. Shields up? Energy level OK? Defend yourself. 19.95

Galaxy - Have you ever wanted to conquer the universe? Send your galactic fleets out to explore, solar system by solar system. From 1 to 20 players 19.95

Bomber Attack - Ground to air warfare. You're in command of a supersonic bomber over enemy terrain. Drop all 25 bombs on key locations. 14.95

Midway Campaign - Your computer controls a huge force of Japanese ships trying to conquer Midway Island. Your only advantage is surprise. 19.95

Dnieper River Line - A fictionalized engagement between Russian & German forces in 1943. Soviet forces, controlled by the computer, seek to overrun your line and capture sufficient objectives to attain victory. Four levels of difficulty. 25.00

Tanktics - Armored combat on the Eastern front of WWII. You start outnumbered 2 to 1 but you choose your tank types before the battle. 24.50

Guns of Fort Defiance - You are the commander of a 19th artillery piece in a besieged fort. Choose type of ammo. Set the cannon's elevation, deflection. 20.00

Computer Baseball Strategy - You, the manager of the home team, test you skill against a wily and unpredictable opponent, your computer. 15.95

Lords of Karma - Like an intriguing puzzle! Decipher secrets while exploring a mythical, magical city & countryside. Avoid the lurking monsters! 20.00

North Atlantic Convoy Raider - It's the Bismarck convoy raid of 1941! The computer controls the British ships. Will you change history? 19.95

Planet Miners - Compete against others and the computer to stake valuable mining claims throughout the solar system in the year 2050. 19.95

Conflict 2500 - In 2500 AD, earth is threatened by attacking aliens with an infinite # of attack strategies with which to tease the defending player. 19.95

Nukewar - Nuclear confrontation between two hypothetical countries. Defend your country with espionage, bombers, missiles, submarines, etc. 19.95

Computer Acquire - New Second Edition! The object is to become the wealthiest person in this "business" game - hotel acquisitions & mergers. 20.00

Andromeda Conquest - Vast scale space strategy game of galactic colonizing and conquest. Strange life forms & alien technologies - exciting! 19.95

Telengard - Microcomputer Dungeon Adventure game. Time fantasy and role-playing. 50 levels of ever-more complex mazes to explore & survive! 25.00

MORE — MORE — MORE

Shipping & Handling Charges:
First two (2) items - $2.00 per item.
Three (3) or more items - $1.00 per item.
For orders over $100 total, surface shipping will be paid by CompuSense. Blue Label or special handling will be paid by the customer.
Additional $2.00 C.O.D. fee on all C.O.D. orders.
MasterCard and Visa accepted. Give card number and expiration date on order form.
Allow three (3) weeks for personal checks.

TO ORDER:
P.O. Box 18765
Wichita, KS 67218
(316) 263-1095

WRITE FOR FREE CATALOG

MasterCard VISA

Prices subject to change.

VIC-20® is a registered trademark of Commodore

C-64	**Compute**	$399.00
VIC-20®	**Personal Computer**	147.00
VIC-1515	**Printer**	334.95
VIC-1530	**Datasette**	67.50
VIC-1541	**Disk Drive**	347.00
VIC-1010	**Expansion Module**	139.95
VIC-1311	**Joystick**	9.95
VIC-1312	**Game Paddles**	19.95
	Telephone Modem	99.95

VIC-1210 **VIC 3K Memory Expander Cartridge** 34.95
Plugs directly into the VIC's expansion port. Expands to 8K RAM total.

VIC-1110 **VIC 8K Memory Expander Cartridge** 52.50
8K RAM expansion cartridge plugs directly into the VIC

CM101 **VIC 16K Memory Expander Cartridge** 99.95

CM102 **24K Memory Expander Cartridge** 119.95

VIC-1011A **RS232C Terminal Interface** 39.95
Provides interface between the VIC-20 and RS232 telecommunications modems. Connects to VIC's user port.

PETSPEED - Basic Compiler for Commodore 140.00
Compile any Pet Basic program. The only optimizing compiler. Programs compiled with Petspeed run up to 40 times faster. Petspeed code is unlistable and compiled programs cannot be tampered with. No security device required for compiled programs. Available NOW for the Commodore 64

Star Gemini 10 Printer	350.00
Star Gemini 15 Printer	450.00
SND Monitor	347.00
16K Memory Expander	50.00

CARDCO

CARDBOARD 6 $87.50
An expansion interface for the VIC-20. Allows expansion to 40K or accepts up to six games. May be daisy chained for more versatility.

CARDBOARD 3 35.95
Economy expansion interface for the VIC-20.

CARD "?" CARD/PRINT 76.00
Universal Centronics Parallel Printer Interface for the VIC-20 or CBM-64. Use an Epson MX-80 or OKIDATA or TANDY or just about any other.

CARDETTE 30.95
Use any standard cassette player/recorder with your VIC-20 or CBM-64

LIGHT PEN 29.95
A light pen with six good programs to use with your VIC-20 or CBM-64.

All CARDCO Products have a lifetime warranty

HOME & BUSINESS PROGRAMS For VIC-20 & C-64

CW-107A	**Home Calculation Program Pack**	$48.95
CPV-31	**Data Files** - your storage is unlimited	14.95
CPV-96	**Household Finance Package** - to keep records of all your household expenses	30.95
CPV-208	**Bar-Chart** - display your numerical data	8.95
CH	**Turtle Graphics** - learn programming	34.95
CH	**VIC Forth** - is a powerful language for BASIC programming	49.95
CH	**HES MON** - is a 6502 machine language monitor with a mini-assembler	34.95
CH	**HES Writer** - time-saving word processing tool	34.95
CH	**Encoder** - keep your personal records away from prying eyes	34.95
CT-21	**Statistics Sadistics** - statistical analysis	14.95
CT-121	**Total Time Manager 2.0** - creates personal or business schedules	15.95
CT-124	**Toti Label** - a mailing list and label program	13.95
CT-125	**Toti Text BASIC**	15.95
CT-126	**Research Assistant** - keep track of reference data	17.50
CT-140	**Toti Text Enhanced**	29.95
CM-152	**Grafix Designer** - design graphic characters	12.95
CQ-5	**Minimon** - allows you to program, load, save, or execute machine language programs	13.95
CT-3	**Order Tracker**	15.95
CT-4	**Business Inventory** - to maintain record of inventory	15.95
CS	**Home Inventory** - lists your home belongings	17.95
CS	**Check Minder** - (V-20 & 64) keep your checkbook the right way	14.95
CS	**General Ledger** - a complete general ledger	19.95
CHC-504	**HES Writer** - word processor	39.95
CHC-503	**Turtle Graphics II** - utilizes the full graphics of your 64	49.95
CHC-502	**HESMON** - machine language monitor w/mini-assembler	34.95
CHP-102	**6502 Professional Development System**	29.95
CFC	**Data Files** - a management program	27.95
CPV-327	**HESCOM** - transfers data and programs bidirectionally between VICs at three times the speed of a disk drive	40.95
CPV-328	**HESCOUNT** - monitors program execution	19.95
CHV	**HESPLOT** - Hi-res graphics subroutines	12.95
CTV-367	**Conversions** - figures, volume, length, weight, area and velocity to all possible configurations	7.95
CC	**The Mail** - your complete mail program Cassette / Disk	24.95 / 29.95
CPV-220	**Client Tickler**	16.95
CPV-221	**Club Lister**	13.95
CPV-224	**Depreciator**	9.95
CPV-236	**Investment Analyst** - keep track of investments and investment opportunities	12.95
CPV-251	**Present Value**	10.95
CPV-269	**Super Broker**	12.95
CPV-270	**Syndicator** - calculates whether to buy or sell	13.95
CPV-274	**Ticker Tape** - maintains investments profile	14.95
CPV-276	**Un-Word Processor** - screen editor	16.95
CPV-286	**Phone Directory** - never lose a phone number again	9.95
CS-111	**Checkbook** - home "utility" program	14.95
CPV-294	**Calendar My Appointments** - print a calendar for every month in any year	14.95
CPV-296	**The Budgeter** - place your personal finances in order	12.95

Logic Gates: A Light Technical View

by Howard Rotenberg
Ontario, Canada

Most of us, at some time have used the logical operators AND, OR and NOT in our programming. To use these operators we of course must know what function it is that they perform. This is an obvious deduction; however, many people who use these operators have no idea what the actual technical aspect of them is. It is because of this that I have decided to write this article. It will deal lightly with logic gates to give the non-technical programmer more of an insight into what actually occurs within any circuit when these operations take place.

The three logic gates (as I will now refer to them) that I have chosen to deal with are the AND, OR and NOT gates, as stated earlier. The role of logic gates is somewhat similar to that of the role of bricks, concrete and wood to the building of a house. In both cases these can be considered the fundamental building blocks of a complete system. We may implement a complete computer system using only these three building blocks. This, however, is not feasible, but it remains a reality. I will not get into semiconductor theory, however we will touch upon a bit of the electronics behind these gates. First, we will just deal with the mechanical aspects of them.

The OR Gate—Let us consider turning on a car's dome light. We all know that this may be done by two methods. The first way is to open the front door and the second is by actually turning on the switch on the instrument panel. In this case there are two switches involved. If we look at Figure #1 we can see a simple circuit diagram which shows this operation. We can see that there are two switches that are connected in parallel to a lamp. If we close switch A or we close switch B the lamp will be supplied power and turn on. The key here is of course the choice of switch A OR B. This setup of parallel switches is referred to as an OR gate. Along with the OR circuit I have shown a few other small diagrams. The one I will start with is probably the most familiar to you. This is the truth table. I have represented a closed switch with a T for true and an open switch with an F for false. By examining the truth table we can see that the lamp will be on if either switch A (OR) switch B is closed. The only condition that will not actuate the lamp is #1 where both switches are open or false.

This is a representation of a two input OR state, however we are certainly not confined to any particular number of inputs. The use of switches has been used to easily show the operation of the gate. Shortly I will show the electronic way of doing this, that is used in today's modern electronic circuits.

The other two small diagrams above the truth table are the accepted ways to show this particular gate. It would be highly impractical to draw the other diagrams for every gate you wanted to show. The first diagram is the industry standard that you would see on most schematics. The Institute of Electrical and Electronics Engineers Inc. approved the symbol shown beside the more familiar one. You probably recognize the term IEEE on the diagram that is the short form for the above mentioned institute.

The AND Gate—The second gate that I will discuss is the AND gate. Once again I will show a mechanical representation of this gate. The use of T for closed swtich and an F for an open one remains constant. If we consider a condition that we want two switches to be pressed for operation, Figure #2 shows this. Once again we see two switches connected to a lamp and a power source. The big difference this time is that the switches are connected in series. In order for the lamp to be turned on both switch A (AND) B must be closed. If we once again look at the truth table for the AND gate we can see that the lamp will be on only if both switches are pressed. If only one switch is closed the circuit is still open and the lamp will not be turned on.

The logic symbols that represent the AND gate are shown along with the mechanical circuit. These two symbols show a two input AND gate and may be expanded also to any number of inputs to accomodate the users requirements.

The NOT Gate—The NOT gate (Figure #3) is very often referred to as an inverter. This is because the output of a NOT gate is the opposite of the input. That is to say, if the input is high (TRUE) then the output is false. I have shown a circuit that contains what is called a normally closed switch. This means that when the switch is NOT pressed there is electrical contact and the circuit is closed. We can further interpret the circuit as follows. The lamp will be on if the switch is NOT pressed. The opposite is true when the switch is pressed. This will break the electrical circuit and turn the lamp off. We can state this one more way. The NOT gate will complement the input. The truth table provided shows the two possible conditions for our circuit. With the input false, the output is true and with a true input our output is false.

The logic symbols are once again shown. This gate is restricted to one input and one output for normal use.

Electronic Gates—While the three mechanical circuits I have shown may

certainly have their useful applications, they are highly impractical for any complex electronic design. Can you imagine building a computer with mechanical switches? The speeds and reliability demanded from today's computers or other electronic devices would certainly call for electronic logic circuits. The most basic ideas of electronic gates may be realized by the use of diodes. To go one step further we should consider the diode as nothing else but an electronic switch. Without going into semiconductor theory, I would like to show how the diode is used for this method and why it works.

We will be referring to Figure #4 and Figure #5 for the following description. A diode is a semiconductor device that will pass current only one way. This is when it is forward biased or anode positive with respect to the cathode to put it another way. When this condition is met the diode acts like a closed switch. The other situation we may have is when the diode is reverse biased or anode negative with respect to the cathode. When this is the case the diode acts like an open switch. The diode cannot pass current unless it is forward biased so it is an ideal switch. There is a very big difference however, since our diode switch is no longer physically opened or closed. It is now done by electrically applying a forward or reverse bias. This brings us a very large improvement in the switch's operating speed since the input signals are no longer mechanical, but electrical. Figure #4 shows a diode that is forward biased. The voltages needed to do this are indicated. The diode as shown will act like the closed switch. In Figure #5 the reversed biased diode is shown along with its mechanical representation. As you can see it will now act like an open switch. More practically, transistors are used in a small silicon substrate chip that is put into a small package. Most integrated circuits are a combination of diodes, resistors, transistors and other components fabricated onto a single chip. We will stay with the diode for most of our purpose since it is the least complicated of the two devices.

A Two Input Diode OR Gate—If we look at Figure #6 we see a two input diode OR gate along with its corresponding truth table. We will assume that our two inputs A and B may be either Ø or +5 volts and nothing else. If we apply +5 volts to either A or B, this will forward bias that diode and current will be able to flow in the circuit. This in turn will cause a voltage drop across the resistor R. It doesn't matter which diode the voltage is applied to since either will cause a voltage drop across the resistor. If both inputs are Ø volts there will be no voltage drop across the resistor. This circuit is operationally exactly the same as the two parallel switches in Figure #1. I have now started to use H and L for the voltage levels in the truth tables since they will not always be +5 volts.

We may add as many diodes to the circuit as we want, depending on our needs. We can summarize our example by saying that a two input OR gate will produce a high output when one input OR the other input OR both are high.

A Two Input And Gate—As before we will use two diodes and the same rules for their biasing stand. I would just like to mention that to put the input at Ø volts we must ground it. Leaving it open (or floating) does not satisfy a low input.

We will refer to Figure #7 for this next part. If we put both inputs at a Ø volt potential (ground them) then the diodes will be forward biased. This, as we said before, means that they will conduct or act like two closed switches between the output and ground. This will put the output at nearly our ground potential which will be low. This is shown by the truth table. If we follow the truth table down, we see that for the second and third case only one diode is forward biased. This will still place the output at ground potential still giving us a low at the output. In the last case only we find that neither diodes is forward biased, turned on or if you want to think of their switch counterparts, closed. Since the output is not shorted, but rather connected to the power supply, the circuit will now produce a high output.

Once again we may add as many diodes to the circuit as we want. In summarizing this two input AND gate we may say that a 2 input AND gate will only produce a high output when BOTH inputs are high.

A NOT Gate—We finally come to the last basic gate shown in Figure #8. This is the NOT gate that will be demonstrated by the use of a transistor. The function is to complement the input. i.e. When the input is low the output is high and when the input is high the output is low. Since I have used a transistor it will be a little more difficult to follow but you may think of the transistor as two diodes back to back. If we apply Ø volts to the input, there will be no base current or no collector current. This means that the transistor will act like an open switch. This in turn means it has no effect on the output which we have connected to five volts, therefore it will remain at five volts or high. The other case we may look at is when we apply +5 volts to the input. This will forward bias the transistor and the output will be connected to ground through the collector-emitter circuit. This will now act as a closed switch leaving the output at ground level or low. In actuality there will be a very small voltage drop across the base emitter junction (.6 volts), however this is not relevant to our example.

To summarize the NOT gate we may say that the inverter will produce a high output when the input is low and a low output when the input is high.

Summary—I believe that a little knowledge of what goes on inside the computer or logic gates may be useful to a non-technical user. If nothing else I hope it will bring the user a little closer to what is actually happening in there. At best I hope it will open some doors that may inspire you to look into a little bit of hardware and who knows, maybe even put together or design some little peripheral for your computer. Although it seems unreal, the fact remains that with just nearly the three logic gates a complete system may be implemented. The rest is all up to you.□

Figure 1

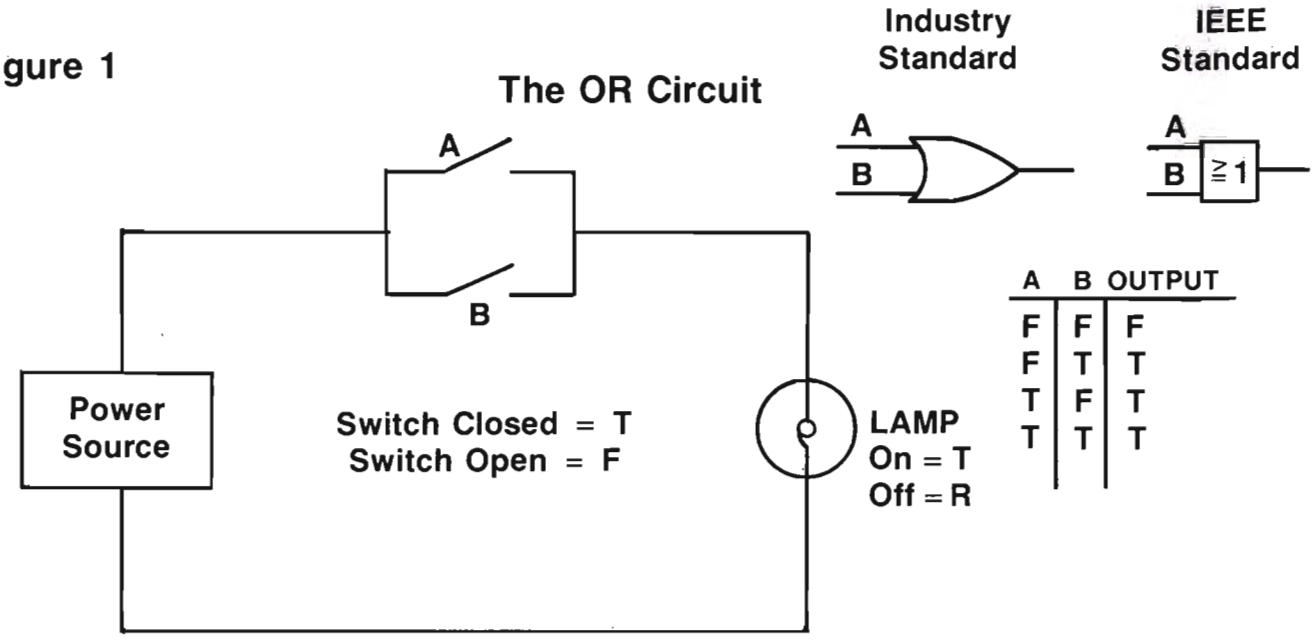


Figure 2

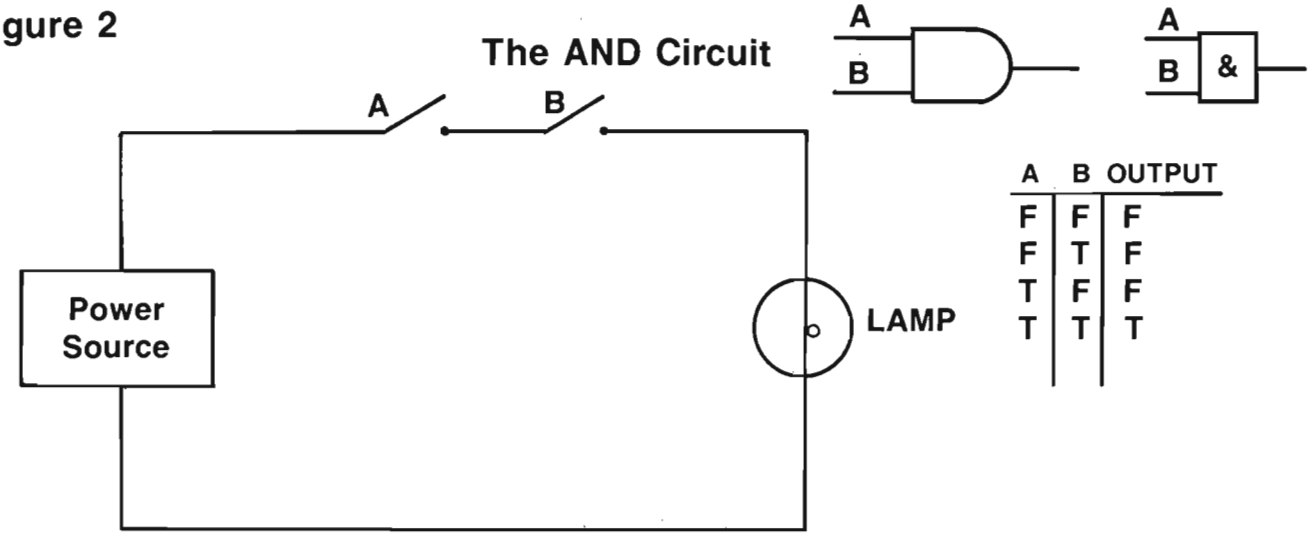


Figure 3

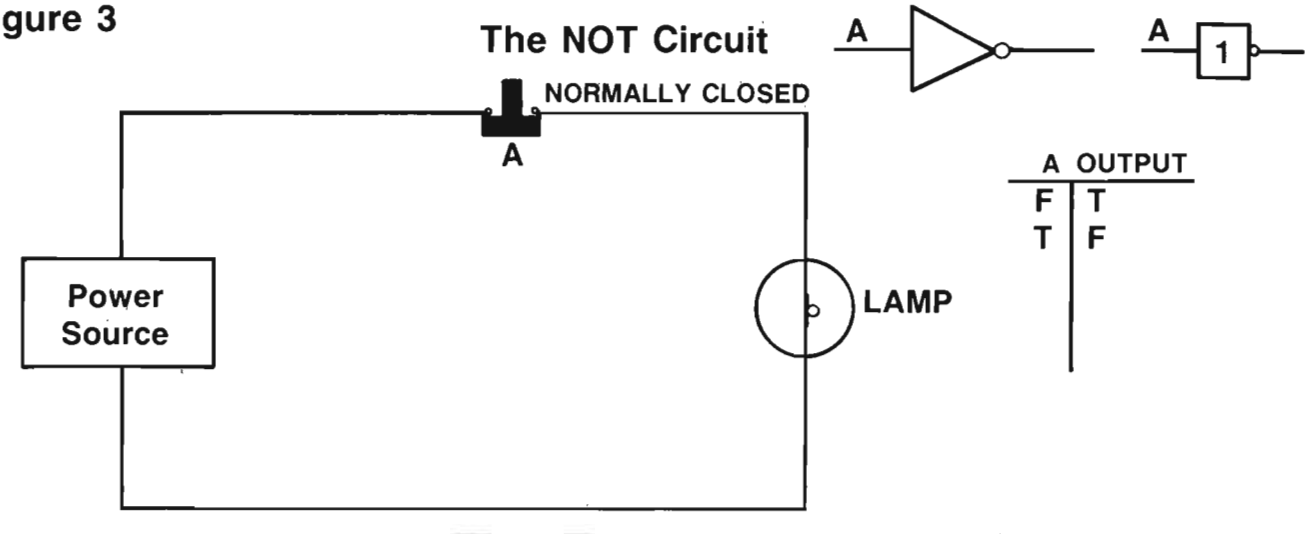


Figure 4

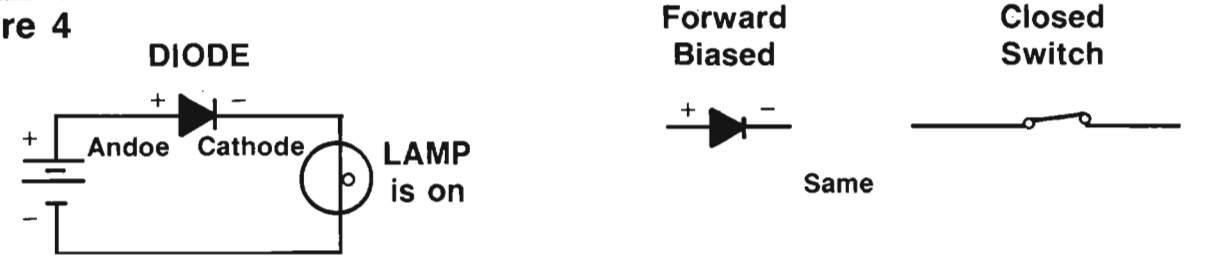


Figure 5

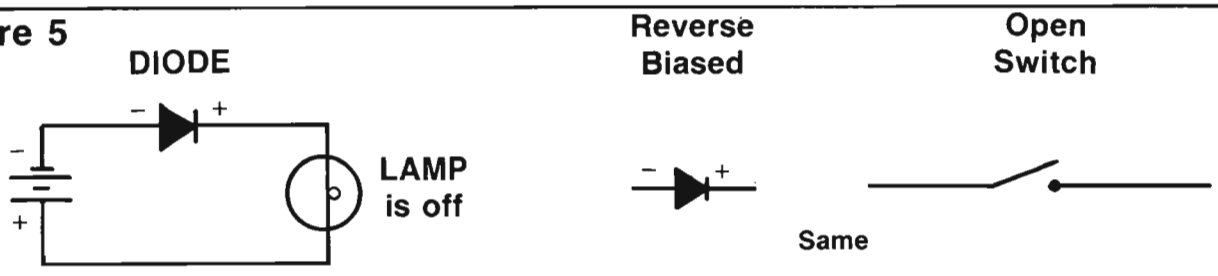
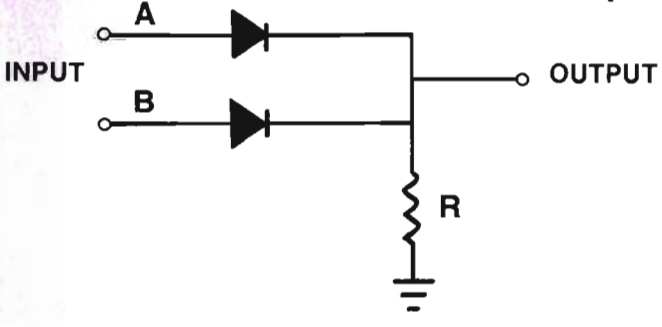


Figure 6

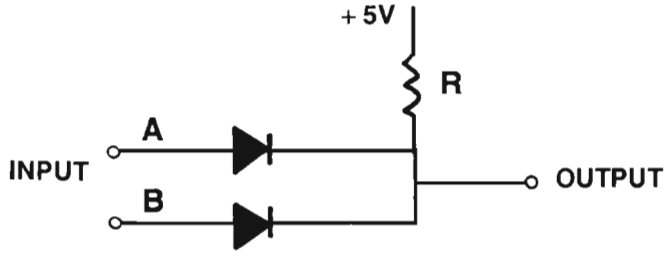
2 Input OR Gate



A	B	OUTPUT
L	L	L
L	H	H
H	L	H
H	H	H

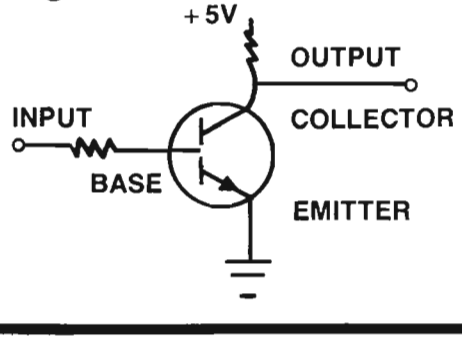
Figure 7

2 Input AND Gate



A	B	OUTPUT
L	L	L
L	H	L
H	L	L
H	H	H

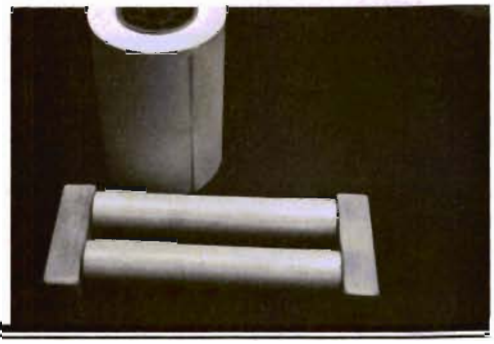
Figure 8



INPUT	OUTPUT
L	H
H	L

Universal Roll Paper Holder

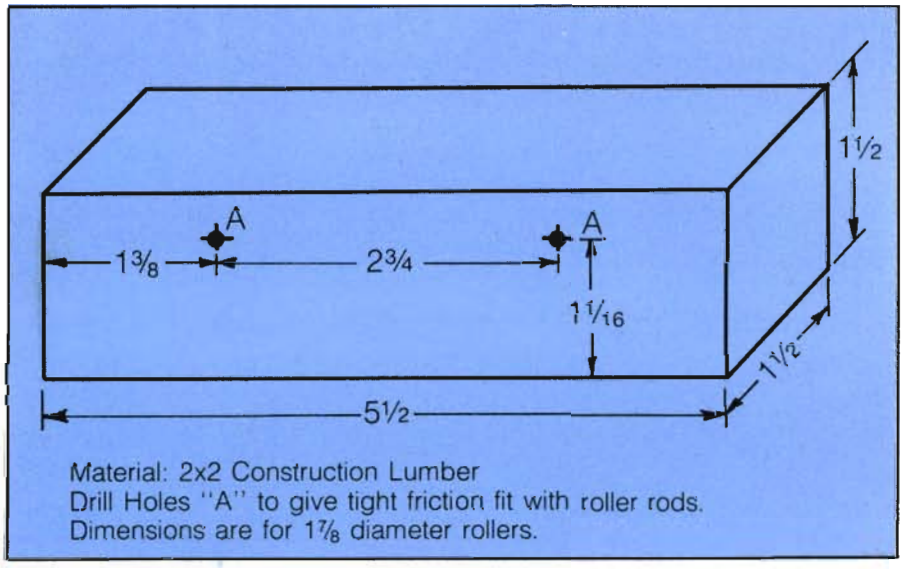
by Louis F. Sander
Pittsburgh, PA



Most printers which take 8½" x 11" sheets will also work with roll paper of the sort that is widely available for Teletypes and other machines. In many applications, the roll paper's low cost makes it a better alternative than fanfold or individual sheets. But the add-on adapters to hold the roll and feed it to the printer are often costly, and many dealers don't stock them. When they are installed, changing back and forth between rolls and other types of paper can be a troublesome chore. This article describes an elegant and inexpensive home-built roll paper holder which works perfectly with my Epson MX-80FT and IBM Selectric printers, and which should work just as well with many other machines.

One day a friend offered me a dozen rolls of printer paper in different widths, just when I needed to buy another ream of paper for my Selectric. My natural cheapness, and a reluctance to look a gift horse in the mouth, combined to inspire the design of the universal roll paper holder described here. Anyone capable of using a hand drill can build it in less than an hour, and the materials should cost less than $8.00 at any store with a housewares department.

The picture shows the finished roll holder. The two rollers are nothing more than standard kitchen rolling pins. The ones I used are made by Ekco, and have a steel center rod with nylon sleeve bearings; they turn easily and smoothly, with no bumps or vibrations. To construct the roll holder, just make two of the end pieces shown in the drawing, pull the handles off the rolling pins, and tap the center rods into the holes in the end pieces, leaving 1/16" clearance between the rollers and the ends. Pulling off the handles takes only a minimum of force and twisting, snce they are held in place by a friction fit. If you want a finely finished appearance, as I did, use a hacksaw to shorten the steel rods so they don't protrude from the end pieces.



Material: 2x2 Construction Lumber
Drill Holes "A" to give tight friction fit with roller rods.
Dimensions are for 1⅞ diameter rollers.

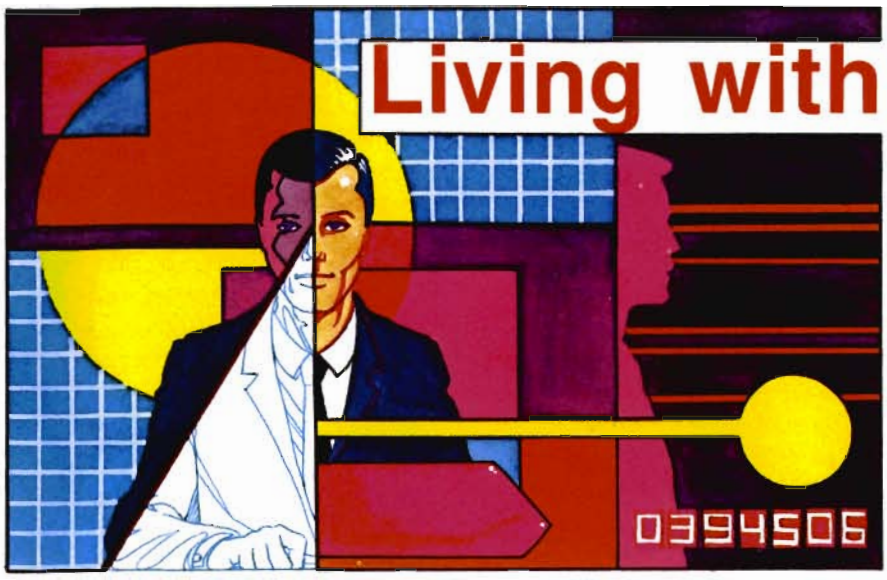
The end pieces are made from scraps of standard 2 x 2 construction lumber. If you are not comfortable sawing wood, ask the man at your lumberyard to cut the pieces to length for you, and he should oblige. If he doesn't, take your business elsewhere. If your rolling pins have a different diameter than mine, you may have to alter the dimensions of the end pieces accordingly. Just be sure the rollers clear the table and the top surface of the end pieces, so your paper will be able to turn freely.

That's all there is to the construction of the roll holder, and there's not much more to its use. Just set the holder in the proper place behind your printer, lay the paper on it, and feed the end into the printer. If the holder is parallel to your platen, nothing should bind up or get out of line. Changing rolls could not be simpler, and the holder can handle rolls of any width or diameter—am currently using a very large roll that was intended for an obsolete copy machine.

The inertia of a heavy roll of paper may cause an occasional line feed problem, as it did with my Selectric—the line feed mechanism just wasn't designed to pull a ten-pound roll, even if it **is** supported on a low-friction holder. I overcome that problem by manually unwinding several feet of paper and letting it drape off the desk behind the roll holder. Every five pages of printing I have to repeat the process, but that is by no means a burdensome chore.

All in all, this holder has been a perfect solution to my need for roll paper capability, and I hope it will be the same for yours.

At the very least, it will be a nice new piece of furniture for your computer room, built without glue, screws, or nails, and handcrafted entirely by you.□



Living with Quick Brown Fox

by Colin F. Thompson
Santa Monica, CA

Business software for a game machine? A contradiction in terms? Yes, for some other brands of computers. Not so for the VIC. The VIC is a powerful computer, whether you use it for games or business. You don't have a business, you say? Think of your home like it's a small business. You have bills to pay, letters to write, taxes to file, and a budget to figure. That's exactly the kind of work the computer is best at. You can use business software in your home to manage your money and paperwork. Many high quality, low cost business programs are released each month. I'll be reviewing the best of them, and telling you, in plain English, how they work, how I use them in my office and what I like and dislike about them.

Business software can be divided into four general catagories: Word Processing, Money Management, Spreadsheets, and Data Base Management. Your VIC can do all these functions and more. This month we will look into word processing and see what life is like, Living With a Quick Brown Fox.

QUICK BROWN FOX (QBF) was originally developed three years ago for the Ohio Scientific microcomputer. While residing there, it was debugged, groomed, and perfected. The OS and VIC have one thing in common: a 6502 microprocessor chip is the heart of each. This allowed the OS version to be modified for use in the VIC and C-64. So you see, QBF is a mature piece of software. That maturity first attracted me to QBF. I hoped it would be bug free. It nearly is.

After opening the sturdy cardboard shipping container, I was delighted to see a professionally produced instruction manual. This is the best looking, most comprehensive manual I have seen for VIC software. As an ex-Apple user, I learned to expect manuals like this with the $300 software packages I used. I like the size. It's a full 8½x11 inches, in a three ring binder. I wish all manuals were this size. The binder comes in a heavy cardboard housing, similar to housings for fine books. Inside is a sealed envelope, containing QBF, which tells you to read the manual before breaking the seal. If, after reading the manual you find QBF is not what you want, you may return it for a full refund. This excellent policy is one I would like to see other companies offer. QBF comes as a cartridge, which plugs into the expansion port on the right rear of the VIC. I didn't plug it in right away. I read the manuals first, and then try it. I've had too many adventures doing it the other way around.

By the Book

The manual is divided into two parts. The pocket notes are six pages long, outlining the difference between the VIC and C-64 versions. They also explain the "File Clerk" functions. The File Clark is the part of QBF that talks to the disk drive and Datasette, allowing you to easily save your Text Files. Text Files are a clever way to describe the documents you write on QBF. Text Files can be letters, forms, manuscripts or any kind of document that you generate. The rest of the manual runs 50 pages and is written in the style of a tutorial. It assumes you have no prior knowledge of either the VIC or word processing. Accompanying the manual is a cassette tape with training files for you to practice on. After reading the pocket notes, I began the tutorial on page one.

Firing It Up

Though QBF needs no extra memory, it can use up to 16K of RAM memory, if you have it. Mega-memory buffs will find that QBF resides in block 3 ($6000 to $7FFF). What that means, in English, is that a 24K RAM card can't be used. Guess who has a 24K card. Right. For serious business use, I recommend adding an 8K or 16K card. Since I like having as much memory as possible, I plugged in my 4K RAM card, made by OEM, Inc., and fired it up. It's very easy to get running. You pull the Fox's tail by typing SYS 24576 and hitting return. The program uses only 1024 bytes of your precious memory. QBF then asks how many columns are displayed on your screen. Like most of you, my screen has 22 columns across. If you have added a Video Pack, expanding your screen to 40 or 80 columns, QBF will handle that nicely. The screen turns black, and in white letters, the Fox greets you.

The main menu displays a list of 12

options. Each option is activated by a single keystroke. As I worked my way through the tutorial, I found myself chuckling. This was the word processor I had been looking for. I rarely get excited when trying out new programs. This one out-performed my expectations. I have used many word processors on my VIC, and found they ranged from awful to acceptable. From the start, I knew QBF was light years better than others I'd tried. Why? Three reasons come to mind: Speed, speed, and more speed. QBF doesn't keep me waiting when I ask it to perform. It doesn't get in the way of writing. Since I was already familiar with word processing, I had no problems learning its powerful features. For those of you new to word processing, the manual will step you through the learning process quite rapidly. I say this with some certainly because I gave the manual to my secretary, Dawna, and turned her loose on the VIC. She immediately found an error that I missed on page four of the manual. On that page, wherever it says **Left-Arrow**, it means Cursor Left. The left arrow located at the top left of your keyboard has a completely different function under QBF. It is used as the Escape Key. Pressing this Key allows the user to change functions or change his mind. It's very handy. After this minor snag, she progressed quickly.

Letters from the Editor

Besides speed, the most noticeable difference between QBF and other word processors I've used is the editor. The editor is the part of the program that looks at the keystrokes you enter and then acts on them. It's like a referee. The editor checks to make sure you type in legal commands, or valid data, and then causes the rest of the program to act on the commands or store the data. Most editors come in one of two flavors: line editors and full screen editors. The VIC has a full screen editor built in. When you are writing a program, the cursor can be moved to any position on the screen to make changes. That is a full screen editor. If you could make changes only on the line that cursor resides, you would have a line editor. There are advantages to both types. Editing on QBF requires placing the cursor over the character you want to change and hitting one key. (I for Insert, R for Replace, D for Delete, etc). Besides having line editor, QBF also has Global Editor. It allows you to search and replace any word or letter in the text. After you read the manual, and learn the commands, you will realize that the editors are the most powerful features of QBF. There is an advantage to expanding your screen past the 22 column standard. C-64 users will find they have nearly 40 characters they can edit without leaving the editor. VIC users have about half that. I tried a VIC running a Data-20 80 column board with QBF at COMDEX last year. Those extra 58 columns are helpful in many respects. The biggest advantage of having 80 columns is in the View mode. QBF allows you to view your document on the screen, formatted as if it was being printed on the printer. With 80 columns, you get a clear picture of how your text will look on paper. If you take your word processing seriously, you should consider an 80 column board.

Earning Its Keep

The first useful document I produced on QBF was a list of the control codes that make my trusty NEC 8023A printer turn on its bells and whistles. I suggest you do the same thing when you get QBF running. It saved my sanity. QBF works with any printer, and doesn't care which channel the printer is attached to. You can easily insert printer control codes into the body of your text. If you use QBF and an NEC 8023A printer on your system, I'll send you that control code list. Just send a SASE and mark "NEC" on the envelope. I believe I've mentioned how fast QBF is. That lightning speed continues when printing. It drives my 100 cps printer flat out.

OK. So it's a great word processor. But what does it DO? It saves a lot of time, that's what. A typical business letter requires me to write it out in longhand, have Dawna type a rough draft and then I correct it. With QBF, I type the letter directly into the computer, make all the changes it needs and print it on the printer. Dawna only sees the finished letter exactly as I want it. She never has to decypher my handwriting, and only types the letter once, not 2 or 3 times. On a letter quality printer, she could print the letter directly onto letterhead and retire the Selectric. Personal letterwriting also benefits. I find myself writing many more letters to my friends, simply because it's so easy.

Each month our office sends out hundreds of form letters. When a reader marks a magazine "bingo card," asking for information about our products, we send him a form letter telling him how wonderful our wigits are, and direct him to the nearest retail dealer. Our dealers love the sales leads and our sales rise, just because we use QBF. I'm a Tech Rep in a high-tech industry. One of my jobs is to write training manuals. These manuals have an average lifetime of three months. Fast moving technology requires them to be frequently updated. QBF is making that dreaded job a breeze.

I promised to tell you what I like and dislike about QBF. The dislike list is mercifully short. When Viewing my document on a 22 column screen, QBF sometimes forgets that I have only 23 lines on the screen and flashes up all 66 lines. I tend to use the printer instead of View mode to see how the document looks. The 80 column VIC Viewed perfectly. My biggest gripe is about the manual's index. There isn't one.

Entering the Fox's Lair

Curious as to why this well done manual lacked an index, I called Ed Moran, National Marketing Manager of QBF. He quickly assured me that an index is being prepared and the miscues on page four are being rectified. The manual is going through a minor revision and will soon be indexed.

"What about that Viewing problem?", I asked.

"What Viewing problem?", he replied.

It seems I'm the first one to complain. He promised his Tech Support

people would look into it. I'll let you know what they find.

The Fox works on the C-64 much as it does on the VIC. There are three advantages using the C-64 version. After loading the program, the C-64 has nearly 38K of working storage. The 40 column screen is a little easier to edit, and the File Clerk allows disk copying. The Copy feature is one I wish the VIC version had. Both versions work with disk or tape, and can send files to another QBF/VIC via modem. At $65, I heartily recommend it.

Next month we examine the chicken that laid the golden egg as we raid the TOTL Software henhouse. Oh yes, there is one thing I do with Quick Brown Fox . . . Write this column.□

Companies mentioned: Quick Brown Fox, 548 Broadway, New York, NY 10012, (212) 925-8290; OEM, Inc., 2729 South US 1, Suite 12, Fort Pierce, FL 33450, (305) 465-9363; Data 20 Corporation, 20311 Moulton Parkway, Suite B10, Luguna Hills, CA 92652, (714) 770-2366.□

Printer Codes for Quick Brown Fox & NEC 8023A

Dot Printer

#n027N	10 cpi Pica	ABCDEFghijkl12345
#n027E	12 cpi Elite	ABCDEFghijkl12345
#n027Q	17 cpi Condensed	ABCDEFghijkl12345
#n027P	Proportional	ABCDEFghijkl12345
#n027!	Enhanced	**ABCDEFghijkl12345**
#n027"	Enhanced off	ABCDEFghijkl12345
#n014	Enlarged	ABCDEFghijkl12345
#n015	Enlarged off	ABCDEFghijkl12345
#n027X	Underline	ABCDEFghijkl12345
#n027Y	Underline off	ABCDEFghijkl12345
#n027A	6 Lines per Inch	
#n027B	8 Lines per Inch	

Printing Sizes

Ch/Line	Ch/Inch	Remarks
136	17	Condensed
68	8.5	Condensed Enlarged
80	10	Pica
40	5	Elite Enlarged
96	12	Elite
48	6	Elite, Enlarged, Proportional

Microworld Electronix ASCII Convertor MW802
Set all switches OFF for use with Quick Brown Fox.

STCP
Standard Terminal Communications Package

PFO IOD OOA CP<D1>D2 BELL = 12 30 00 10:14:36

Don't settle for non-standard Communications Protocol! Access Micro Net, Source, Bulletin Boards, Local Mainframe, etc.

- Complete Package — Includes RS232 Interface Board and software (does not include modem)
- Communicates in Industry Standard ASCII
- Upload/Download to/from Disk
- Automatic File Translation
- Can be controlled from keyboard or user supplied basic or machine language program

Specify: 3.0 or 4.0 ROMS or 8032 Commodore Computer 4040 or 8050 or PEDISK II Disk

Price: $129.95

ATARI AND PET EPROM PROGRAMMER

Programs 2716 and 2532 EPROMs. Includes hardware and software. PET = $75.00 – ATARI (includes sophisticated machine language monitor) = $119.95

Prowriter Printer - Excellent dot matrix print Parallel = $489.00 Serial = $600.00 IEEE = $589.00

VIC RABBIT CARTRIDGE

"High-Speed Cassette Load and Save!"

Expansion Connector

$39.95 (includes Cartridge and Manual)

"Don't waste your Life away waiting to LOAD and SAVE programs on Cassete Deck."

Load or Save 8K in approximately 30 seconds! Try it — your Un-Rabbitized VIC takes almost 3 minutes. It's not only Fast but VERY RELIABLE.

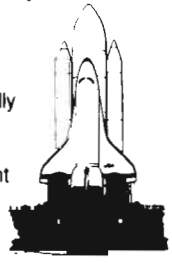
Almost as fast as VIC Disk Drive! Don't be foolish — Why buy the disk when you can get the VIC Rabbit for much, much less!

Easy to install — it just plugs in.
Expansion Connector on rear.
Works with or without Expansion Memory.
Works with VIC Cassette Deck.
12 Commands provide other neat features.

Also Available for 2001, 4001, and 8032

More than just an Assembler/Editor!

It's a Professionally Designed Software Development System



MAE
for
PET
APPLE
ATARI
~~$150.95~~
NEW PRICE
$99.95

Blast off with the software used on the space shuttle project!

- Designed to improve Programmer Productivity.
- Similar syntax and commands - No need to relearn peculiar syntaxes and commands when you go from PET to APPLE to ATARI
- Coresident Assembler/Editor - No need to load the Editor then the Assembler then the Editor, etc
- Also includes Word Processor, Relocating Loader, and much more
- Options: EPROM Programmer, unimplemented opcode circuitry
- STILL NOT CONVINCED: Send for free spec sheet!

TRAP 65
TRAP 65 is a hardware device that plugs into your 6502's socket. Prevents execution of unimplemented opcodes and provides capability to extend the machines' instruction set.
For PET/APPLE/SYM.
Reduced from $149.95 to $69.95

DC Hayes Smart Modem = $235.00
DC Hayes Micro Modem II = $289.00

Rana Disk Drive - 375
4 Drive Controller - 114

5¼ INCH SOFT SECTORED DISKETTES

Highest quality. We use them on our PETs, APPLEs, ATARIs, and other computers. $22.50/10 or $44.50/20

EPROMS 2716 = $6.50 2532 = $12.50
Over 40 Commodore Programs by Baker (on 4040) = $25.00

Eastern House

3239 Linda Dr.
Winston-Salem, N.C. 27106
(919) 924-2889 (919) 748-8446
Send for free catalog!

VISA
MasterCard

Circle No. 14

Commodore 64
HARDWARE AND SOFTWARE

MASS STORAGE:

PETDISK II High Performance FLOPPY DISK

PEDISK directly transfers data to computer memory. This and the 250000 bps transfer rate means performance up to 10 times faster than a serial bus disk.

Model C340-2 Dual 3'... $995.00 Model C877-1 Single 8'... $1095.00
Model C540-2 Dual 5'... $895.00 Model C877-2 Dual 8' ... $1695.00

80 COLUMN VIDEO:

Screenmaker 80 column VIDEO BOARD..... $159.95
Give the 64 a screen full of characters. Screenmaker gives a complete set of characters (80X24) in a 2K Video RAM. Software to link the system is included.

WORD PROCESSING:

COPY-WRITER Professional Word Processor..... $145.00
The next logical step in the evolution of Word Processors. Copy-Writer has the features found in the best and more. Double columns, shorthand, the works!

COMMUNICATIONS:

COMPACK Intelligent Terminal Package..... $129.95
A complete communications control center – record/read to/from disk – convert files ASCII, BASIC, BINARY, MAE – print incoming data. Complete with software, port board and cable.

LANGUAGES:

fullFORTH+ enhanced fig Forth for Commodore 64... $100.00
Strings, floating point, editor, conditional assembler, interpreter, and more are included in fullFORTH +. Target Compiler is also available for $50.00

KMMM PASCAL for Commodore 64 by Wilserve.... $85.00
One of the newest HL languages, KMMM PASCAL is a true compiler that generates machine code from PASCAL source... FAST! Editor, Compiler, Translator included.

UTILITIES:

Copymaker SINGLE DISK BACKUP ROUTINE..... $30.00
Copymaker allows a 1541 owner to quickly backup an entire floppy disk on ONE DRIVE! Simple swap prompting and full use of memory make this easy to use and essential for any disk owner.

MAE Macro Assembler Editor from EHS..... $ 99.95
MAE has become the standard of the 6502 industry by providing the power and ease of use needed by the best assembly programmers. MAE is a complete development system including a word processor and lots of source goodies.

MICROTECH is your complete 64 center. Dealer inquiries invited.

cgrs MICROTECH

P.O. BOX 102
LANGHORNE, PA 19047
215-757-0284

Packing

The Commodore relative file format is somewhat easy to use; that is, if you're working with strings. Storing numeric data can become somewhat cumbersome since they must be converted to strings beforehand then concatenated with commas as delimiters. Reading the record fields back to numeric data can become even more of a headache as the strings must be separated properly and converted to real numbers. When the size of the records exceeds 80 characters it becomes even more painful to read them from the file. Here is a small machine language routine which will help overcome most of these problems.

Basically what this routine will do is either write or read a single dimension array of numbers to or from a previously opened relative file. The numbers are basically written to the file in floating point format. Since each number requires only 5 bytes we can write up to 50 numbers on a single record with a maximum length of 254. When a record is read from the file it transfers directly to the memory assigned to the designated array so no further manipulations are required.

Care must be taken however that the record length is long enough to hold the array. With a record size of 254 a dimensioned array of 49 is maximum allowed.

NOTE: This program is designed to work with BASIC 4.0 only.

Another limitation is that the entire array must be read or written at once. Trying to write a smaller array where a larger array was previously written will cause all of the old data to be lost so one should take care to read and write the same size array to a given file. Reading only the lower portion of an

Circle No. 6

Arrays Into Relative Files

by Paul Donato
Sudburg, Ontario, Canada

```
READY.

 5 REM POKE MACHINE CODE INTO FIRST CASSETTE BUFFER
 10 FORI=634TO745:READX:POKEI,X:NEXTI
 20 DATA32,245,190,32,152,189,165,68,133,0,165
 30 DATA69,133,1,56,165,68,233,1,133,68,165,69
 40 DATA233,0,133,69,160,0,177,68,133,2,24,42,42
 50 DATA101,2,133,2,32,245,190,32,152,189,32,45
 60 DATA201,165,18,240,3,76,0,191,165,17,133,210
 70 DATA170,96,32,122,2,32,201,255,160,0,177,0,32
 80 DATA210,255,196,2,240,4,200,76,192,2,32,204,255
 90 DATA96,32,122,2,32,198,255,160,0,32,228,255,145
 95 DATA0,196,2,240,4,200,76,217,2,32,204,255,96
 97 REM
 98 REM NOW CHECK THE PROGRAM
 99 REM
 100 DIMA(49),B(49)
 110 FORI=0TO49:A(I)=RND(0):NEXTI
 120 DOPEN#1,"TFLE",D0,L254
 130 RECORD#1,1:SYS696,A(0),1
 140 RECORD#1,1:SYS721,B(0),1
 150 FORI=0TO49:PRINTA(I),B(I):NEXTI
 160 DCLOSE#1
READY.
```

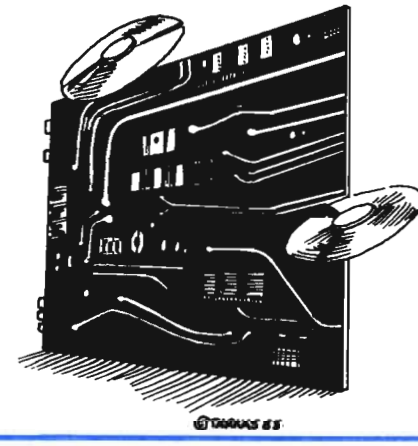
```
    C*
         PC   IRQ   SR AC XR YR SP
    .;  B780 724D 3A 9E 35 34 FA
    .
    .:  027A 20 F5 BE 20 98 BD A5 44
    .:  0282 85 00 A5 45 85 01 38 A5
    .:  028A 44 E9 01 85 44 A5 45 E9
    .:  0292 00 85 45 A0 00 B1 44 85
    .:  029A 02 18 2A 2A 65 02 85 02
    .:  02A2 20 F5 BE 20 98 BD 20 2D
    .:  02AA C9 A5 12 F0 03 4C 00 BF
    .:  02B2 A5 11 85 D2 AA 60 20 7A
    .:  02BA 02 20 C9 FF A0 00 B1 00
    .:  02C2 20 D2 FF C4 02 F0 04 C8
    .:  02CA 4C C0 02 20 CC FF 60 20
    .:  02D2 7A 02 20 C6 FF A0 00 20
    .:  02DA E4 FF 91 00 C4 02 F0 04
    .:  02E2 C8 4C D9 02 20 CC FF 60
    .:  02EA FF 00 FF 00 FF 00 FF 00
```

array, however, should present no problems.

The basic program shown pokes the machine language routine into the first cassette buffer at 027a. Line 100 dimensions a and b to their maximum permitted size for a file of recordsize 254. It is important that the numbers are dimensioned correctly or the program will fail. Line 110 creates 50 random numbers in the array A(49) and line 120 opens a relative file called 'TFLE' which is set up with records of 254 bytes. Line 130 writes the array a(49) to record #1 of the file. Line 140 writes that same record into the array b(49). Line 150 prints out both arrays to see if they are equal.

The syntax of the machine language call is SYS696,A(O),1. The first member of the array we wish to transfer must appear after the first comma. It must always have a zero in the brackets. The 1 following the next comma is the logical file number that is open and that we wish to transfer to. This can be any valid value. The read portion syntax is identical but is called at location 721.

You will find that any limitations in using this routine are more than offset by the speed at which the transfers will occur.□



An Introduction to Assembly Language Programming on the VIC-20

Part V—Branches and Comparisons

by Eric Giguere
Peace River, Alberta, Canada

Last month I introduced you to the concept of loading and storing the 6502's registers. Let's review these concepts. LDA, LDX and LDY are the instructions that tell the computer to load a value into the accumulator, X-register, and Y-register, respectively. The opposites of these are STA, STX and STY, which will store the values of the registers into memory. Along with each of these instructions there must be either a value of an address, so that the computer knows where to get (load) or put (store) the specified register. This is the addressing mode discussed in Part III. (See Example 1)

```
LDA #$01—loads the accumulator with the value $01
STA $E2—stores it in memory location $E2
LDX $7F—loads the X-register from location $7F
STX $8000—stores it at $8000(32768)
LDY $1EBF,X—loads the Y-register with the value it finds at location
     ($1EBF + value of X-reg.)
STY $00—stores it at location $00
```

On their own, these commands cannot do very much, except change the values of some locations, as was explained last month. But this month we'll learn about branches and comparisons, and how we can use them for practical things.

Addresses

Before going on with this month's topic, I want to make a comment about the way memory addresses are stored in memory, because it confuses people. The 6502 chip (and 6510) stores addresses in **reverse order** from which they're read. This means that the address $1E2F will be stored in two bytes of memory as 2F 1E, instead of 1E 2F. This is often referred to as low-byte, high-byte format, as the lower (rightmost) byte—in this case $2F—is stored before the higher byte ($1E). This should be remembered when programming from monitor, as the computer could jump to the wrong address if you store it in high-byte, low-byte format. Of course, those of you with an assembler (like my EDIT/ASM) or at least a one-line assembler/disassembler (like the VIC-MON cartridge) don't have to worry about this, as it is done automatically.

Comparisons: The IF of Assembly Language

Now that we can load values into the registers, it'd be nice to be able to do something with it other than storing it. This is where the comparison instructions of the 6502 come in. There are three of them: one for each register. CMP is used for the accumulator, while CPX and CPY are used for the X- and Y-registers (CMP is the most powerful—it has the most addressing modes). What these instructions do is compare the value of the specified register against that of a memory location. It sets some flags in the status register against that of a memory location. It sets some flags in the status register (explained below) according to the results of the comparison, while leaving the register itself intact, which means that you don't have to reload the value into the register. (See Example 2 for comparison sample.)

```
LDA $3F—load accumulator from location $3F
CMP #$0D—compare to the value $0D (13)
... ...—space for branch statement
LDA $F6—continue with program
```

This example will load the accumulator from $3F and then compare it to the value $0D. The space is left for a branch statement, which we'll discuss later. We could have made the example different by using LDX...CPX or LDY... CPY. It would have had the same effect, but would use the X- or Y-register instead. As it is written, the CMP will set or clear some flags depending on whether or not certain conditions are present. These flags are then used by an appropriate branch statement, for which I left a space. The LDA $F6 is there for no particular reason other than to show that the program continues if the branch is not taken. So basically, the compare instruction acts like the IF in BASIC. It checks to see if a branch (like THEN GOTO) can take place or not.

The Status Register

In Part III I mentioned that the 6502 also had another register, called the **status register**, that was useful in making comparisons. This register (abbr. P—for Processor Status Register) is really nothing but a single byte wired to use its bits as flags (indicators). Figure 1 gives a representation of the status register and what each bit represents.

The status register reflects the "condition" of the last operation performed by the microprocessor, if it was capable of changing the P register. If there was a carry, the C flag (bit 0) is set. If the last operation resulted in a zero, the Z flag (bit 1) is set—otherwise it is reset to 0. Going through the rest: the I flag enables or disables inter-

rupts; the D flag indicates the decimal mode; the B flag that a break (BRK) instruction was executed; the V flag that there was an overflow; and the S flag that the byte is negative or positive. Only the S, V, Z and C flags are used by branch instructions; the rest represent conditions. Don't concern yourself with what each flag is used for—it will all be explained in due time. All you have to understand is the idea behind the status register.

Branches: Powerful THEN Statements

Now that we can set flags in the status register, we need to use them somehow. This is where **branches** come in. A branch is an instruction to the microprocessor to jump forward or backward a specified number of bytes **if a certain condition in the status register is met**. That condition depends on the branch instruction itself, of which there are eight. (See Example 3 for listing.)

BCC—branch on carry clear
BCS—branch on carry set
BEQ—branch if equal (Z flag = 1)
BNE—branch if not equal (Z flag = 0)
BMI—branch if negative (minus)
BPL—branch if positive (plus)
BVC—branch on overflow clear
BVS—branch on overflow set

As you can see, each branch has an opposite, such as BCC and BCS. An instruction like BNE $03 would cause the chip to jump three bytes ahead **if** the last comparison was between two unequal (not equal) values. We could use the opposite if we wished—it would then be BEQ $03—but this would cause the chip to jump three ahead only if the last values compared were equivalent. Thus you can program branches for any number of possible situations.

Signed Numbers

As I mentioned, a branch instruction allows you to either jump backwards or forwards. Alas, the range is not unlimited, and must be able to fit inside on byte. (Each branch takes two bytes—one for the instruction itself, and the other for the value to jump). So we could assume that the most it could jump was 255, or $FF—right? (A byte only holds up to 255). This would normally (isn't there anything normal?!) be right, except for one small problem: there is no way to tell if you want to go backward or forward. So some smart person came up with the idea of using one bit of the value to jump as a flag to indicate this. The leftmost bit (bit 7) was chosen to do so. This means that the range of a branch instruction is limited to +127 to −128. This should be kept in mind, otherwise your system could crash.

Right now you're probably wondering how we can represent negative values in binary so that the computer could understand what we mean. Lets examine a byte:

bit 7 6 5 4 3 2 1 0
0 1 1 1 1 1 1 1

Bit 7 is our positive/negative flag, and since it is zero, we will exclude it from our calculations. Thus the byte represents the number 127 decimal ($2^6 + 2^5 + 2^4 + 2^3 + 2^2 + 2^1 + 2^0 = 127$). This is the limit of our positive numbers since adding one would clear bits 0 to 6 and set bit 7, which would mean the byte is negative. In any case, the numbers 0 to 127 (0 is considered positive in assembly language) take up the first 128 possible combinations in a byte. Since a byte can hold from 0 to 255, there are still another 128 positions left unfilled (0 to 255 = 256 positions, minus 128 = 128). These are negative values since they all have the high bit (bit 7) on, and thus also represent a value of 128 or greater (ignoring the sign). Following the pattern of positive numbers, you'd probably expect

1 0 0 0 0 0 0 0

to represent −0 (negative zero) since the sign bit is the only one on. In fact, that's quite wrong. The value 10000000 binary represents **−128**, not −0. How did we get this? You simply take the negative number and add it to 256. Doing this with −128, we show it as:

```
   256
+(−128)      add neg. value
   128       resultant ($80 hex)
```

The resultant is $80, or %10000000. The number −20 could then be calculated as:

```
   256
+(−  20)
   226       ($E2)
```

In binary this would be:

1 1 1 0 0 0 1 0

Similarily, −1 would be:

```
   256
+(−   1)
   255       ($FF)
```

or

1 1 1 1 1 1 1 1

The whole range of signed numbers goes something like this:

+127	%01111111	$7F
+126	%01111110	$7E
.	.	.
.	.	.
.	.	.
+ 1	%00000001	$01
0	%00000000	$00
− 1	%11111111	$FF
.	.	.
.	.	.
.	.	.
−127	%10000001	$81
−128	%10000000	$80

I realize that this may be confusing, but it is probably the easiest way to represent signed numbers in one byte.

It's Relative

One nice thing about branches is that they are **relative**, which means it will execute properly no matter where it's put in memory (some instructions must always be changed). For example, if you put a BEQ $0F at location $033C (the cassete buffer), and then moved it to $03FC, it would still cause the chip to jump 15 ($0F) ahead, regardless of its present position. It's all relative to the chip's present position, which is why branches are also called "relative branches."

Using Branches with Assemblers

Using branches on an assembler is a lot easier than with a monitor. All you have to do is specify the target label of the line you wish to go to, and the branch will be automatically calculated if within the correct range. The same sort of thing is done with the VICMON cartridge. You specify the target address (such as BNE $1201), and if it's within the proper range (−128 to +127), it will automatically place the

proper value into memory. When you disassemble it, it will also give you the address, just so that you don't have to figure out that BNE $AD means to jump back 83 bytes. I just wanted to make this clear so that you don't get confused.

Branch if Equal . . .

The first branch we'll look at is BEQ, meaning branch if equal. Upon receiving this instruction, the chip checks to see if the Z flag in the status register is set. If it is, it branches; otherwise it continues with the next instruction. An example of this would be:

```
START LDA #$03
      CMP #$FF
      BEQ SKIP
      LDX #$2D
SKIP  LDY $FD
```

The accumulator will be loaded with $03 and then compared to $FF (255). Since they are not equal, the Z flag is set to 0, and the BEQ test fails, and it executes the LDX #$2D. Naturally, this is bad coding, since the accumulator will never contain $FF, but I just wanted to give you a demonstration of using the branch after a compare.

Setting the Z Flag

The Z flag is probably the one set most often. Loading or affecting the contents of a register in any way whatsoever will either set or clear the Z flag, depending if the new contents of the register equals zero or not. Thus if you do a LDA #$00, the Z flag will be set, since the register now holds a value of zero. A compare also sets the Z flag if both items being compared are equal—otherwise it is cleared to zero. So testing for a zero value does not necessarily need a compare, since a BEQ statement would work just as well without it.

Branch if Not Equal . . .

The opposite of BEQ is BNE, branch if not equal, and this is usually the more common of the two since it is used in loops, explained below. BNE tests to see if the Z flag is **cleared** (0), and if it is, causes the chip to branch to the specified address. An example would be:

```
LDA $3B
CMP #$EB
BNE CONTINUE
.
.
.
CONTINUE LDA #$FF
```

If the value in $3B **does not equal** $EB, then it will branch to the code with the label CONTINUE. Otherwise it will continue with the code after the branch.

Loops

Loops in assembly language are not very hard to program, and can be very handy. The following is an example of a loop:

```
LDY#$FF
LOOP1 DEY
BNE LOOP1
```

Here you are introduced to a new instruction. DEY decreases the present value in the Y-register by one. A similar statement is DEX, which operates on the X-register. And the opposites of these statements are INY and INX, which **increase** the appropriate register by one. They come in very handy for loops. In the example, the Y-register is first loaded with $FF, and then decreased by one with the DEY instruction. A test is then made to see if Y does not equal zero. Since Y only equals $FE (254), the test is positive (the Z flag is clear) and the computer backtracks to LOOP1, where it encounters the DEY statement again and repeats the process of checking to see if the register is not equal to zero. Finally, after 254 loops, the Y-register equals zero, and the test fails. The computer continues on with its work, after having been delayed a few milliseconds.

The following is another example of a loop. It uses the X-register instead of the Y, and uses INX statements along with BNE:

```
LDX #$00
LOOP2 INX
BNE LOOP 2
```

Looking at this, you're probably thinking that the computer will be caught in an endless loop, since X will never equal zero, and so be able to leave the loop by failing the BNE test. Normally, this would be correct, but not here. A byte can be compared to a score counter in a game: if it gets past a certain number, the whole counter rolls over back to zero, as such:

```
  1 1 1 1 1 1 1 1  (255)
+               1  (  1)
-----------------------
1 0 0 0 0 0 0 0 0  (256)
```

As you can see, the new number is %100000000. But since this is a 9-bit number and the registers can only hold 8 bits (a byte), the extra digit (1) is ignored, and thus the register now holds %00000000, or zero. If we apply this to our example, we can see that once we get to $FF and increment that, we'll get $00, after which the BNE fails and the computer goes about executing whatever follows this simple loop. It isn't that hard to understand, is it?

Next Month...

I'm running out of room here, so I'll leave the rest of my explanation about loops until next month, at which time I'll include some practical examples, including a routine to scroll the screen to the left. If you have any problems in the meantime, feel free to contact me at Box 901, Peace River, Alberta, Canada TOH 2X0

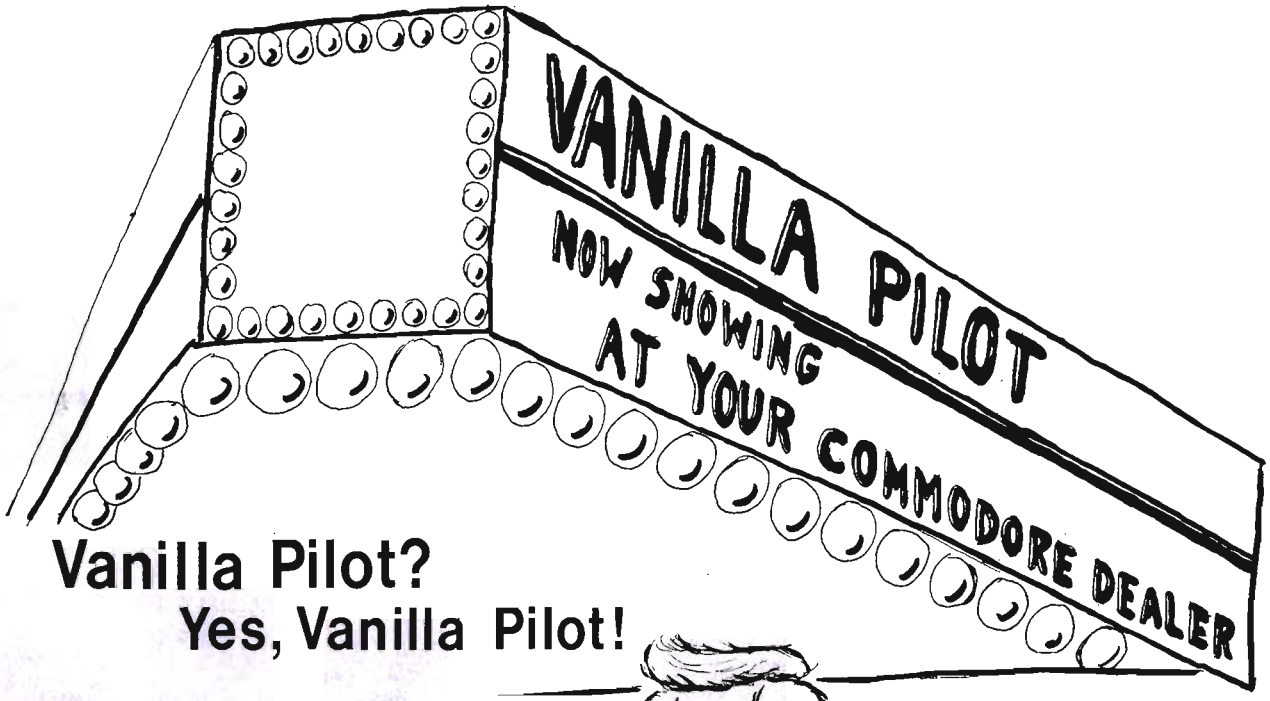
(P.S.—A note to the VIC owners who typed in that lengthy monitor listing last month—if you did it right, you should have put the words "HI THERE!" at the top corner of the screen. I realize that it was quite a tedious and useless task to type all that in, so next month I'm also presenting a routine to print any message to the screen using the loops.)

Figure 1:

Bit Position

```
7 6 5 4 3 2 1 0
S V   B D I Z C
```

S: sign status
V: overflow flag
B: break flag
D: decimal mode flag
I: interrupt enable/disable
Z: zero flag
C: carry status
(bit 5 is unused)



Vanilla Pilot?
Yes, Vanilla Pilot!

What is Vanilla Pilot?

Vanilla Pilot is a full-featured pilot language interpreter including TURTLE GRAPHICS for the PET or CBM 4000, 8000, 9000 and CBM-64 series computers.

At last! A Pilot interpreter for the Commodore computers. This Pilot includes some powerful extensions to the screen editor of the computer. Things like FIND/CHANGE, TRACE and DUMP enhance the programming environment.

The TURTLE has a very powerful set of graphics commands. You can set the Turtle's DIRECTION and turn him LEFT or RIGHT. The pen he carries can be set to any of the 16 colors in the CBM-64. He can DRAW or ERASE a Line.

What else? Vanilla Pilot is all this and much, much more. In fact, we can't tell you about all of the features of the language in this small ad. So rush down to your local Commodore computer dealer and ask him to show you Vanilla Pilot in action. Be sure to take the $2.00 discount coupon.

Hurry, you have only a short time to redeem your coupon. So use it now!

Tamarack Software
Darby, MT. 59829

SAVE $2.00

VANILLA PILOT

Retailer: Send the redeemed coupons to Tamarack Software, Darby, MT 59829. We will pay $2. plus $.35 handling for the redemption of these coupons. If requested, invoices showing sufficient purchase of Vanilla Pilot must be submitted. Coupons submitted to us more than 30 days after the expiration date will not be honored.

Expires April 15, 1983.

Circle No. 42

Peek & Poke
A USR Instruction Sheet

by George Gaukel
Tacoma, WA

This program provides a set of USR instructions to allow direct BASIC access to the SID and VIC chips and for some graphic functions. The program is stored in the RAM area of 49152 ($C000) to ($CED1).

The program is self-initializing and once run, a machine language version may be saved using a monitor. If a machine language version is loaded, you need to initialize the program as in lines 130 and 140 of the listing. This sets the USR vector to $C100.

Note that USR(0) only initializes the program's internal tables and pointers. USR(1) will execute the mapping sequence. USR(1) stores the current VIC map and installs the preset map. This allows toggling between two VIC maps, as USR(2) returns to the map that USR(1) stored. If USR(1) is executed twice in a row then the current and previous maps will be the same and you will be locked into the preset map until a new USR(0) and USR(1) are executed.

The RESTORE key will not allow for a proper recovery to the BASIC map, as it does not clear the BMM, ECM and MCM bits. I usually add the following line to a program:

60000 A = USR(0),0,1,4:
A = USR(1): A = USR(17):
A = USR(19): A = USR(21)

If I crash, I CLR-HOME and enter GOTO60000. This is easier than trying to enter all of the above without a video display.

All numbers passed to the USR program must be positive and in the range of 0-65535 (decimals will be truncated) or there will be an illegal quantity error. If the expected number of variables is not present, there will be a syntax error. In the instruction list I have indicated byte and flag types. All this means is that the high byte is

```
100 REM 'USER.DATA'
110 FOR AD=49152TO52946:READ DA
120 POKE AD,DA:NEXT AD
130 POKE785,0 : POKE786,193
140 A=USR(0),0,1,4 : A=USR(1)
150 END
160 DATA 36, 193, 33, 194, 98, 194
170 DATA 132, 194, 154, 194, 177, 194
180 DATA 209, 194, 227, 194, 239, 194
190 DATA 38, 195, 56, 195, 144, 204
200 DATA 144, 204, 144, 204, 144, 204
210 DATA 144, 204, 87, 195, 96, 195
220 DATA 105, 195, 114, 195, 123, 195
230 DATA 132, 195, 141, 195, 150, 195
240 DATA 159, 195, 168, 195, 177, 195
250 DATA 186, 195, 195, 195, 220, 195
260 DATA 48, 198, 144, 204, 227, 195
270 DATA 235, 195, 243, 195, 62, 196
280 DATA 80, 196, 101, 196, 122, 196
290 DATA 140, 196, 165, 196, 224, 196
300 DATA 238, 196, 244, 196, 250, 196
310 DATA 2, 197, 10, 197, 18, 197
320 DATA 26, 197, 34, 197, 42, 197
330 DATA 59, 197, 67, 197, 144, 204
340 DATA 144, 204, 144, 204, 144, 204
350 DATA 75, 197, 97, 197, 123, 197
360 DATA 156, 197, 175, 197, 194, 197
370 DATA 213, 197, 191, 198, 195, 198
380 DATA 213, 199, 217, 199, 254, 200
390 DATA 2, 201, 39, 201, 69, 201
400 DATA 116, 201, 144, 204, 144, 204
410 DATA 144, 204, 144, 204, 144, 204
420 DATA 144, 204, 144, 204, 144, 204
430 DATA 144, 204, 144, 204, 144, 204
440 DATA 144, 204, 144, 204, 144, 204
450 DATA 144, 204, 144, 204, 144, 204
460 DATA 188, 201, 246, 201, 253, 201
470 DATA 27, 202, 56, 202, 87, 202
480 DATA 116, 202, 183, 202, 210, 202
490 DATA 21, 203, 40, 203, 59, 203
500 DATA 85, 203, 117, 203, 131, 203
510 DATA 137, 203, 144, 204, 144, 204
520 DATA 144, 204, 143, 203, 151, 203
530 DATA 159, 203, 167, 203, 207, 203
540 DATA 214, 203, 221, 203, 228, 203
550 DATA 14, 204, 18, 204, 52, 204
```

cleared. Where byte values are less than the range of 0-255 are indicated, I have masked for the value. When values are returned they will be double byte, signed or unsigned as appropriate.

For those with a relocating monitor, the first page ($C000-$C0FF) of the program is an internal word table in the range of $C000-$CFFF. The code starts at $C1000 and is continuous to the absolute tables which start with $FF, which should abort most relocators.

The X-Y and line plotting will allow for positive wrap-around. X-Y may be any value in the range of 0-65535 and the routines will rescale the values.

The SID routines maintain an image of the write only latches. This allows for simplified commands such as voice on or off.

The USR program is not designed to replace the awareness of how the chips operate. It is designed to provide programmer access to the chips using a systematic format and allow limited time (for most of us) to be better spent in program applications, rather than trying to do something in BASIC which should be done in machine language.

With a 4K limit I have included only those commands I find most useful. There are many things that can be done to the bit map, using standard library calls, such as character rotation and simplified scrolling in both axes. Send in a wish list, and if there is enough interest I will publish a supplement.

The example programs should be self-explanatory.□

USR Command List

```
  ,B     0 To 255 BYTE
  ,DB    0 TO 65535 DOUBLE BYTE
  ,FL    =0 FLAG OFF/CLR
  ,FL    0 FLAG ON/SET
  A=USR(32),B
  A=USR(9),DG
  A=USR(90),B,FL,FL,FL
SYNTAX:
  A=USR(0),0,1,4
  B=USR(1)
  B=USR(BB(6)))
  X=USR(90),1,0,0,0
```

```
560 DATA 56, 204, 60, 204, 64, 204
570 DATA 147, 204, 28, 207, 28, 207
580 DATA 35, 207, 42, 207, 32, 247
590 DATA 183, 201, 0, 208, 27, 141
600 DATA 10, 207, 152, 201, 123, 176
610 DATA 19, 10, 170, 173, 247, 192
620 DATA 72, 173, 246, 192, 72, 189
630 DATA 1, 192, 72, 189, 0, 192
640 DATA 72, 96, 76, 73, 188, 32
650 DATA 62, 206, 173, 188, 206, 41
660 DATA 3, 141, 20, 207, 173, 190
670 DATA 206, 41, 15, 141, 18, 207
680 DATA 173, 192, 206, 41, 14, 141
690 DATA 16, 207, 169, 8, 141, 0
700 DATA 207, 169, 0, 141, 1, 207
710 DATA 169, 64, 141, 2, 207, 169
720 DATA 1, 141, 3, 207, 169, 0
730 DATA 141, 4, 207, 169, 4, 141
740 DATA 5, 207, 174, 20, 207, 189
750 DATA 172, 206, 141, 249, 206, 141
760 DATA 7, 207, 141, 8, 207, 169
770 DATA 0, 141, 6, 207, 141, 248
780 DATA 206, 169, 8, 45, 16, 207
790 DATA 240, 9, 24, 169, 32, 109
800 DATA 7, 207, 141, 7, 207, 162
810 DATA 62, 160, 253, 32, 39, 205
820 DATA 162, 0, 165, 253, 157, 189
830 DATA 207, 232, 165, 254, 157, 189
840 DATA 207, 232, 134, 2, 162, 253
850 DATA 160, 74, 32, 175, 205, 166
860 DATA 2, 224, 31, 144, 229, 173
870 DATA 18, 207, 10, 170, 189, 189
880 DATA 207, 141, 252, 206, 189, 190
890 DATA 207, 141, 253, 206, 173, 16
900 DATA 207, 10, 170, 189, 189, 207
910 DATA 141, 250, 206, 189, 190, 207
920 DATA 141, 251, 206, 162, 76, 160
930 DATA 253, 32, 39, 205, 162, 0
940 DATA 165, 253, 157, 55, 207, 232
950 DATA 165, 254, 157, 55, 207, 232
960 DATA 134, 2, 162, 253, 160, 72
970 DATA 32, 175, 205, 166, 2, 224
980 DATA 51, 144, 229, 162, 0, 134
990 DATA 253, 134, 254, 165, 253, 157
1000 DATA 107, 207, 232, 165, 254, 157
1010 DATA 107, 207, 232, 134, 2, 160
1020 DATA 70, 162, 253, 32, 175, 205
1030 DATA 166, 2, 224, 81, 144, 229
1040 DATA 24, 169, 248, 109, 252, 206
1050 DATA 141, 254, 206, 169, 3, 109
1060 DATA 253, 206, 141, 255, 206, 96
1070 DATA 173, 136, 2, 141, 22, 207
1080 DATA 173, 24, 208, 141, 24, 207
1090 DATA 173, 0, 221, 141, 26, 207
1100 DATA 173, 253, 206, 141, 136, 2
1110 DATA 173, 18, 207, 32, 241, 204
1120 DATA 13, 16, 207, 141, 24, 208
```

A = USR(Z),A,B,C
B = USR(X%)
B = USR(X(Y))

USR0 PRESET/VIC GENERATE MAPS
,B,B,B
BANK 0-3; VIDEO MEMORY 0-15; VIDEO BASE 0-14 STEP2

USR1 GO VIC PRESET SETUP

USR2 RETURN PREVIOUS SETUP

USR3 PRESET BIT MAP
,B
SET THE 8000 BYTES TO B

USR4 PRESET COLOR RAM
,B
SET ALL COLOR NIBBLES TO VALUE 0-15

USR5 PRESET POINTER RAM
,B,B
HI NIBBLE 0-15; LO NIBBLE 0-15

USR6 SET BGC REGISTERS
,B,B
BACKGROUND REG 0-3; COLOR 0-15

USR7 SET BORDER COLOR
,B
COLOR 0-15

USR8 COPY CHAR ROM 0 OR 1
,B,B
CHARACTER ROM 0-1; STORAGE POINTER 0-14 STEP 2

USR9 CHANGE END BASIC MEM
,DB
0-65535

USR10 CHANGE START BASIC MEM
,DB
0-65535

USR16 SET BMM BIT

USR17 CLEAR BMM BIT

USR18 SET ECM BIT

USR19 CLEAR ECM BIT

USR20 SET MCM BIT

USR21 CLEAR MCM BIT

USR22 SET 38/40 COL BIT

USR23 CLEAR 38/40 COL BIT

USR24 SET DIN BIT

USR25 CLEAR DIN BIT

USR26 SET 24/25 ROW

USR27 CLEAR 24/25 ROW

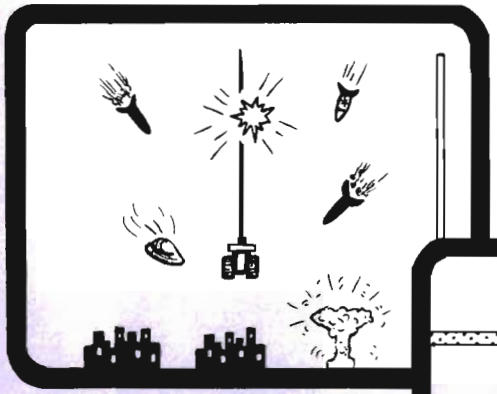
USR28 SCROLL Y
,B
SCROLL 0-7

```
1130 DATA 173, 2, 221, 72, 169, 3
1140 DATA 120, 141, 2, 221, 173, 0
1150 DATA 221, 41, 252, 13, 20, 207
1160 DATA 73, 3, 141, 0, 221, 104
1170 DATA 141, 2, 221, 88, 96, 173
1180 DATA 22, 207, 141, 136, 2, 173
1190 DATA 24, 207, 141, 24, 208, 173
1200 DATA 2, 221, 72, 169, 3, 120
1210 DATA 141, 2, 221, 173, 26, 207
1220 DATA 141, 0, 221, 104, 141, 2
1230 DATA 221, 88, 96, 32, 47, 206
1240 DATA 169, 64, 133, 253, 169, 31
1250 DATA 133, 254, 162, 76, 160, 251
1260 DATA 32, 39, 205, 32, 165, 204
1270 DATA 96, 32, 47, 206, 173, 188
1280 DATA 206, 41, 15, 141, 188, 206
1290 DATA 169, 0, 133, 251, 169, 216
1300 DATA 133, 252, 32, 157, 204, 96
1310 DATA 32, 53, 206, 173, 188, 206
1320 DATA 32, 241, 204, 133, 251, 173
1330 DATA 190, 206, 41, 15, 5, 251
1340 DATA 141, 188, 206, 162, 66, 160
1350 DATA 251, 32, 39, 205, 32, 157
1360 DATA 204, 96, 32, 53, 206, 173
1370 DATA 188, 206, 41, 3, 170, 173
1380 DATA 190, 206, 41, 15, 157, 33
1390 DATA 208, 96, 32, 47, 206, 173
1400 DATA 188, 206, 41, 15, 141, 32
1410 DATA 208, 96, 32, 53, 206, 173
1420 DATA 188, 206, 41, 14, 10, 170
1430 DATA 189, 189, 207, 133, 253, 189
1440 DATA 190, 207, 133, 254, 169, 0
1450 DATA 133, 251, 133, 20, 169, 8
1460 DATA 133, 21, 169, 208, 133, 252
1470 DATA 173, 190, 206, 41, 1, 240
1480 DATA 4, 169, 216, 133, 252, 32
1490 DATA 217, 204, 32, 12, 206, 32
1500 DATA 234, 204, 96, 32, 107, 206
1510 DATA 173, 188, 206, 133, 51, 133
1520 DATA 55, 173, 189, 206, 133, 52
1530 DATA 133, 56, 96, 32, 107, 206
1540 DATA 24, 173, 188, 206, 133, 43
1550 DATA 105, 2, 133, 45, 133, 47
1560 DATA 133, 49, 173, 189, 206, 133
1570 DATA 44, 105, 0, 133, 46, 133
1580 DATA 48, 133, 50, 96, 173, 17
1590 DATA 208, 9, 32, 141, 17, 208
1600 DATA 96, 173, 17, 208, 41, 223
1610 DATA 141, 17, 208, 96, 173, 17
1620 DATA 208, 9, 64, 141, 17, 208
1630 DATA 96, 173, 17, 208, 41, 191
1640 DATA 141, 17, 208, 96, 173, 22
1650 DATA 208, 9, 16, 141, 22, 208
1660 DATA 96, 173, 22, 208, 41, 239
1670 DATA 141, 22, 208, 96, 173, 22
1680 DATA 208, 9, 8, 141, 22, 208
1690 DATA 96, 173, 22, 208, 41, 247
```

D.E.S.-SOFT ™

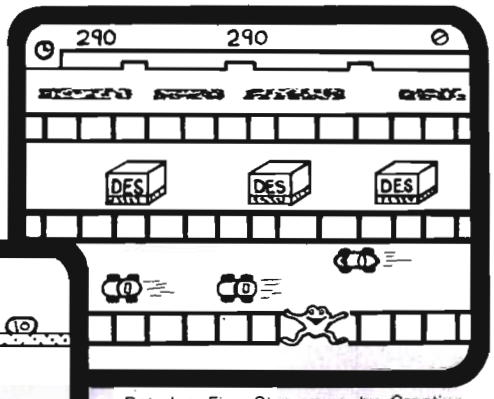
a division of
DES-Data Equipment Supply Corp.

LASER COMMAND by Bob Burnett



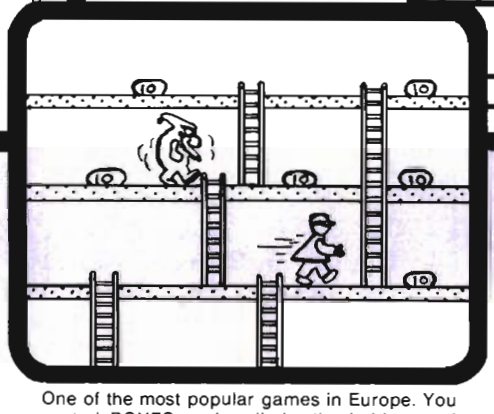
You are the commander of a squadron of laser ships. It is your duty to defend the cities of Earth against the alien onslaught. Spectacular graphics and machine code for super fast arcade fun. VIC-20 and cassette, joystick.
$20.00

HOPPER by Thomas Kim



Rated a Five Star game by Creative Computing. Avoid the cars, buildings, logs and other obstacles to bring the frog home. Machine language. VIC-20, cassette and joystick.
$20.00

BONZO (c)by Kavan



One of the most popular games in Europe. You control BONZO as he climbs the ladders and picks up point blocks. Watch out for the alien guards. Excellent graphics & sound. 100% machine code. VIC-20 w/8K expander, cassette. Joystick or keyboard.
$20.00

SHIFTY (c)by Kavan

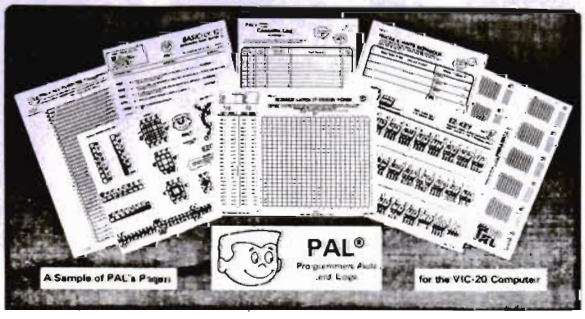
Watch the maze change as you pass thru the revolving doors. This is a really cute one. Machine language. VIC-20 w/8K expander, cassette. Joystick and keyboard.
$20.00

SPACE TRADER
by Doug Caruthers

Search for the lost planet of Alantia. 1 to 4 players. Text adventure. VIC-20 w/16K expander and cassette.
$39.95

Many exciting titles to choose from.
New Software for the CBM B500/700 series available now !!

PAL 20 ™ **$10.00**



- 95 pages of aids, worksheets & logs
- Something for every VIC-20 programmer
- Coming soon for the Commodore 64

NEW for the VIC-20 & 64

electronic ab VIC-20 products

VIC FORTH **$59.95**
This is a highly capable language that operates from cartridge. It is based on Fig-Forth. Disk and cassette compatible. Vic Forth will work with any memory expansion. 3K of RAM is included in this cartridge.

VIC GRAPH **$49.95**
The intention of this program is to serve as a mathematical and pedagogic aid for studying complicated equations and functions by their graphs. Plots graphics in high resolution within an x-axis range defined by you. You can also "blow up" parts of a graph in detail by a specified range.

VIC STAT **$49.95**
Vic Stat is a cartridge which will simplify your work with statistics and graphic displays. It will add approximately 15 commands to BASIC. For example, bar chart, horizontal or vertical, plotting with 2024 points, printout of screen. Statistical commands for calculations of, for example, mean value, standard deviation, variance, etc.

VIC REL **$59.95**
The purpose of this cartridge is to simplify control of, for example, burglar alarms, garage doors, door locks, heating elements, lamps, radios, remote controllers, valves, pumps, telephones, accumulators, irrigation systems, electrical tools, stop watches, ventilators, humidifiers, etc., etc. This cartridge contains 6 relay outputs and 2 inputs of type optocoupler. For the VIC-20 and Commodore 64.

SEE YOUR LOCAL DEALER TO SEE OUR FINE PRODUCTS

Dealer inquiries invited ***Software Distribution Available*** **Programs wanted**

(714) 778-5455 **D E S** **Data Equipment Supply Corp. 8315 Firestone Blvd., Downey, CA 90241** **(213) 923-9361**

VIC-20™, COMMODORE™, COMMODORE 64™, and CBM™ are trademarks of Commodore Business Machines, Inc.

USR29 SCROLL X
,B
SCROLL 0-7

USR30 COPY SPRITE TO BIT MAP
,B,B,B
X 0-39; Y 0-24; SPRITE MAP 0-255

USR32 SPRITE ON
,B
SPRITE 0-7

USR33 SPRITE OFF
,B
SPRITE 0-7

USR34 MOVE SPRITE
,DB,B,B
X POSITION; Y POSITION;
SPRITE 0-7

USR35 SET SPRITE COLOR
,B,B
SPRITE 0-7; COLOR 0-15

USR36 SET SPRITE MCM BIT
,B
SPRITE 0-7

USR37 CLR SPRITE MCM BIT
,B
SPRITE 0-7

USR38 SET SPRITE MULTICOLOR REGS
,B,B
REGISTER 0-1; COLOR 0-15

USR39 CHANGE SPRITE MAP
,B,B
SPRITE 0-7; MAP 0-255

USR40 COPY SPRITE MAP TO MAP
,B,B
MAP 0-255; MAP 0-255

USR41 KILL & HOME SPRITES

USR42 READ BACKGROUND COLLISION REGISTER

USR43 READ SPRITE COLLISION REGISTER

USR44 SPRITE HORZ ON
,B
SPRITE 0-7

USR45 SPRITE HORZ OFF
,B
SPRITE 0-7

USR46 SPRITE VERT ON
,B
SPRITE 0-7

USR46 SPRITE VERT OFF
,B
SPRITE 0-7

USR48 SPRITE/BACKGROUND SET

```
1700 DATA 141, 22, 208, 96, 173, 17
1710 DATA 208, 9, 16, 141, 17, 208
1720 DATA 96, 173, 17, 208, 41, 239
1730 DATA 141, 17, 208, 96, 173, 17
1740 DATA 208, 9, 8, 141, 17, 208
1750 DATA 96, 173, 17, 208, 41, 247
1760 DATA 141, 17, 208, 96, 32, 47
1770 DATA 206, 162, 17, 173, 188, 206
1780 DATA 41, 7, 141, 188, 206, 189
1790 DATA 0, 208, 41, 248, 13, 188
1800 DATA 206, 157, 0, 208, 96, 32
1810 DATA 47, 206, 162, 22, 208, 229
1820 DATA 32, 47, 206, 160, 21, 76
1830 DATA 86, 196, 32, 47, 206, 160
1840 DATA 21, 76, 107, 196, 32, 98
1850 DATA 206, 173, 21, 208, 141, 194
1860 DATA 206, 174, 192, 206, 189, 132
1870 DATA 206, 45, 21, 208, 141, 21
1880 DATA 208, 138, 10, 170, 173, 188
1890 DATA 206, 157, 0, 208, 173, 190
1900 DATA 206, 157, 1, 208, 173, 189
1910 DATA 206, 240, 15, 174, 192, 206
1920 DATA 189, 124, 206, 13, 16, 208
1930 DATA 141, 16, 208, 24, 144, 12
1940 DATA 174, 192, 206, 189, 132, 206
1950 DATA 45, 16, 208, 141, 16, 208
1960 DATA 173, 194, 206, 141, 21, 208
1970 DATA 96, 32, 53, 206, 173, 188
1980 DATA 206, 41, 7, 170, 173, 190
1990 DATA 206, 41, 15, 157, 39, 208
2000 DATA 96, 32, 47, 206, 160, 28
2010 DATA 173, 188, 206, 41, 7, 170
2020 DATA 189, 124, 206, 25, 0, 208
2030 DATA 153, 0, 208, 96, 32, 47
2040 DATA 206, 160, 28, 173, 188, 206
2050 DATA 41, 7, 170, 189, 132, 206
2060 DATA 57, 0, 208, 153, 0, 208
2070 DATA 96, 32, 53, 206, 173, 188
2080 DATA 206, 41, 1, 170, 173, 190
2090 DATA 206, 41, 15, 157, 37, 208
2100 DATA 96, 32, 53, 206, 173, 188
2110 DATA 206, 41, 7, 133, 2, 162
2120 DATA 68, 160, 251, 32, 39, 205
2130 DATA 164, 2, 173, 190, 206, 145
2140 DATA 251, 96, 32, 53, 206, 162
2150 DATA 4, 32, 87, 205, 162, 4
2160 DATA 160, 251, 32, 39, 205, 162
2170 DATA 251, 160, 64, 32, 175, 205
2180 DATA 160, 5, 162, 2, 32, 87
2190 DATA 205, 162, 2, 160, 253, 32
2200 DATA 39, 205, 162, 253, 160, 64
2210 DATA 32, 175, 205, 32, 200, 204
2220 DATA 160, 63, 177, 251, 145, 253
2230 DATA 136, 16, 249, 32, 228, 204
2240 DATA 96, 169, 0, 141, 21, 208
2250 DATA 162, 16, 157, 0, 208, 202
2260 DATA 16, 250, 96, 173, 31, 208
```

USR49 SPRITE/BACKGROUND CLR

USR50 MOVE CURSOR
,B,B
X 0-39; Y 0-24

USR51 RETURN CURSOR X POS

USR52 RETURN CURSOR Y POS

USR57 SET COLOR NIBBLE
,B,B,B
X 0-39; Y 0-24; COLOR 0-15

USR58 SET VIDEO PTR NIBS
,B,B,B,B
X 0-39; Y 0-24; COLOR 0-15;
LO COLOR 0-15

USR59 SET B7&6 VIDEO PTR
,B,B,B
X 0-39; Y 0-24; BIT PAIR 0-3

USR60 UNSIGNED EOR RETURN
,DB,DB 0-65535

USR61 UNSIGNED AND RETURN
,DB,DB 0-65535

USR62 UNSIGNED OR RETURN
,DB,DB 0-65535

USR63 COPY CHAR BLOCK TO BIT MAP
,B,B,B,B
X 0-39; Y 0-24; STORAGE PTR 0-14
STEP2; CHAR INDEX 0-255

USR64 SET X Y HIRES
,DB,DB
X 0-65535; Y 0-65535

USR65 CLR X Y HIRES
,DB,DB
X 0-65535; Y 0-65535

USR66 SET LINE
,DB,DB,DB,DB
X1 0-65535; Y1 0-65535;
X2 0-65535; Y2 0-65535

USR67 CLR LINE
,DB,DB,DB,DB
X1 0-65535; Y1 0-65535;
X2 0-65535; Y2 0-65535

USR68 PLOT LINE - SET
,DB,DB
X2 0-65535; Y2 0-65535

USR69 PLOT LINE - CLR
,DB,DB
X2 0-65535; Y 0-65535

USR70 SET POINT
,DB,DB,B
X 0-65535; Y 0-65535;
BIT PAIR 0-3

USR71 LINE - POINTS
,DB,DB,DB,DB,B

```
2270 DATA 76, 25, 205, 173, 30, 208
2280 DATA 76, 25, 205, 32, 47, 206
2290 DATA 160, 29, 76, 86, 196, 32
2300 DATA 47, 206, 160, 29, 76, 107
2310 DATA 196, 32, 47, 206, 160, 23
2320 DATA 76, 86, 196, 32, 47, 206
2330 DATA 160, 23, 76, 107, 196, 32
2340 DATA 47, 206, 160, 27, 76, 86
2350 DATA 196, 32, 47, 206, 160, 27
2360 DATA 76, 107, 196, 32, 53, 206
2370 DATA 174, 190, 206, 172, 188, 206
2380 DATA 24, 32, 240, 255, 32, 36
2390 DATA 234, 96, 56, 32, 240, 255
2400 DATA 152, 76, 25, 205, 56, 32
2410 DATA 240, 255, 138, 76, 25, 205
2420 DATA 32, 62, 206, 32, 243, 205
2430 DATA 32, 46, 197, 173, 192, 206
2440 DATA 41, 15, 164, 211, 145, 243
2450 DATA 32, 254, 205, 96, 32, 71
2460 DATA 206, 32, 243, 205, 32, 46
2470 DATA 197, 173, 192, 206, 32, 241
2480 DATA 204, 13, 194, 206, 164, 211
2490 DATA 145, 209, 32, 254, 205, 96
2500 DATA 32, 62, 206, 32, 243, 205
2510 DATA 32, 46, 197, 173, 192, 206
2520 DATA 10, 10, 32, 241, 204, 133
2530 DATA 251, 164, 211, 177, 209, 41
2540 DATA 63, 5, 251, 145, 209, 32
2550 DATA 254, 205, 96, 32, 113, 206
2560 DATA 173, 188, 206, 77, 190, 206
2570 DATA 168, 173, 189, 206, 77, 191
2580 DATA 206, 76, 28, 205, 32, 113
2590 DATA 206, 173, 188, 206, 45, 190
2600 DATA 206, 168, 173, 189, 206, 45
2610 DATA 191, 206, 76, 28, 205, 32
2620 DATA 113, 206, 173, 188, 206, 13
2630 DATA 190, 206, 168, 173, 189, 206
2640 DATA 13, 191, 206, 76, 28, 205
2650 DATA 32, 71, 206, 32, 17, 198
2660 DATA 162, 8, 160, 3, 32, 87
2670 DATA 205, 173, 192, 206, 41, 14
2680 DATA 10, 170, 24, 189, 189, 207
2690 DATA 109, 194, 206, 133, 251, 189
2700 DATA 190, 207, 109, 195, 206, 133
2710 DATA 252, 162, 24, 160, 253, 32
2720 DATA 39, 205, 169, 8, 133, 20
2730 DATA 32, 200, 204, 160, 0, 32
2740 DATA 37, 206, 76, 228, 204, 162
2750 DATA 2, 160, 3, 32, 87, 205
2760 DATA 162, 4, 160, 3, 32, 87
2770 DATA 205, 162, 2, 160, 36, 32
2780 DATA 63, 205, 162, 4, 160, 38
2790 DATA 32, 63, 205, 32, 222, 198
2800 DATA 96, 32, 62, 206, 32, 17
2810 DATA 198, 162, 6, 160, 6, 32
2820 DATA 87, 205, 24, 173, 189, 207
2830 DATA 109, 192, 206, 141, 192, 206
```

X1 0-65535; Y1 0-65535;
X2 0-65535; Y2 0-65535;
BIT PAIR 0-3

USR72 PLOT LINE - POINTS
,DB,DB,B
X2 0-65535; Y2 0-65535;
BIT PAIR 0-3

USR90 SET VOICE;BIT,RING, SYNC
,B,FL,FL,FL
VOICE 0-3; FLAG;FLAG;FLAG

USR91 SET VOICE:AD
,B,B,B
VOICE 0-3; A 0-15; D 0-15

USR92 SET VOICE:SR
,B,B,B
VOICE 0-3; S 0-15; R 0-15

USR93 VOICE:FREQUENCY
,B,DB
VOICE 0-3; FREQUENCY 0-65535

USR94 SET VOICE: PULSE WIDTH
,B,DB
VOICE 0-3; FREQUENCY 0-4096?

USR95 SET SID CUTOFF FREQ
,B,DB
VOICE 0-3; FREQUENCY 0-4096?

USR96 SET SID:FILTER INPUTS
,B,B,B,B
FLAGS:EXT,VOICE1,VOICE2, VOICE3

USR97 SET SID:FILTER Q
,B
FILTER Q 0-15

USR98 SET SID:FILTER MODES
,B,B,B,B
FLAGS:CUTV3,HI-PASS ON, BAND-PASS ON,LO-PASS ON

USR99 VOICE GATE ON

USR100 VOICE GATE OFF

USR101 SET SID:VOLUMN
,B
VOLUMN 0-15

USR102 SET VOICE:WAVEFORM
,B
WAVE FORM 0-3

USR103 CLR SID & PSEUDO REGS

USR104 RETURN OCS3 RND

USR105 RETURN OSC3 WAVEFORM

**ALL THE REST ARE RETURNS

USR109 XBUTTON PORT2 PADDLE

USR110 YBUTTON PORT2 PADDLE

```
2840 DATA 133, 253, 173, 190, 207, 109
2850 DATA 193, 206, 141, 193, 206, 133
2860 DATA 254, 32, 97, 198, 32, 149
2870 DATA 198, 32, 97, 198, 32, 149
2880 DATA 198, 32, 200, 204, 162, 0
2890 DATA 160, 0, 177, 253, 145, 251
2900 DATA 232, 224, 21, 208, 3, 76
2910 DATA 228, 204, 142, 194, 206, 238
2920 DATA 224, 206, 208, 3, 238, 225
2930 DATA 206, 32, 222, 198, 24, 165
2940 DATA 253, 105, 3, 133, 253, 165
2950 DATA 254, 105, 0, 133, 254, 174
2960 DATA 194, 206, 76, 102, 198, 162
2970 DATA 4, 160, 38, 32, 63, 205
2980 DATA 24, 173, 222, 206, 105, 8
2990 DATA 141, 222, 206, 173, 223, 206
3000 DATA 105, 0, 141, 223, 206, 32
3010 DATA 222, 198, 238, 192, 206, 208
3020 DATA 3, 238, 193, 206, 162, 6
3030 DATA 160, 253, 32, 39, 205, 96
3040 DATA 169, 255, 208, 2, 169, 0
3050 DATA 141, 12, 207, 169, 0, 141
3060 DATA 14, 207, 162, 36, 32, 246
3070 DATA 204, 162, 38, 32, 246, 204
3080 DATA 32, 222, 198, 76, 129, 199
3090 DATA 173, 224, 206, 41, 7, 141
3100 DATA 220, 206, 173, 222, 206, 41
3110 DATA 7, 141, 218, 206, 169, 0
3120 DATA 141, 219, 206, 141, 221, 206
3130 DATA 162, 38, 160, 30, 32, 63
3140 DATA 205, 162, 30, 160, 3, 32
3150 DATA 97, 205, 162, 36, 160, 28
3160 DATA 32, 63, 205, 162, 28, 160
3170 DATA 3, 32, 97, 205, 173, 217
3180 DATA 206, 240, 19, 56, 173, 216
3190 DATA 206, 233, 25, 141, 216, 206
3200 DATA 173, 217, 206, 233, 0, 141
3210 DATA 217, 206, 208, 237, 173, 216
3220 DATA 206, 201, 25, 176, 230, 173
3230 DATA 215, 206, 240, 19, 56, 173
3240 DATA 214, 206, 233, 40, 141, 214
3250 DATA 206, 173, 215, 206, 233, 0
3260 DATA 141, 215, 206, 208, 237, 173
3270 DATA 214, 206, 201, 40, 176, 230
3280 DATA 173, 214, 206, 10, 170, 173
3290 DATA 216, 206, 10, 168, 24, 185
3300 DATA 55, 207, 125, 107, 207, 133
3310 DATA 251, 141, 210, 206, 185, 56
3320 DATA 207, 125, 108, 207, 133, 252
3330 DATA 141, 211, 206, 24, 160, 34
3340 DATA 162, 251, 32, 175, 205, 160
3350 DATA 22, 162, 251, 32, 52, 205
3360 DATA 96, 174, 218, 206, 160, 0
3370 DATA 173, 14, 207, 208, 37, 173
3380 DATA 12, 207, 240, 16, 32, 200
3390 DATA 204, 177, 251, 72, 32, 228
3400 DATA 204, 104, 29, 140, 206, 145
```

TURN YOUR COMPUTER INTO A FULL-BLOODED WORD PROCESSOR.

VIC 20™ and Commodore 64™ users, something very clever is lying in wait for you. It's called Quick Brown Fox.™

Quite simply, Quick Brown Fox is the quickest, easiest to learn, user-friendliest—and most versatile—word processing software running.

Take a look at some of these crafty features. You get full editing, even on standard displays. (The Fox supports most 80-column boards too.) You get automatic reformatting of edited text, not the tedious paragraph-by-paragraph runaround. There's more. You get single-key operation, text moving, boilerplating, tab and margin settings, right justification, proportional spacing. You get intelligent software that uses less computer memory. (That's how come it even works with an off-the-shelf VIC 20.) You also get compatibility with a wide range of printers—plus plenty more.

And you get it all for only $65. Doesn't that make you want to trot through your texts with a Quick Brown Fox?

QUICK BROWN FOX™

Call or write for more details:
548 Broadway, New York, NY 10012 (212) 925-8290
Dealer Inquiries Invited

Circle No. 9

COMPU SENSE

CARDBOARD 6
$87.95
An expansion interface for the VIC-20. Allows expansion to 40 K or accepts up to six games. May be daisy chained for more versatility.

CARDBOARD 3
$39.95
Economy expansion interface for the VIC-20

CARD "?" CARD/PRINT
$79.95
Universal Centronics Parallel Printer Interface for the VIC-20 or CBM-64. Use an Epson MX-80 or OKIDATA or TANDY or just about any other.

CARDETTE
$39.95
Use any standard cassette player/recorder with your VIC-20 or CBM-64

LIGHT PEN
$29.95
A light pen with six good programs to use with your VIC-20 or CBM-64

Prices subject to change.
TO ORDER: P. O. BOX 18765
WICHITA, KS 67218
(316) 263-1095
Personal Checks Accepted (Allow 3 Weeks)
or C.O.D. (Add $2) Handling Charges $2.00

Intelligent Software For Commodore Computers

Copycalc is an affordable electronic spread-sheet which turns your video screen into a window on a matrix of numbers. Cursor around the matrix, enter numbers; the totals reflect the changes. You can save the matrix to disk or tape, or print it or your printer. For $20 ($15 with another program), this program might justify the cost of your computer. Requires 6k RAM; smaller version available for a standard VIC.

Word Processor Plus was not designed to be an expensive toy; it was designed solely to facilitate correspondence, for a wide range of personal and business uses, quickly and easily, with a minimum of training and frustration on the part of its user, and at the least possible cost, both in hardware and software. The most thoroughly tested, useable word processor available at anywhere near the price, $25; 10k RAM, printer req'd.; RS-232C version available for VIC and 64.

Also available: **Baseball Manager,** a sports-documentation program; and **Inventory,** a perpetual inventory control program for a small retail business (various reports, multiple vendors); $30 each; 10k RAM req'd., printer suggested.

All programs will load and run on any Commodore computer; all support tape, disk, and printer.

Prices include documentation and shipping; Calif. residents add 6%. Please specify hardware configuration when ordering. Sorry, no games available.

William Robbins, Box 3745, San Rafael, CA 94912

Circle No. 20

```
3410 DATA 251, 96, 32, 200, 204, 177
3420 DATA 251, 72, 32, 228, 204, 104
3430 DATA 61, 148, 206, 145, 251, 96
3440 DATA 32, 200, 204, 177, 251, 133
3450 DATA 253, 32, 228, 204, 165, 253
3460 DATA 61, 156, 206, 133, 253, 173
3470 DATA 212, 206, 41, 3, 168, 189
3480 DATA 156, 206, 73, 255, 57, 164
3490 DATA 206, 5, 253, 160, 0, 145
3500 DATA 251, 96, 169, 255, 208, 2
3510 DATA 169, 0, 141, 12, 207, 169
3520 DATA 0, 141, 14, 207, 162, 54
3530 DATA 32, 246, 204, 162, 56, 32
3540 DATA 246, 204, 162, 58, 32, 246
3550 DATA 204, 162, 60, 32, 246, 204
3560 DATA 162, 58, 160, 54, 169, 50
3570 DATA 32, 133, 205, 162, 50, 32
3580 DATA 191, 205, 162, 60, 160, 56
3590 DATA 169, 52, 32, 133, 205, 162
3600 DATA 52, 32, 191, 205, 162, 58
3610 DATA 160, 54, 32, 215, 205, 141
3620 DATA 230, 206, 162, 60, 160, 56
3630 DATA 32, 215, 205, 141, 232, 206
3640 DATA 169, 0, 141, 234, 206, 141
3650 DATA 235, 206, 141, 203, 206, 141
3660 DATA 205, 206, 169, 1, 141, 202
3670 DATA 206, 141, 204, 206, 173, 14
3680 DATA 207, 240, 3, 141, 202, 206
3690 DATA 162, 54, 160, 36, 32, 63
3700 DATA 205, 162, 56, 160, 38, 32
3710 DATA 63, 205, 162, 50, 160, 52
3720 DATA 32, 215, 205, 48, 58, 32
3730 DATA 216, 198, 162, 36, 160, 58
3740 DATA 32, 215, 205, 208, 1, 96
3750 DATA 32, 209, 200, 162, 48, 160
3760 DATA 52, 169, 48, 32, 107, 205
3770 DATA 162, 50, 160, 48, 169, 42
3780 DATA 32, 133, 205, 162, 48, 160
3790 DATA 42, 32, 215, 205, 48, 213
3800 DATA 32, 232, 200, 162, 48, 160
3810 DATA 50, 169, 48, 32, 133, 205
3820 DATA 76, 93, 200, 32, 216, 198
3830 DATA 162, 38, 160, 60, 32, 215
3840 DATA 205, 208, 1, 96, 32, 232
3850 DATA 200, 162, 48, 160, 50, 169
3860 DATA 48, 32, 107, 205, 162, 52
3870 DATA 160, 48, 169, 42, 32, 133
3880 DATA 205, 162, 48, 160, 42, 32
3890 DATA 215, 205, 48, 213, 32, 209
3900 DATA 200, 162, 48, 160, 52, 169
3910 DATA 48, 32, 133, 205, 76, 151
3920 DATA 200, 162, 36, 160, 16, 173
3930 DATA 230, 206, 240, 13, 48, 6
3940 DATA 169, 36, 32, 107, 205, 96
3950 DATA 169, 36, 32, 133, 205, 96
3960 DATA 162, 38, 160, 18, 173, 232
3970 DATA 206, 240, 13, 48, 6, 169
```

USR111 XBUTTON PORT1 PADDLE
USR112 YBUTTON PORT1 PADDLE
USR113 XPADDLE PORT2
USR114 YPADDLE PORT2
USR115 XPADDLE PORT1
USR116 YPADDLE PORT1
USR117 BUTTON PORT2 JOY
USR118 BUTTON PORT1 JOY
USR119 PORT1 X(-1 0 1)
USR120 PORT1 Y(-1 0 1)
USR121 PORT2 X(-1 0 1)
USR122 PORT2 Y(-1 0 1)

*UNUSED NUMBERS
USR11
USR12
USR13
USR14
USR15
USR31
USR53
USR54
USR55
USR56
USR73
USR74
USR75
USR76
USR77
USR78
USR79
USR80
USR81
USR82
USR83
USR84
USR85
USR86
USR87
USR88
USR89
USR106
USR107
USR108
*RESERVED INTERNAL TABLE
*USR123
*USR124
*USR125
*USR126
*USR127
/ /

```
3980 DATA 38, 32, 107, 205, 96, 169
3990 DATA 38, 32, 133, 205, 96, 169
4000 DATA 255, 208, 2, 169, 0, 141
4010 DATA 12, 207, 169, 0, 141, 14
4020 DATA 207, 162, 58, 160, 54, 32
4030 DATA 63, 205, 162, 60, 160, 56
4040 DATA 32, 63, 205, 162, 58, 32
4050 DATA 246, 204, 162, 60, 32, 246
4060 DATA 204, 76, 248, 199, 162, 36
4070 DATA 32, 246, 204, 162, 38, 32
4080 DATA 246, 204, 162, 26, 32, 16
4090 DATA 205, 162, 36, 160, 1, 32
4100 DATA 87, 205, 169, 2, 141, 14
4110 DATA 207, 76, 216, 198, 162, 54
4120 DATA 32, 246, 204, 162, 56, 32
4130 DATA 246, 204, 162, 58, 32, 246
4140 DATA 204, 162, 60, 32, 246, 204
4150 DATA 162, 26, 32, 16, 205, 162
4160 DATA 54, 160, 1, 32, 87, 205
4170 DATA 162, 58, 160, 1, 32, 87
4180 DATA 205, 169, 2, 141, 14, 207
4190 DATA 76, 248, 199, 162, 58, 160
4200 DATA 54, 32, 63, 205, 162, 60
4210 DATA 160, 56, 32, 63, 205, 162
4220 DATA 58, 32, 246, 204, 162, 60
4230 DATA 32, 246, 204, 162, 26, 32
4240 DATA 16, 205, 162, 58, 160, 1
4250 DATA 32, 87, 205, 169, 2, 141
4260 DATA 14, 207, 76, 248, 199, 173
4270 DATA 188, 206, 41, 3, 10, 170
4280 DATA 189, 176, 206, 133, 251, 189
4290 DATA 248, 192, 133, 20, 189, 177
4300 DATA 206, 133, 252, 189, 249, 192
4310 DATA 133, 21, 96, 32, 71, 206
4320 DATA 32, 161, 201, 169, 0, 133
4330 DATA 253, 173, 190, 206, 240, 6
4340 DATA 165, 253, 9, 8, 133, 253
4350 DATA 173, 192, 206, 240, 6, 165
4360 DATA 253, 9, 4, 133, 253, 173
4370 DATA 194, 206, 240, 6, 165, 253
4380 DATA 9, 2, 133, 253, 160, 4
4390 DATA 177, 20, 41, 241, 5, 253
4400 DATA 145, 20, 145, 251, 76, 25
4410 DATA 205, 32, 62, 206, 160, 5
4420 DATA 208, 5, 32, 62, 206, 160
4430 DATA 6, 32, 161, 201, 173, 190
4440 DATA 206, 32, 241, 204, 133, 253
4450 DATA 173, 192, 206, 41, 15, 5
4460 DATA 253, 145, 251, 145, 20, 76
4470 DATA 25, 205, 32, 80, 206, 32
4480 DATA 161, 201, 160, 0, 173, 190
4490 DATA 206, 145, 251, 145, 20, 200
4500 DATA 173, 191, 206, 145, 251, 145
4510 DATA 20, 172, 190, 206, 76, 28
4520 DATA 205, 32, 80, 206, 32, 161
4530 DATA 201, 160, 2, 173, 190, 206
4540 DATA 145, 251, 145, 20, 200, 173
```

Circle No. 5

PUT SOME MUSCLE
IN YOUR
VIC 20
16K RAM
EXPANSION
$69.90
8K RAM
EXPANSION
$47.70

•DIRECT FROM
MANUFACTURER
•HIGHEST QUALITY
•LOW PRICE
•90 DAY WARRANTY

CENTURY© MICRO

7881 La Riviera Dr. Suite 131
Sacramento, CA 95826
Add $2 for shipping & handling
(California Residents add 6% sales tax)
DEALER INQUIRES WELCOME

COMPU SENSE

CARDBOARD 3
An Economy Expansion Interface
(Motherboard)
For the VIC-20® Personal
Computer

The "CARDBOARD/3" is an expansion interface designed to allow the user to access more than one of the plug-in-type memory or utility cartridges now available. It will accept up to 3 RAM or ROM cartridges at once. For example:

- 16k RAM + 16k RAM + 3k RAM
- 16k RAM + 8k RAM + Super Expander
- 16k RAM + 8k RAM + Vic-Mon
- 16k RAM + 3k RAM + Programmer's Aid
- High quality T.R.W. gold plated connectors
- This board is fused
- 90 day free replacement warranty covering everything except the fuse

$39.95

CARDBOARD 6
An Expansion Interface for VIC-20®

- Allows memory expansion up to 40K
- Accepts up to six games
- Includes a system reset button
- All slots are switch selectable
- Daisy chain several units for even more versatility

$87.95

TO ORDER:
P. O. BOX 18765
WICHITA, KS 67218
(316) 263-1095

VISA
MasterCard

Personal checks accepted
(Allow 3 weeks) or
C.O.D. (Add $2)
Handling charge $2.00
VIC-20™ is a registered trademark of Commodore

Circle No. 9

```
4550 DATA 191, 206, 41, 15, 145, 251
4560 DATA 145, 20, 172, 190, 206, 76
4570 DATA 28, 205, 32, 80, 206, 173
4580 DATA 190, 206, 41, 7, 141, 21
4590 DATA 212, 141, 49, 207, 173, 191
4600 DATA 206, 141, 22, 212, 141, 50
4610 DATA 207, 172, 49, 207, 76, 28
4620 DATA 205, 32, 71, 206, 169, 0
4630 DATA 133, 251, 173, 188, 206, 240
4640 DATA 6, 165, 251, 9, 8, 133
4650 DATA 251, 173, 190, 206, 240, 6
4660 DATA 165, 251, 9, 1, 133, 251
4670 DATA 173, 192, 206, 240, 6, 165
4680 DATA 251, 9, 2, 133, 251, 173
4690 DATA 194, 206, 240, 6, 165, 251
4700 DATA 9, 4, 133, 251, 173, 51
4710 DATA 207, 41, 240, 5, 251, 141
4720 DATA 51, 207, 141, 23, 212, 76
4730 DATA 25, 205, 32, 47, 206, 173
4740 DATA 188, 206, 32, 241, 204, 133
4750 DATA 251, 173, 51, 207, 41, 15
4760 DATA 5, 251, 141, 23, 212, 141
4770 DATA 51, 207, 76, 25, 205, 32
4780 DATA 71, 206, 169, 0, 133, 251
4790 DATA 173, 188, 206, 240, 6, 165
4800 DATA 251, 9, 128, 133, 251, 173
4810 DATA 190, 206, 240, 6, 165, 251
4820 DATA 9, 64, 133, 251, 173, 192
4830 DATA 206, 240, 6, 165, 251, 9
4840 DATA 32, 133, 251, 173, 194, 206
4850 DATA 240, 6, 165, 251, 9, 16
4860 DATA 133, 251, 173, 52, 207, 41
4870 DATA 15, 5, 251, 141, 52, 207
4880 DATA 141, 24, 212, 76, 25, 205
4890 DATA 32, 47, 206, 32, 161, 201
4900 DATA 160, 4, 177, 20, 9, 1
4910 DATA 145, 20, 145, 251, 76, 25
4920 DATA 205, 32, 47, 206, 32, 161
4930 DATA 201, 160, 4, 177, 20, 41
4940 DATA 254, 145, 20, 145, 251, 76
4950 DATA 25, 205, 32, 47, 206, 173
4960 DATA 52, 207, 41, 240, 133, 251
4970 DATA 173, 188, 206, 41, 15, 5
4980 DATA 251, 141, 52, 207, 141, 24
4990 DATA 212, 76, 25, 205, 32, 53
5000 DATA 206, 32, 161, 201, 173, 190
5010 DATA 206, 41, 3, 170, 189, 168
5020 DATA 206, 133, 253, 160, 4, 177
5030 DATA 20, 41, 15, 37, 253, 145
5040 DATA 20, 145, 251, 76, 25, 205
5050 DATA 162, 24, 169, 0, 157, 0
5060 DATA 212, 157, 28, 207, 202, 16
5070 DATA 247, 96, 173, 27, 212, 76
5080 DATA 25, 205, 173, 28, 212, 76
5090 DATA 25, 205, 162, 0, 169, 4
5100 DATA 133, 253, 208, 22, 162, 0
5110 DATA 169, 8, 133, 253, 208, 14
```

```
5120 DATA 162, 1, 169, 4, 133, 253
5130 DATA 208, 6, 162, 1, 169, 8
5140 DATA 133, 253, 120, 189, 2, 220
5150 DATA 133, 251, 169, 0, 157, 2
5160 DATA 220, 234, 189, 0, 220, 9
5170 DATA 128, 73, 255, 133, 252, 165
5180 DATA 251, 157, 2, 220, 88, 165
5190 DATA 253, 37, 252, 76, 25, 205
5200 DATA 169, 128, 72, 162, 0, 240
5210 DATA 19, 169, 128, 72, 162, 1
5220 DATA 208, 12, 169, 64, 72, 162
5230 DATA 0, 240, 5, 169, 64, 72
5240 DATA 162, 1, 120, 173, 2, 220
5250 DATA 133, 251, 169, 192, 141, 2
5260 DATA 220, 104, 141, 0, 220, 160
5270 DATA 127, 234, 136, 16, 252, 189
5280 DATA 25, 212, 133, 252, 165, 251
5290 DATA 141, 2, 220, 88, 165, 252
5300 DATA 76, 25, 205, 162, 0, 240
5310 DATA 2, 162, 1, 120, 189, 2
5320 DATA 220, 133, 251, 169, 0, 157
5330 DATA 2, 220, 234, 189, 0, 220
5340 DATA 133, 252, 165, 251, 157, 2
5350 DATA 220, 88, 165, 252, 73, 16
5360 DATA 41, 16, 76, 25, 205, 162
5370 DATA 1, 208, 12, 162, 1, 208
5380 DATA 25, 162, 0, 240, 4, 162
5390 DATA 0, 240, 17, 32, 115, 204
5400 DATA 169, 12, 37, 252, 240, 33
5410 DATA 169, 8, 37, 252, 240, 17
5420 DATA 208, 20, 32, 115, 204, 169
5430 DATA 3, 37, 252, 240, 16, 169
5440 DATA 2, 37, 252, 240, 5, 136
5450 DATA 152, 108, 5, 0, 152, 200
5460 DATA 76, 28, 205, 152, 76, 28
5470 DATA 205, 160, 0, 120, 189, 2
5480 DATA 220, 133, 251, 169, 0, 157
5490 DATA 2, 220, 234, 189, 0, 220
5500 DATA 73, 15, 41, 15, 133, 252
5510 DATA 165, 251, 157, 2, 220, 88
5520 DATA 96, 96, 234, 234, 173, 10
5530 DATA 207, 208, 1, 96, 76, 121
5540 DATA 0, 169, 232, 133, 253, 169
5550 DATA 3, 133, 254, 160, 0, 165
5560 DATA 254, 240, 14, 173, 188, 206
5570 DATA 145, 251, 200, 208, 251, 230
5580 DATA 252, 198, 254, 208, 245, 165
5590 DATA 253, 240, 10, 173, 188, 206
5600 DATA 145, 251, 200, 198, 253, 208
5610 DATA 249, 96, 173, 8, 207, 48
5620 DATA 1, 96, 165, 1, 141, 9
5630 DATA 207, 41, 252, 120, 133, 1
5640 DATA 96, 165, 1, 141, 9, 207
5650 DATA 41, 251, 120, 133, 1, 96
5660 DATA 173, 8, 207, 48, 1, 96
5670 DATA 173, 9, 207, 133, 1, 88
5680 DATA 96, 10, 10, 10, 10, 96
```


Circle No. 27

NOW
EDUCATIONAL SOFTWARE
Grades K-12
FOR PET®, VIC® AND COMMODORE 64

READING	MATH	SCIENCE
VOCABULARY	METRICS	HEALTH
LANGUAGE	ALGEBRA	COMPUTER LIT.
SPELLING	PHYSICS	SOCIAL STUDIES
TEACHER AIDS	CHEMISTRY	MUSIC

PET & VIC are registered trademarks of Commodore Business Machines

☐ Please send me FREE information about your ☐ PET, ☐ VIC, and ☐ Commodore 64 programs
Name _____
Address _____
City _____
State _____ Zip _____ c

MICROGRAMS
INCORPORATED
P.O. BOX 2146 LOVES PARK IL 61130
PHONE 815 965 2464

COMMODORE 64® OWNERS ONLY

• SHARE • LEARN • ENJOY •

• Monthly Newsletter
• Public Domain Software
• Reports of Recent 64 Articles
• Local Chapter Meetings
• Product Discounts • Service Advice
• Bi-Monthly Magazine • Advice on Training
• Annual Convention
• Member Bulletin Board

Send Name, address, phone no. and annual dues ($25) to:

The Commodore 64 Users Group
Suite 100, Corporate West
4200 Commerce Court
Lisle, Illinois 60532

Or Call:

(312) 369-6525 (Weekdays 9:00am—5:00pm—Central Time)
MASTERCARD OR VISA ACCEPTED
"An independent not-for-profit organization".

Circle No. 8

PAT. #4,259,705

ESP

DON'T BLAME THE SOFTWARE!

ISO-3

Power Line Spikes and Hash often cause memory loss or erratic operation. Often floppies, printer & processor interact!

OUR patented ISOLATORS eliminate equipment interaction AND curb damaging Power Line Spikes, Surges and Hash.

Filtered 3-prong sockets and integral Spike Suppression. 125 VAC, 15 Amp, 1875 W Total - 1 KW per socket.

ISO-1 ISOLATOR. 3 Filtered Sockets; 1000 Amp 8/20 usec Spike Suppressor $76.95

ISO-4 ISOLATOR. 6 Filtered Sockets; 1000 Amp 8/20 usec Spike Suppressor $128.95

ISO-3 SUPER-ISOLATOR. 3 DUAL filtered Sockets; 2000 Amp 8/20 usec Spike Suppressor $115.95

ISO-7 SUPER-ISOLATOR. 5 DUAL filtered Sockets; 2000 Amp 8/20 usec Spike Suppresor $186.95

Master-Charge, Visa, American Express

TOLL FREE ORDER DESK 1-800-225-4876

(except AK, HI, MA, PR & Canada)

Electronic Specialists, Inc.

171 South Main Street, Natick, MA 01760

Technical & Non-800: 1-617-655-1532

Circle No. 15

Circle No. 32

C64 FORTH
for the
Commodore 64

Fig.-Forth implementation including:

- Full feature screen editor and assembler
- Forth 79 Standard Commands with extensions
- High resolution, 16 color character and sprite graphics
- Full I/O allowing IEEE cartridge and Basic data file compability
- Three voice tone and music synthesizer
- Detailed manual with examples and BASIC-FORTH conversions
- Trace feature for Debugging

$99.95 - Disk Version
(Works with 1540 or 1541 Disk)
or Cassette Version

(Commodore 64 is a trademark of Commodore)

PERFORMANCE MICRO PRODUCTS
770 Dedham Street, S-2
Canton, MA 02021
(617) 828-1209

```
5690 DATA 134, 2, 32, 253, 174, 32
5700 DATA 138, 173, 32, 247, 183, 166
5710 DATA 2, 157, 187, 206, 152, 157
5720 DATA 186, 206, 169, 255, 141, 10
5730 DATA 207, 96, 32, 246, 204, 169
5740 DATA 0, 157, 187, 206, 96, 168
5750 DATA 169, 0, 133, 98, 132, 99
5760 DATA 162, 144, 56, 32, 73, 188
5770 DATA 96, 189, 186, 206, 153, 0
5780 DATA 0, 189, 187, 206, 153, 1
5790 DATA 0, 96, 181, 0, 153, 186
5800 DATA 206, 181, 1, 153, 187, 206
5810 DATA 96, 189, 186, 206, 153, 186
5820 DATA 206, 189, 187, 206, 153, 187
5830 DATA 206, 96, 181, 0, 153, 0
5840 DATA 0, 181, 1, 153, 1, 0
5850 DATA 96, 30, 186, 206, 62, 187
5860 DATA 206, 136, 208, 247, 96, 94
5870 DATA 187, 206, 126, 186, 206, 136
5880 DATA 208, 247, 96, 133, 2, 24
5890 DATA 189, 186, 206, 121, 186, 206
5900 DATA 133, 20, 189, 187, 206, 121
5910 DATA 187, 206, 133, 21, 162, 20
5920 DATA 164, 2, 76, 52, 205, 133
5930 DATA 2, 56, 189, 186, 206, 249
5940 DATA 186, 206, 133, 20, 189, 187
5950 DATA 206, 249, 187, 206, 133, 21
5960 DATA 162, 20, 164, 2, 76, 52
5970 DATA 205, 56, 181, 0, 249, 186
5980 DATA 206, 149, 0, 181, 1, 249
5990 DATA 187, 206, 149, 1, 96, 24
6000 DATA 181, 0, 121, 186, 206, 149
6010 DATA 0, 181, 1, 121, 187, 206
6020 DATA 149, 1, 96, 189, 187, 206
6030 DATA 48, 1, 96, 160, 0, 56
6040 DATA 152, 253, 186, 206, 157, 186
6050 DATA 206, 152, 253, 187, 206, 157
6060 DATA 187, 206, 96, 169, 0, 32
6070 DATA 133, 205, 173, 187, 206, 48
6080 DATA 15, 240, 2, 16, 5, 173
6090 DATA 186, 206, 240, 3, 169, 1
6100 DATA 96, 169, 0, 96, 169, 255
6110 DATA 96, 56, 32, 240, 255, 142
6120 DATA 206, 206, 140, 207, 206, 96
6130 DATA 174, 206, 206, 172, 207, 206
6140 DATA 24, 32, 240, 255, 32, 36
6150 DATA 234, 96, 160, 0, 165, 21
6160 DATA 240, 15, 177, 251, 145, 253
6170 DATA 200, 208, 249, 230, 252, 230
6180 DATA 254, 198, 21, 208, 241, 165
6190 DATA 20, 240, 9, 177, 251, 145
6200 DATA 253, 200, 198, 20, 208, 247
6210 DATA 96, 162, 2, 32, 16, 205
6220 DATA 96, 32, 47, 206, 162, 4
6230 DATA 32, 16, 205, 96, 32, 53
6240 DATA 206, 162, 6, 32, 16, 205
6250 DATA 96, 32, 62, 206, 162, 8
```

```
6260 DATA 32, 16, 205, 96, 32, 47
6270 DATA 206, 162, 4, 32, 246, 204
6280 DATA 96, 32, 107, 206, 162, 4
6290 DATA 32, 16, 205, 96, 32, 89
6300 DATA 206, 162, 6, 32, 16, 205
6310 DATA 96, 162, 2, 32, 246, 204
6320 DATA 96, 32, 107, 206, 162, 4
6330 DATA 32, 246, 204, 96, 255, 255
6340 DATA 1, 2, 4, 8, 16, 32
6350 DATA 64, 128, 254, 253, 251, 247
6360 DATA 239, 223, 191, 127, 128, 64
6370 DATA 32, 16, 8, 4, 2, 1
6380 DATA 127, 191, 223, 239, 247, 251
6390 DATA 253, 254, 63, 63, 207, 207
6400 DATA 243, 243, 252, 252, 0, 85
6410 DATA 170, 255, 16, 32, 64, 128
6420 DATA 0, 64, 128, 192, 0, 212
6430 DATA 0, 212, 7, 212, 14, 212
6440 DATA 67, 79, 80, 89, 82, 73
6450 DATA 71, 72, 84, 32, 49, 57
6460 DATA 56, 50, 32, 71, 46, 82
6470 DATA 46, 71, 65, 85, 75, 69
6480 DATA 76, 170, 170, 170, 170, 170
```


Circle No. 9

COMPU SENSE

"CARD/?"
(CARD/PRINT)

UNIVERSAL CENTRONICS
PARALLEL PRINTER
INTERFACE FOR THE VIC-20®

Now you can use your VIC-20® with an EPSON MX-80 printer, or an OKI-DATA printer, or a TANDY printer, or just about anybody's printer. And you don't have to give up the use of your user port (MODEM), or change to special printer commands, or load any special software driver programs to do it.

- Outputs standard ASCII codes to the printer.
- Plugs in the VIC-20® printer serial i/o port.
- Understands all standard VIC-20® print commands.
- No modification to your VIC-20®.
- No special programs required.
- Includes all necessary cables to hook up a standard printer using centronics parallel input.
- MADE IN THE U.S.A.

The "CARD/?" is a product of CARDCO, Inc.

$79.95

TO ORDER:
P. O. BOX 18765
WICHITA, KS 67218
(316) 263-1095

Personal checks accepted
(Allow 3 weeks) or
C.O.D. (Add $2.00)
Handling charges $2.00

VIC-20* is a registered trademark of Commodore

PSYCOM SOFTWARE INTERNATIONAL
BUILDS ADULT SOFTWARE FOR THE
COMMODORE 64,TEXAS INSTRUMENTS
AND OTHER PERSONAL COMPUTERS.
INDIVIDUAL ORDERS ARE ACCEPTED
BY TELEPHONE USING YOUR VISA
OR MASTER CARD OR SHIPPED COD.
CALL (513)-474-2188
YOU MAY ALSO ORDER USING THE
CONVENIENT FORM INCLUDED BELOW.
distributor inquiries invited

```
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
X                               X
Xname---------------------------X
X                               X
Xstreet-------------------------X
X                               X
Xcity---------------------------X
X                               X
Xstate ------ zip-------------- X
X                               X
Xchg.card exp date--------------X
X                               X
Xcard#---------------------------X
Xplease rush me [  ] copies of  X
Xthe PERSONALITY ANALYZER today X
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

Personality Analyzer

Analyze yourself, your spouse, your date, relatives, co-workers and friends.

Find out who you will get along with, who will work well with you, who will be fun to be with.

Measure compatibility, career potential, behavior tendencies, values, etc.

PSYCOM SOFTWARE INTERNATIONAL

2118 Forest Lake Drive
Cincinnati, Ohio 45244 USA

$24.95
2.50 disk (additional)

Circle No. 35

PET JOYSTICK INTERFACE

- Now any PET® or CBM® can use joysticks and game paddles.
- Accepts popular Atari®- and Apple®-style joysticks/paddles.
- Sample software provided.
- **Only $69.95!**

Send check, money order, VISA/MC (please include exp. date) or specify C.O.D.

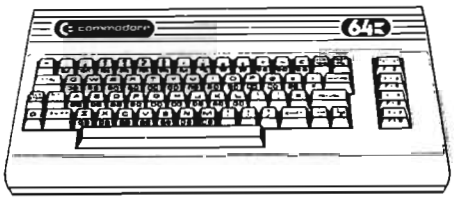
J SYSTEMS CORP.
1 Edmund Place
Ann Arbor, MI 48103
313-662-4714

Circle No. 21

```
100 REM 'XDEMLO'
110 A=USR(0),2,0,8
120 A=USR(1):A=USR(16)
130 A=USR(3),0
140 A=USR(5),1,0
150 A=USR(7),0
160 A=USR(20)
170 A=USR(6),0,0
175 :
180 P=160 : Q=64
190 XP=144:XR=1.5*3.14159265
200 YP=56:YR=1:ZP=64
210 XF=XR/XP:YF=YP/YR:ZF=XR/ZP
220 FOR ZI=-Q TO Q-1
230 ZT=ZI*XP/ZP:ZZ=ZI
240 XL=INT(.5+SQR(XP^2-ZT^2))
250 FOR XI=-XL TO XL STEP2
260 XT=SQR(XI^2+ZT^2)*XF:XX=XI
270 YY=(SIN(XT)+.4*SIN(3*XT))*YF
280 X1=INT((XX+ZZ+P)/2)
290 Y1=INT(199-(YY-ZZ+100))
300 A=USR(70),X1,Y1,1
310 IF Y1=199THEN330
320 A=USR(71),X1,(Y1+1),X1,199,0
330 NEXTXI
340 NEXTZI
350 GETIN$:IFIN$=""THEN350
360 A=USR(2):A=USR(17):A=USR(21):A=USR(6),0,6:A=USR(7),14
370 :
380 END
390 REM RUN TIME ABOUT 1:30
400 REM BIT MAPPING - POINT PAIRS
410 REM RESIDES UNDER BASIC ROM
420 REM SAME AS XDEMHI ONLY HALF
430 REM THE HORIZONTAL RESOLUTION
```


COMMODORE 64

FULL FACTORY WARRANTY



IN STOCK NOW !

CALL FOR OUR LOW PRICE !

LIBERTY COMPUTER DISTRIBUTORS

(313) 295-2330

Also SAVE on ...

A COMPLETE line of COMMODORE Accessories

	List Price	YOUR PRICE
VIC-1541 (Disk Drive)	399.00	339.00
VIC-1525 (Printer)	395.00	339.00
VIC-1530 (Datasette)	74.95	64.95
VIC-1600 (Modem)	109.95	97.00

Special Package Prices Available !

★★★

Wide Selection of 64 SOFTWARE !

★★★

We SERVICE ALL COMMODORE Computers

Call or Write for a FREE catalog

LIBERTY COMPUTER DISTRIBUTORS

P.O. BOX 1786 313-295-2330

DEARBORN, MICHIGAN 48121

MONEY ORDERS AND CASHIER'S CHECKS - FREE SHIPPING
ALL COD's REQUIRE 25% DEPOSIT
PERSONAL CHECKS ALLOW 2-4 WEEKS
CANADIAN ORDERS ADD 5%
PRICES SUBJECT TO CHANGE

SAVE with LIBERTY your FULL SERVICE Computer Center

Send for Catalog and Information about FREE SOFTWARE for the 64 !

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

LIBERTY COMPUTER DISTRIBUTORS
P.O. BOX 1786
DEARBORN, MI 48121
(313) 295-2330

'COMMODORE 64' REG. TRADEMARK CBM, INC.

Circle No. 23

Listing 1

```
100 REM 'XDEMHI'
110 A=USR(0),2,0,8
120 A=USR(1):A=USR(16)
130 A=USR(3),0
140 A=USR(5),1,0
150 A=USR(7),0
160 A=USR(19):A=USR(21)
170 :
180 P=160:Q=100
190 XP=144:XR=1.5*3.14159265
200 YP=56:YR=1:ZP=64
210 XF=XR/XP:YF=YP/YR:ZF=XR/ZP
220 FOR ZI=-Q TO Q-1
230 IF ZI<-ZP OR ZI>ZP THEN 350
240 ZT=ZI*XP/ZP:ZZ=ZI
250 XL=INT(.5+SQR(XP^2-ZT^2))
260 FOR XI=-XL TO XL
270 XT=SQR(XI^2+ZT^2)*XF:XX=XI
280 YY=(SIN(XT)+.4*SIN(3*XT))*YF
290 X1=XX+ZZ+P
300 Y1=YY-ZZ+Q
310 A=USR(64),X1,199-Y1
320 IF Y1=0THENTHEN340
330 A=USR(67),X1,199-(Y1-1),X1,199
340 NEXTXI
350 NEXTZI
360 GETIN$:IFIN$=""THEN360
370 A=USR(2):A=USR(17):A=USR(7),14
380 :
390 END
400 REM RUN TIME ABOUT 3:00
410 REM BIT MAP - PIXELS
420 REM RESIDES UNDER BASIC ROM
430 REM A DESIGN SEEN VERY OFTEN
```

Listing 2

```
100 REM 'XGT5'
110 A=USR(9),32767 : CLR
120 A=USR(0),2,2,8
130 A=USR(8),0,0
140 A=USR(1):A=USR(16)
150 A=USR(3),0
160 A=USR(5),1,0
170 A=USR(66),10,10,189,189
180 A=USR(68),309,10
190 A=USR(68),10,10
200 A=USR(35),0,1
210 A=USR(32),0
220 A=USR(34),180,100,0
230 FORI=0 TO255:FORJ=0TO550:NEXT
240 A=USR(30),20,12,I
250 A=USR(39),0,I
260 A=USR(63),3,23,0,I:NEXT
270 GETIN$:IFIN$=""THEN150
280 A=USR(2):A=USR(17)
290 A=USR(41)
300 :
310 REM SHOWS CHARS TO MAP
320 REM AND SPRITES TO MAP
330 REM THE REAL SPRITE IS
340 REM THE TOP ONE
350 REM SPRITE MAPS ARE NOT
360 REM ALWAYS SAME AS SPRITE
370 REM SEES CHAR ROM
380 REM AND USR SEES ALL RAM
```

Listing 3

```
100 REM 'XGT4'
110 A=USR(9),32767 : CLR
120 A=USR(0),2,0,8
130 A=USR(1):A=USR(16)
140 A=USR(66),0,0,0,0
150 A=USR(3),INT(RND(1)*255)
160 A=USR(5),INT(RND(1)*16),INT(RND(1)*16)
170 A=USR(7),INT(RND(1)*16)
180 FORJJ=0TO20
190 A=USR(69),INT(RND(1)*320),INT(RND(1)*200)
200 A=USR(68),INT(RND(1)*320),INT(RND(1)*200)
210 NEXT
220 A=USR(8),8,0
230 A=USR(8),12,1
240 FORI=0TO1000:NEXT
250 GETIN$:IFIN$=""THEN140
260 A=USR(2):A=USR(17)
270 :
280 REM SOME RANDOM LINES
290 REM ON RANDOM BACKGROUND
300 REM AND COPY CHAR ROM
310 REM TO MAP FOR TEST
```

Array Assignment Sort

by David Steffes and Art Dudley
Bremerton, WA

Most efficient sorting routines are lengthy and too complex for a beginner to understand. The listed program is just the opposite. It is short and simple almost beyond belief with an added advantage of being relatively fast. Before this article goes any further, we want to mention that this is not a miracle sort. It does have limitations, but its simplicity warrants its mention.

The structure of the program is based on using two one-dimensional arrays. The first array is used for the sort procedure and the second for keeping track of duplicate numbers. The sort in actuality is nothing more than a FOR-NEXT loop used to set up an array; however, when values are assigned, they must correspond to their array element's subscript (i.e. A(5) = 5, A(1) = 1, A(10) = 10...). To list the values in order involves nothing more than displaying the contents of the array using a separate FOR-NEXT loop.

To best explain this sort program, an example will be used. For simplicity's sake, say we input a 4 (variable N) for the amount of numbers to be sorted with a 5 (variable Z) as the highest number. Array "A" may look like this:

Unsorted Numbers

A(1) = 5
A(2) = 1
A(3) = 5
A(4) = 2

Note: Remember the numbers are generated at random.

Lines 90 to 130 will set up two arrays like so:

B(1) = 1	C(1) = 0
B(2) = 2	C(2) = 0
B(3) = 0*	C(3) = 0
B(4) = 0*	C(4) = 0
B(5) = 5	C(5) = 1

(Meaning we have one duplicate number. This is accomplished in line 110.)

*Line 160 will prevent the zeros from being printed.

Lines 150 to 180 will then print out the contents of the array. Now since C(5) = 1, the program will print out the contents of B(5) one extra time. This is accomplished in line 170.

You may have already noticed the shortcomings of this program. The two we noticed are as follows:

1. Variable Z is used to dimension both arrays "B" and "C"; therefore, the largest number one can use is based on memory size. For example: A 1000 as the largest number will set up an array of 1001 elements. If there are 4 bytes per element, this will take up 4004 bytes of memory for each array or a total of 8008 for both.

2. Since the program will print out only numbers greater than zero, unsorted values cannot contain a zero.

There is no need for array "A" in practical situations. Also array "C" is used to keep track of duplicate numbers. So if there are no duplicate numbers, array "C" can be deleted. These two techniques should save a considerable amount of memory.

Since time is an important aspect of any sort, we have constructed the below table listing sort times in relation to the amount of numbers to be sorted and the largest value. The total sort time includes not only the time it takes to sort but also the time necessary to display the sorted numbers. The actual time devoted to sorting is but a small fraction of the total time.

Program Runs Performed on the Commodore VIC-20

As a final note, even though this program does have its shortcomings, we believe this sort can be a useful tool in some applications as well as in displaying another function of an array to beginners.

Program Details

Line 10	Input the amount of numbers to be sorted (variable N).
Line 20	Input the largest number to be sorted (variable Z).
Line 50	Dimensions the three arrays. Array "A" uses the subscript N, and arrays "B" and "C" use subscript Z. Note: Array "A" is not used in the sorting process but instead as storage for the random numbers.
Line 60 to 70	Sets up array "A" with random numbers.
Lines 90 to 130	Sort routine: Line 110 keeps a count of duplicate numbers. Line 120 assigns a value to its proper array element.
Lines 150 to 180	A simple FOR-NEXT loop that prints out the array in the order of its subscripts. Line 170 displays duplicate numbers.

Largest Number to be Sorted

Amount of Numbers to be Sorted	50	100	200	400
50	2 sec.	4 sec.	9 sec.	17 sec.
100	3 sec.	5 sec.	9 sec.	18 sec.
200	4 sec.	6 sec.	10 sec.	18 sec.
300	5 sec.	7 sec.	11 sec.	19 sec.

```
5 REM *****ARRAY ASSIGNMENT SORT*****

10 INPUT"NUMBER OF ITEMS TO BE SORTED";N
20 INPUT"LARGEST VALUE TO BE SORTED";Z

40 REM **DIMENSION AN ASSIGN RANDOM VALUES TO ARRAY**
50 DIM A(N),B(Z),C(Z)
60 FOR J=1 TO N
70 A(J)=INT(RND(1)*Z):PRINTA(J)
80 NEXT J
85 REM**BEGIN SORT**
90 FOR J=1 TO N
100 X=A(J)
110 IFX=B(X)THEN C(X)=C(X)+1:REM**TALLY OF DUPLICATE NUMBERS**
120 B(X)=X
130 NEXTJ:PRINT:PRINT
140 REM**PRINT OUT SORTED NUMBERS**
150 FOR J=1 TO Z
160 IF B(J)>0THEN PRINT B(J),
170 IF C(J)>0THEN P=C(J):FOR Q=1 TO P:PRINT B(J),:NEXT Q
180 NEXT J
190 END
```

Circle No. 43

TAYLORMADE SOFTWARE • TAYLORMADE

Expanded offering of Educational Software

for the COMMODORE 64

- **Touch Typing Tutor (TTT64)**.....diskette $24.95 cassette $19.95

Ideal for typing students or computer users. Learn to type with all fingers on your computer's keyboard by following the keyboard and finger placement pictured on your TV screen. 19 lessons fully described in 12-page manual. Select PRACTICE and type computer generated pseudo words for your rate and list of errors. Select TEXT and practice English words for timed test of any duration.

for the VIC-20

- **Touch Typing Tutor 3.0 (TTT5K)**.....cassette $19.95

Has same features as TTT64 above. Will run on basic VIC. Four separate programs. Enhanced version now provides practice typing English words. Includes 12-page manual. Selected by Denver Public Schools to train 700 elementary students in keyboard skills.

- **Fun Fractions (FF+8K)**.....diskette $24.95 cassette $19.95

The fun way to learn addition, subtraction, multiplication, and division of fractions for grades 4-9 with sound, color, and graphics. Watch VIC show you all the intermediate steps on the screen blackboard. Then take a turn and see if you can answer before the parachute jumper crashes. Three levels of difficulty. Help is given for incorrect answers: learn your score. Requires 8K (or more) memory expansion. Includes 16-page manual.

Foreign orders payable U.S. dollars plus $3.00 shipping/handling

TAYLORMADE SOFTWARE

P.O. Box 5574
Lincoln, NE 68505
(402) 464-9051

MasterCard VISA

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

TAYLORMADE SOFTWARE • TAYLORMADE

Circle No. 44

COMMODORE 64

ACCOUNTING SOFTWARE

General Ledger . . . . . $ 129.95
Detail G/L Income Stmt. • Bal. Sheet Journals • Budget Variance Stmt. • Trial Bal. Cash Flow Analysis • 300 Chart of Accounts • 700 J/E.

Payroll System . . . . . $ 129.95
Emp. Time Card Lists • Work. Comp. Rept. Ck. Register • W-2 Forms • Payroll Cks. • 941 Reports Employee Wage Analysis • Pre-Pymt. Register Emp. Info. Labels • 300 Emp. YTD • Hourly Employees (50).

Accounts Payable . . . . . $ 129.95
Purchases Journal • Vendor Report • Pre-Payment Reg. • Open Invoices (300) • Cash Register Projection

Accounts Receivable . . . . . $ 129.95
Cus. Sales History • Cust. List (300) • Sales Journals • Inv. Income Proj. • Cust. Stmts. • Labels • Open Inv. (300)

Client Accounting . . . . . $ 229.95
Everything a bookkeeping service needs to keep books for a typical small business client. Includes all features on G/L, plus the ability to produce disbursements registers, 941-B Forms and W-2 Forms.

Each of the modules includes all logic to allow it to post to the G/L. All interface logic for these systems is included in this software. This is a simple disk system. It will operate on a Commodore 64, using a 1541 disk drive.

ORDER FROM
TEXAS TECHNICAL SERVICES, INC.
3115 W. Loop, S., Suite 26 • Houston, Tex. 77027
PH: (713) 965-9977

VISA
Dealer Inquiries Welcome
VISA & Master Card Accepted
MasterCard

SW COMPUTERS

BRINGS YOU THESE NEW ITEMS!

5¼" FLOPPY DISCS, Boxes of 10, Guaranteed 5 yrs. 12MM Passes. . . SS, SD $20.30/SS,DD $23.10/DS DD $27.30

C-10 Blank Cassette Tapes, Case of 50, screw-pac Commercial Grade. . . $25.00

The TAPEWORM™ the Amazing Cassette Recorder interface for all COMMODORE™ Products. . . $24.95

COMPUTER FURNITURE, All styles and sizes Ask for our catalog

SPEECH SYNTHESIZER • by METAVOX™ for Vic-20™ and COMMODORE™ 64. . . $168.00

BACK ISSUES • COMPUTE! Magazine • 5 Issue minimum, $2.50 per issue, specify month

A/V Interface for COMMODORE™ 64. . . $19.95

VISA, MASTERCHARGE, No COD's

Prices exclude delivery cost (allow 30 days delivery)

Dealer Inquiries Invited

SW COMPUTERS

1125 N.E. 82nd
Portland, OR 97220, (503) 257-9464

Circle No. 40

Build Your Own Computer Table

by Spike Bickel
Chicago, IL

After spending about three months puzzling over which personal computer to buy, I decided on a Commodore 64. My only problem was a place to put it in my apartment. My desk was not deep enough to hold both the computer and the monitor in a position that I could see the monitor while typing on the keys.

I then made the rounds of furniture stores to locate a table. Either they were too shallow or too high, I wanted a table of typing height so my hands would not be level with my chest. I finally found a table made of plywood with an oak veneer for $160. I couldn't see paying that much since I planned to paint it. I decided to build my own. The cost? $29 plus paint, which I already had.

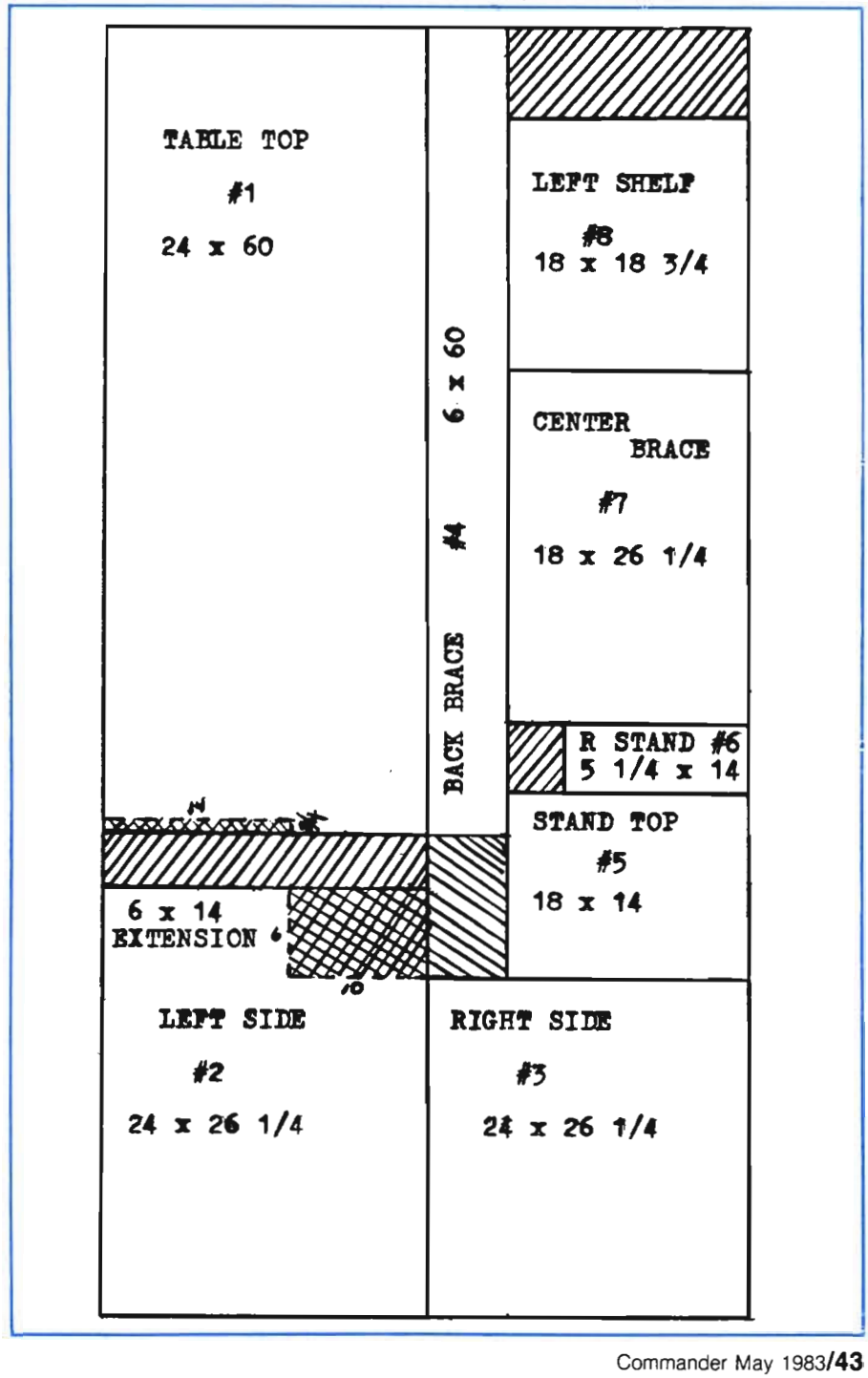
The materials I needed were: 1-4x8x¾ particle board cut as in diagram; 4-3½ corner irons; 31-1¼ flat head wood screws; 1 pint primer-sealer; 1 quart paint.

The tools I used were a jigsaw, drill (for starter holes and counter sinking), and a screw driver.

Procedure:

1. Have the lumber yard make the cuts in the sheet of board. Make sure they cut them in order numerically.
2. Cut the notches in pieces 1 and 2.
3. Attach piece 1 to 2 then 1 to 3. 1 sits on top of 2 and 3.
4. Attach 4 to the back of the table so the top edge is 12 inches from the floor.
5. Attach 5 to 6 then this to 1 and 2. This makes a monitor stand.
6. Attach 7 to the bottom of 1 and front of 4. Use 8 as a spacer.
7. Lay 8 between 7 and 3. Rest the back on 4. Level and attach to 7, 3 and 4.
8. Prime and paint.

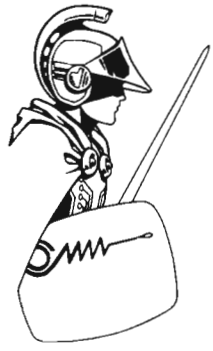
I am not a carpenter, but was able to assemble this in about two hours with the help of a friend. It is sturdy, large enough to hold a future printer, and is perfect for me (and I hope for you, too). Now, if only the postman would bring my computer.□



Formatting and Error Checking— A Time Saving Algorithm

by Tony La Martina
Pittsburg, PA

Due to an error in our March/April issue the program was deleted. We apologize for the inconvenience.
The Editor



```
READY.

 5 PRINT"□"
 10 INPUT" ";A$
 20 A=VAL(A$)
 30 PRINTSPC(20)"□";:INPUT" ";B$
 40 B=VAL(B$)
 50 DEFFNA(C)=INT(C*100+.5)/100
 60 C=A/B
 70 C$=STR$(FNA(C))
 80 X$=RIGHT$(C$,2)
 90 IF LEFT$(X$,1)="." THEN C$=C$+"0"
 100 IF C=INT(C) THEN C$=C$+".00"
 110 PRINTSPC(60-LEN(C$))"□"C$
 120 GOTO10
 130 END
READY.
```

```
READY.

 5 REM FORMATTING DEMO W/ERROR CHECKING,AUDIBLE ALERT
 7 REM AND INVALID ENTRY ERASURE
 10 PRINT"□"
 20 INPUT"    ■■■■";A$
 30 K=LEN(A$)
 40 FOR J=1TOK
 50 IF ASC(MID$(A$,J,1))<45 OR ASC(MID$(A$,J,1))>57 THEN J=K:GOTO1000
 55 IF LEN(A$)>7 THEN1000
 60 NEXT
 70 A=VAL(A$)
 80 PRINTSPC(20)"□";:INPUT"    ■■■■";B$
 90 K=LEN(B$)
 100 FOR J=1TOK
 110 IF ASC(MID$(B$,J,1))<45 OR ASC(MID$(B$,J,1))>57 THEN J=K:GOTO1050
 115 IF LEN(B$)>7 THEN1050
 120 NEXT
 130 B=VAL(B$)
 135 IF B$="0" THEN C$=".00":GOTO200
 140 DEFFNA(C)=INT(C*100+.5)/100
 150 C=A/B
```

```
160 C$=STR$(FNA(C))
170 X$=RIGHT$(C$,2)
180 IF LEFT$(X$,1)="." THEN C$=C$+"0"
190 IF C=INT(C) THEN C$=C$+".00"
200 PRINTSPC(60-LEN(C$))"□"C$
210 GOTO20
999 REM INVALID ENTRY ERASURE
1000 GOSUB5000:REM AUDIBLE ALERT
1010 PRINTCHR$(22)
1020 PRINT"□□":GOTO20
1050 GOSUB5000:REM AUDIBLE ALERT
1060 PRINTTAB(10);CHR$(22)
1070 PRINT"□":GOTO70
4999 REM AUDIBLE ALERT SUBROUTINE
5000 FOR I=1TO3
5010 POKE59467,16:POKE59464,50:POKE59466,100
5020 FOR T=1TO100:NEXT T
5030 POKE59464,75:POKE59466,175
5040 FOR T=1TO100:NEXT T
5050 NEXT I:POKE59467,0:POKE59464,0:POKE59466,0
5060 PRINT"□■"
5070 RETURN
READY.
```


COMMODORE USERS

Join the largest, active Commodore users group in North America and get —

— Access to club library of over 3000 free programs.

— Informative club newsletter.

— The latest information about the PET®, CBM™, VIC 20™, Super-PET™ and Commodore 64™.

Send $20.00 ($30.00 overseas) for Associate Membership to:

Toronto Pet Users Group
Department "D"
1912A Avenue Road, Suite 1
Toronto, Ontario, Canada M5M 4A1

Circle No. 45

COMPU SENSE

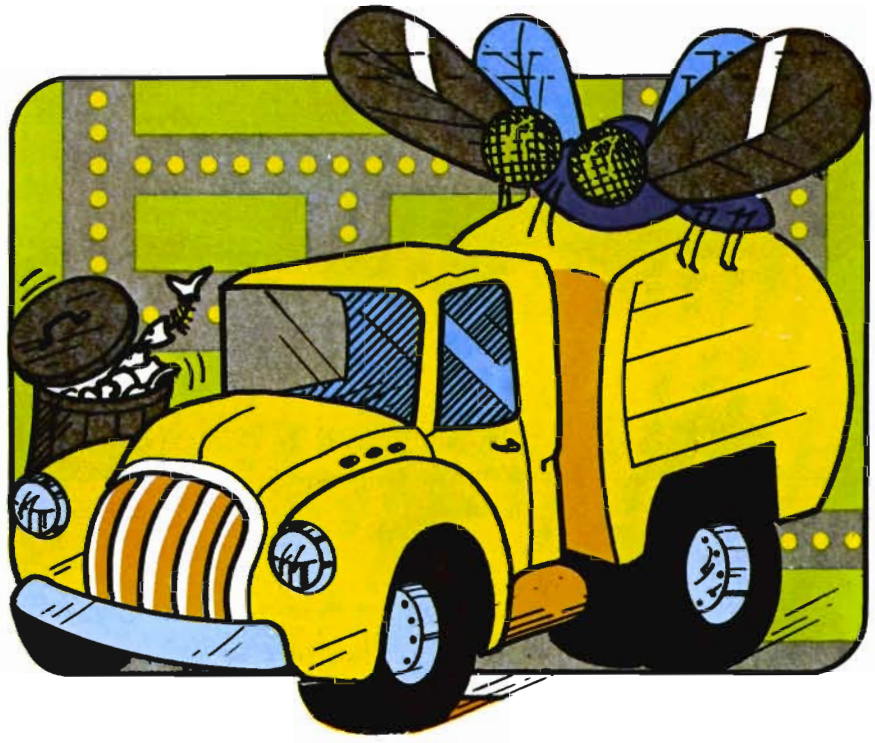
QUICK BROWN FOX **$60.95**
The #1 word processor!
GENERAL LEDGER **$19.95**
(VIC-20)
CHECK MINDER
VIC-20 **$19.95** C-64 **$24.95**
HOME INVENTORY **$19.95**
(VIC-20)
CENTIPOD **$27.95**
Like Centiped, only better!
FROGEE **$27.95**
The exciting arcade game of Frogger.
MOTOR MOUSE **$29.95**
What a cheese'ee game!
CRIBBAGE
VIC-20 **$14.95** C-64 **$17.95**
This is the game of Cribbage
STAR TREK
VIC-20 **$12.95** C-64 **$17.95**
Excellent adventure game!
MASTER MIND
VIC-20 **$12.95** C-64 **$19.95**
Makes you think
ROACH MOTEL **$9.95**
Kill the bugs!
YAHTZEE 1.1 **$12.95**
YAHTZEE 2.1 **$14.95**

TO ORDER:
P. O. BOX 18765
WICHITA, KS 67218
(316) 263-1095

Personal checks accepted
(Allow 3 weeks) or
C.O.D. (Add $2.00)
Handling charges $2.00
VIC-20* is a registered trademark of Commodore

Circle No. 9

Game—CONTEST



The Game Contest is a continuing feature of Commander magazine aimed at providing entertainment for and promoting competition among our readers. United Microware Industries has graciously provided us with February's Game Contest.

DEADLINE FOR ENTRIES:

JULY 1, 1983

Trashman may be purchased from Creative Software or any one of its fine dealers:

230 East Caribbean Drive
Sunnyvale, CA
1-408-745-1655

Terms for Game Contest

First prize will be awarded to the person with the highest score. The winning entry must contain a photograph of the highest score of the game, a Creative Software package front and proof of purchase slip.

Entries must be mailed to Commander, Creative Software Contest, PO Box 98827, Tacoma, WA 98498. All entries must be mailed, as postmarks are required to determine the earliest winning entry. In the event of a tie, duplicate prizes will be awarded. Employees of Creative Software and their families may not participate. First prize will be $250, second prize $100, third prize $50.

The contest will run until a first prize is awarded. Creative Software will notify Commander Magazine of the winner(s).

Winners of Escape MCP are:

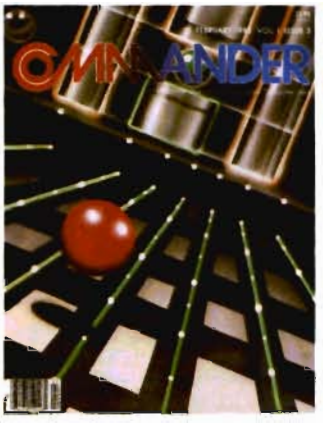
1st Prize:
Karen Dantes, Milford, MI

2nd Prize:
Eric Pefley, Seattle, WA

3rd Prize:
Kelly Shackleford,
Tacoma, WA

Final tune was "Stars & Stripes Forever."

COMMANDER



Only COMMANDER will do all this

GUIDE Reports that give you hands-on, user oriented information on the entire range of Commodore Computers • More comparison charts, diagrams, instructional illustrations, and how-to photos than any other publication in the field • Articles written by the top working experts in the field.

INSTRUCT Innovative ways to use your computer equipment—from self-improvement to home security • Valuable tricks and practical advice on how to get the most from your investment in the high tech field of computers • In depth and unbiased analyses of the latest in educational software.

ENTERTAIN Fascinating glimpses into the wonders of the computer future • Profiles of the industry's most creative people • Provocative discussions on the impact computers will have on you and your family.

SIMPLIFY Critical comparisons of the Commodore Computers • Exactly how your computer equipment works • What those computer "buzz words" mean and expensive "special features" do • Useful trouble-shooting & maintenance advice.

INFORM An expanded directory of the latest programs on ROM-PAK, tape and disc • New product previews of the latest and best equipment on the market • Exciting technologies in development for tomorrow • Important applications of computers for health, education, business, and the public good • New directions in computers • Much More . . .

Subscribe now and take advantage of our Limited Offer of $4 off the one year subscriptions

—Subscription Orders Only—
Toll Free Number: 1-800-426-1830
(except WA, HI, AK)

COMMANDER
PO BOX 98827
TACOMA, WASHINGTON 98498
(206) 565-6818

☐ **1 YR. $22** ☐ **2 YR. $40**
☐ **3 YR. $58**

(Prices do not include $4 discount)
Prices in U.S. Funds
Washington residents please add 7.8% sales tax
Allow 5-6 weeks for delivery.

DON'T MISS OUT
on the most informative magazine dedicated to the COMMODORE COMPUTERS
HAVE YOU GOT WHAT IT TAKES TO BE A

COMMANDER

GAME PROGRAM DEVELOPMENT KIT

for the

VIC - 20 and COMMODORE - 64

Registered trademarks of Commodore Business Machines, Inc.

SIX TOOLS TO HELP YOU WRITE YOUR OWN FAST ACTION ARCADE-STYLE GAMES

DECODER — Decodes programs written in machine language (like game cartridges, utility cartridges, and even the computer's own internal operating programs). Produces a program in an English-like language (Assembler) which can be studied to figure out how they did it. The programs created with the decoder can be customized with the **EDITOR** AND INCORPORATED INTO YOUR OWN NEW GAME PROGRAM. The **ASSEMBLER** turns your programs created with the Decoder and the Editor back into machine language and puts them out to tape or disk so the **LOADER** can load them into the computer's memory to be tested and RUN. The **MONITOR** assists you in debugging your new game program by allowing you to run it a step at a time and making modifications if you need to. The **INSTRUCTION GUIDE** is written so that even a beginner can learn the skills needed to become a pro!!!

DESIGNED TO RUN ON ALL VIC-20's

$49.95 plus $2.00 p&h buys the kit that could make you rich. Why wait?

Send check, M.O., VISA/MC ($2.00 s.c., please include expiration date), or specify COD (add $3.00) to:

French Silk smooth ware

P.O. Box 207, Cannon Falls, MN 55009

507-263-4821

Circle No. 17

Win A FREE Commodore 64™ Computer

Can You Beat PARATROOPER?

10 Prize Winners

A New Commodore 64 will be awarded to the person with the highest score. The winning entry must contain a photograph of the highest score of the game.

PARATROOPER *By Nic Dudzik*

REALISTIC SMOOTH ACTION AND TRUE HI-RES GRAPHICS

JOYSTICK OR KEYBOARD

1st Prize
CBM 64

2nd Prize
Disk Drive

3rd Prize
$200 worth of Software

4th - 10th Prize
$100 worth of Software

PARATROOPER a High Resolution game that doesn't let you make any mistakes. You are in command. Helicopters fill the sky, (and we mean fill the sky!), dropping paratroopers. Your mission is to keep 3 paratroopers from hitting the ground on either side of your gun. But that's just the beginning. You score by hitting the helicopters or the paratroopers, but if you miss a shot it subtracts from your score. Therefore, you must make every shot count to make a high score! IT HAS FOUR FAST ACTION LEVELS TO CHALLENGE THE BEST PLAYER. The High Resolution graphics helicoptors are fantastic. They look exactly like helicopters! The paratroopers are super realistic. Their chutes open and then they drift down to earth. If this weren't enough the sounds are fantastic. There are helicopter blades whirring and you can hear the howitzer pumping shells. This game really show off the sound and graphic capabilities of you VIC. PARATROOPER IS OUR #1 SELLING ARCADE GAME, you've got to see this game to believe it. **$19.95**

Order your copy today or see your dealer.
Will you get the top score?

RULES

1. All entries must be mailed, as postmarks are required to determine the earliest winning entry. In the event of a tie the postmark will determine the winner.
2. Deadline for entries is July 31, 1983.
3. Proof of purchase must be provided. Return your entry with package front and proof of purchase slip and photo.
4. **ENTRIES MUST BE MAILED TO:** PARATROOPER CONTEST, P.O. Box 388, Lake Havasu City, AZ 86403
5. Game contest void where prohibited.
6. Contest begins April 2, 1983. All entries must be postmarked by July 31, 1983. Contest ends July 31, 1983.
7. Winners will be notified by mail. Public notice of winners will be printed in this and other computer magazines.
8. Only one entry per person please -- all duplicates will be discarded.
9. There will be 10 winners for a 1st, 2nd & 3rd prize. Prizes for 4th - 10th will be for software.
10. Contest is limited to U.S.A., Properties and Canada only.

ComputerMat • P.O. Box 1664T • Lake Havasu City, Arizona 86403

Game Reviews

Trashman

by Robert L. Foster
Salt Lake City, UT

Creative Software
230 East Caribbean Drive
Sunnyvale, CA 94086
(408) 745-1655

Now I know this will sound a bit strange, but Creative Software has developed a fun and exciting computer game called Trashman. With a name like that, I was curious to say the least!

It turned out to be a fun game for all ages, easy to play, but difficult to describe. There are various skill levels which makes it adaptable for younger children.

As the "trashman" you are allowed three garbage trucks, but only one at a time. When the game starts you are in your yellow truck ready to go. You must maneuver your truck across the screen picking up dots of litter, while you are being pursued by four "evil" flies. Spaced at intervals are six trash cans. If an evil fly touches you before you reach a trash can you get "canned," if you'll pardon the pun!

However, if you reach a trash can, you can turn on your pursuers and gobble them up! Your truck has two arms with which it picks up the trash. While you and the flies battle each other, little worms in the center of the screen regenerate into flies, which will come in pursuit.

At the beginning, when you first turn on the game, the "William Tell Overture" starts off the game. When all three of your trucks lose their battle against the evil flies, you will hear a mournful "taps" being played.

Despite the bizarre name, this game is fast moving, requires skill, and will provide many hours of family fun, especially for younger members. We let some younger relatives, girls and boys, ages 7 through 12, play the game and they were thoroughly entranced by this unusual video game and had no difficulty with it at all.□

Skibbereen

by Robert L. Foster
Salt Lake City, UT

United Microware Industries
3503-C Temple Avenue
Pomona, CA 91768
(714) 594-1351

For a change of pace, let's go to old Ireland, land of rainbows, pots of gold, and leprechauns. As the old Irish tale goes "At the end of the rainbow, there a pot o' gold will be," so also with this new game developed by Joanne Lee for United Microware Industries.

The object is to break through the rainbows and get to the pot full of gold. While trying to get to the treasure, snakes appear in front of the two rainbows and try to eat the ball which you are using to break through.

The fascination of this game lies in its unusual sound. A series of Irish jigs play during the entire game. A bit distracting at first, you come to realize that the music is what makes the game lively and fun.

Skibbereen has nine skill levels, each progressively more difficult. When a rainbow has been completely destroyed, a leprechaun does a lively jig and the pace of the game increases a full skill level.

This game has about the best sound of any available for the VIC. The graphics are good also. The rainbows are quite colorful, the pots of gold glitter like the real thing, and the snakes slither like snakes.

Skibbereen rates very well in sound quality, and the graphics are good. The skill levels are well defined so that almost all could play and enjoy this game. Even if you don't play the game and just listen to the lilting Irish music, you'll enjoy it very much.□

Astroblitz

by Robert L. Foster
Salt Lake City, UT

Creative Software
230 East Caribbean Drive
Sunnyvale, CA 94086
(408) 745-1655

Earth is being taken over by hostile aliens! You are the only one who can stop them. Their spaceships patrol the sky, red and green lights flashing from their windows. Bullets from the alien craft plaster the sky trying to find and destroy your cruiser as you fire back, dodging left and right, up and down. You must stay alert so you do not run into an occasional enemy bomb.

WARNING: Keep your distance when shooting at the bombs. The debris from the explosions shower the sky and a stray piece of shrapnel may just find your ship. While shooting at the aliens, dodging their bullets and bombs, alien guntowers riddle the sky hoping to find you. If you think the action is fast and furious, wait until the aliens unleash their guppies! That's right, guppies! But don't let the name fool you. These guppies are flying, fish-like creatures that become relentless assassins from which there is no escape. They will pursue you until you are destroyed or you destroy them. Oddly enough, these deadly creatures carry the lowest points possible!

Since aliens have captured most of the cities, they have put deadly force fields or charges around them. Touching these force fields means death.

While cruising through space fighting these deadly perils, you have the aid of a radar scanner which permits you to see UFO's, guntowers, guppies, cities and buildings before reaching them. There are brackets like gunsights allowing you to zero in on enemy targets.

Astroblitz is a suspenseful, fast moving game. Perhaps those with heart conditions should leave it alone. But for you other space adventurers, this is the game for you. You will thrill to this action packed game.

Tom Griner who developed the game for Creative Software, has nearly outdone himself this time. The color, sound, and detailed features are absolutely excellent. To some, the game may seem a bit difficult to master, but anyone over twelve who has fast reflexes and a little free time can thoroughly enjoy Astroblitz. A good game pays off! You get to put your initials up on the built-up "top ten" scoreboard.

At the start of the game, you receive five ships. This doesn't seem near enough firepower to save the earth. But after scoring 2200 on the scoreboard, the screen turns brilliant green, and you get a new squadron; after five thousand points you get another new ship to join your attack force.

Take it from an Astroblitz addict; this new game will provide many hours of fun and excitement on your VIC.

Choplifter

by Robert L. Foster
Salt Lake City, UT

Creative Software
230 East Caribbean Drive
Sunnyvale, CA 94086
(408) 745-1655

The enemy has taken sixty-four of your citizens hostage! Your mission:

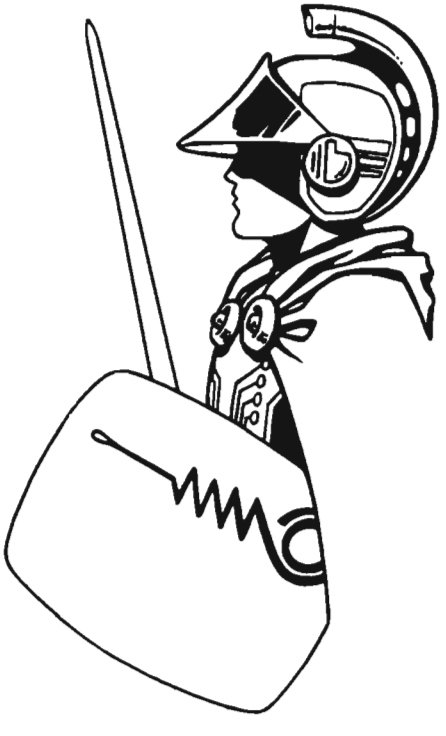
Fly your chopper into enemy territory and rescue the captives. This is a most dangerous assignment. The enemy has tanks, planes and satellites bent on knocking your chopper out of the air or destroying it on the ground. While you are in the air you are able to defend yourself and can destroy tanks, planes, and satellites. However, once you have landed and are loading the hostages enemy tanks can destroy you, your chopper and the people you are trying to rescue! You can carry only sixteen hostages per trip.

The hostages are in separate buildings, sixteen hostages in each building. If an enemy plane bombs a building the hostages are free to run—but enemy tanks are all about waiting for them! You must demonstrate your skill as a chopper pilot to stay alive, gather the captives and get back to your base! If you escape with the first load you must return to rescue the others. You must do this three more times until all sixty-four have been rescued or otherwise accounted for. In the event you get shot down, you have two more choppers waiting to go. So you actually have three choppers to help get the job done.

Enemy planes become more numerous as the game intensifies. They will try to bomb you on the ground and even while you are in the air trying to get back to your base. Enemy satellites also try to destroy you by chasing you.

Because of the superb sound and tremendous graphics you actually feel like you are on a combat mission. Your chopper sounds exactly like a real chopper. It responds to the joystick exactly as a real helicopter would. The hostages scurry about, the enemy tanks and planes are very real.

This excellent game was created by Tom Griner for Creative Software and has arcade quality features. The only minor disadvantage is that the game isn't overly difficult to master. Perhaps that isn't a disadvantage! Choplifter is always a fun and exciting game even when you've mastered it. The entire family can enjoy many hours of exciting fun with the new Choplifter game.



Product Reviews

Spritemaster 64™ Program Description

The SPRITEMASTER 64™ animation program is designed as a sprite generator and editor for use by programmers or as a fun and creative playmate for children or adults.

Sprites are moveable object blocks which, through the power of the new Commodore 64 computer, can be made to imitate almost any moving object.

SPRITEMASTER™ helps you build your sprite, then copy and modify it to produce a sequence of pictures which represent the object in motion. The ANIMATE command will then put each picture on the screen in rapid succession to create the animation. This is similar to what takes place in a movie projector where still photographs, each a slightly different picture, are rapidly projected one after another onto the screen to produce a "motion picture."

SPRITEMASTER™ lets you modify your sprite picture sequence to produce colors, shapes and sizes which give the best effect. In addition, you may change the speed of animation (the rate at which the still frames are displayed) or the speed of travel (the vertical or horizontal movement across the screen).

Once you have created your animated figure, you can save the information to tape or disk for retrieval at a later time. You may want to refine several figures for use in a game program.

Although SPRITEMASTER™ is not a game program, it is a program to create game objects. For example, it cannot display a pitcher throwing a baseball to a catcher. It can, however, be used to create the pitcher as a separate sprite, including the throwing motion, then the baseball as another sprite, and then the catcher as the final sprite. Each object is created separately and then transferred to other programs for interaction and movement as desired. The programmer's reference section provides guidance on how to manipulate sprites in your own programs.

As a learning companion for children, SPRITEMASTER™ helps teach artistry and creativity. Children can experience the excitement of first visualizing the still picture sequence involved in motion and then seeing their creations spring to life on the screen.

Access Software Inc., 925 East 900 South, Salt Lake City, (800) 532-1134.☐ Circle No. 74

Current Product Review 8000 Series & Commodore-64

Legal Plus

This is an enhanced version of Legal Time Accounting with TRUST and RETAINER tracking. LTA has sold more than 800 copies. CALENDAR/80 can be integrated.

CALENDAR/80

A Calendar/Scheduling module for legal, medical and dental packages. This module is also available as a stand alone product.

MAS

More than 400 sold. Designed for the small medical office.

DAS

An open item, treatment plan oriented dental accounting system for the small dental office. More than 150 sold.

ULTRA

WordCraft ULTRA, the supreme word processing package.

EXECUTIVE

Combines THE MANAGER with ULTRA in one interactive package.

CMAR

A machine code file handling program for sophisticated programmers.

Comp-U-Cost

The most comprehensive job costing program available.

INSTA-WRITER

A simple to use CARTRIDGE based word processing package for the COMMODORE-64.

ULTRA CALC

New for the 8096 series and the soon to be released 500 and 700 series computers is **WordCraft ULTRA CALC.**

Built into ULTRA is a full function **calculator** with MEMORY, CONSTANT, PERCENTAGES, MIXED CALCULATIONS and 0 to 9 DECIMAL PLACES.

All calculations are performed on the **4th** line and then transferred anywhere in text. Horizontal and vertical calculations are simple two key functions.

SPREADSHEET work can now be accomplished after a 10 minute training period.

DISPLAY BRACKETS LAST OP
[ ] [ ] [ ]
MEMORY CONSTANT
[ ] [ ] [ ]

Invoices, purchase orders, sales orders and other business forms can all be done easily and automatically.

Fill File Selection

Also included in ULTRA CALC is field selectable sort and **wild card** search features.

Much of the DATA BASE work that people need to perform is served by this kind of capability.

By building **TEMPLATES,** the user can establish **ARGUMENTS** that are equal to, greater than, less than, not equal to, less than or equal to, greater

than or equal to or within a specified range.

This is an extremely powerful capability and adds a dimension not approached by any competitive word processing package on any micro system.

MORE...

A KEYWORD SECURITY system for "secret" documents, cursor movement between pages, filling form **alien** files, disk directory print out, communications for different modems and support for parallel printers are also included.

HYDRA

HYDRA is a true **Local Area Network** (LAN) system for the Commodore 8000 series. Up to 128 computers (autonomous nodes) may operate within the network. The basic configuration for each computer is a printed circuit card, a twisted pair cable and resident ROM microcode.

HYDRA allows any network site to access disk units or printers at other sites. Any number of disk units may be accessed by each computer on the network. A **multi-user** DOS (MUDOS) supplied with each HYDRA allows each disk unit to handle 50 relative files simultaneously.

System speed is 250K baud (30,000 characters per second) at a maximum distance of 3000 feet. Smaller network configurations allow for longer distances.

Typical uses are education, resource sharing, electronic mail and multi-user applications development.

SYSTEM 96

SYSTEM 96 is a **language system** for the 8096. It allows programs of up to 80K-bytes to be run and supports an enhanced version of BASIC 4.0.

It operates in a dual mode in that BASIC code can either be interpreted or compiled (DTL-BASIC compiler). By using powerful OVERLAYS, programs up to **two and half** times larger than before can be run.

64K Board

Available in March from Cimarron is a compact and versatile 64K add on board for the 8032. It is 100% compatible, very small and cool running and includes provision for up to 4 ROMS or EPROMS on the board itself.

DTL Compiler

This is a two pass compiler that is currently available for the 8000 series and soon to be released for the 500, 700 and Commodore-64 series computers.

It is fully compatible with BASIC programs **including** machine code routine. The compilers run smaller and faster than their competitors.

Approximately 55 times faster than interpreted code.

INSTA SERIES

Following INSTA-WRITER are **five** additional Commodore-64 cartridge/disk based products for release over the next three months.

All are professionally packaged with point of sale exciters such as posters and placards.

The MAIN LINE PUNCH of these products are **"INSTANT"** operation and **ease of use**. The products will carry the same message and indentity throughout, whether a graphing package, a spreadsheet package or personal finance.

All will stress **personal productivity** as their hallmark.

WordCraft 64

Due for April release is WordCraft 64 featuring all the capabilities of the 80 column version.

META MUSIC

Just finished and released to Commodore is META MUSIC I. This program fully exploits the features of Commodore's SID chip in the 64.

With META MUSIC I, the operator can score, orchestrate, compose, program custom sounds and single/multi-part record.

EDIT mode will include keyboard notation, step sequencing, auto tempo generation and 3 pseudo voices for special effects and pitch blending and sweeping. The user may score in muscial notation with run time options including voices, passages, tempo, and measures. Video scanning will also be available.

PLAY mode will assemble all of the above options operationally.

For more imformation about these and other Cimarron products, please contact us direct or drop us a line: CIMARRON, 666 Baker Street, Suite 319, Costa Mesa, CA 92626, (714) 641-1156☐ Circle No. 75

VIC 20/PET/CBM OWNERS

WALLBANGER - Blast your way through the dodge'm, blast'm, and attack modes. If you destroy the bouncing balls before they destroy you, the walls close in for the next round. WALLBANGER is written in machine language, has great sound, and encourages complex strategies.

CASS/5K/VIC 20
ALL 40/80 COLUMN PETS & CBMS ..... (Includes Shipping/Handling) **$19.95**
[CALIF. RES. ADD 6% SALES TAX]

CHICKEN CHASE - Help your hapless hen avoid hungry chicken hawks, sneaky coyotes, and fiendish zompys. If your chicken gets into trouble, "hyper-hen" to a new spot on the maze. If your chicken travels the entire maze, you advance to the next level where the action is faster and the predators more numerous. Hi-res graphics, great sounds, and machine language help make CHICKEN CHASE a hilarious fun-filled game for the whole family.

CASS/5K/VIC-20 ..... (Includes Shipping/Handling) **$19.95**
[CALIF. RES. ADD 6% SALES TAX]

ROADTOAD - Hop your toad across 5 lanes of traffic, avoid deadly snakes, and dodge the dreaded toad-eaters. Cross a raging river full of logs, turtles, alligators, and park your toad in the safety of a harbor. Each time you park 5 toads, you enter a tougher level where the action is faster and the toad-eaters are more numerous. ROADTOAD is written in machine language and uses high resolution graphics. The sound effects are excellent and you can use a joystick or the keyboard to control your toad.

CASS/5K/VIC 20 ..... (Includes Shipping/Handling) **$19.95**
[CALIF. RES. ADD 6% SALES TAX]

Write For FREE Catalog

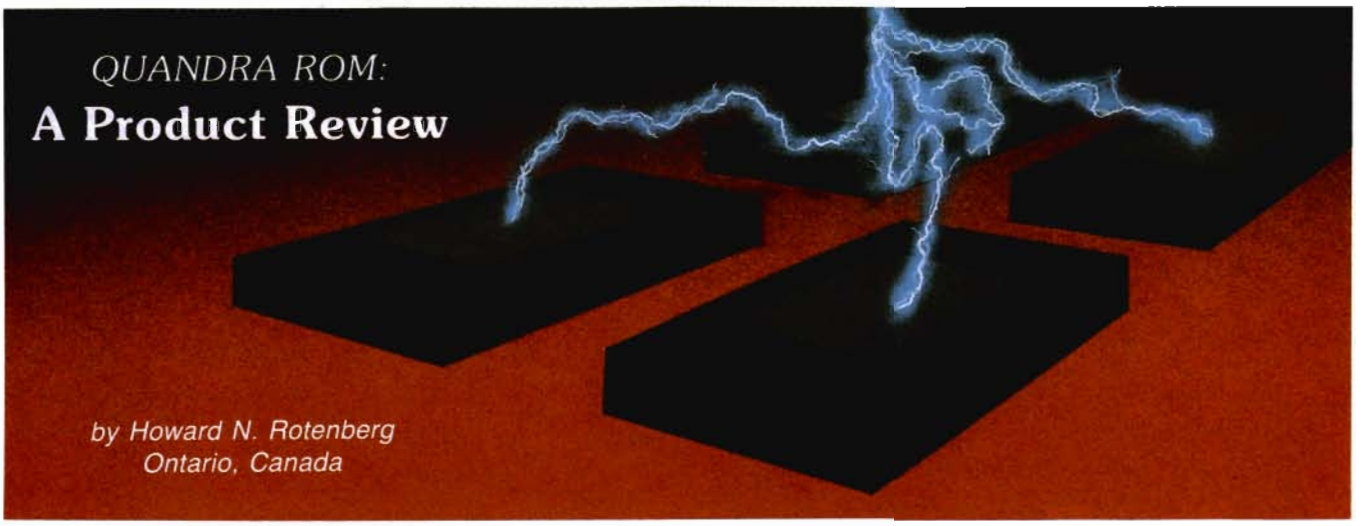
NIBBLES & BITS, INC.
P.O. BOX 2044
ORCUTT, CA 93455

Write For FREE Catalog

WARNING! These games cause high panic levels!

VIC 20/PET/CBM OWNERS

Circle No. 30



QUANDRA ROM: A Product Review

by Howard N. Rotenberg
Ontario, Canada

About two years ago I found myself in an awkward position that many other people have also experienced. I had three Roms that all resided at the same address. This is really no problem since swapping the Roms was not at all a hard task. The problem arises because the pins on the Rom and the actual socket started to take a beating after a number of insertions. I found that if the pins were not breaking off then some of the contacts on the COMMODORE motherboard were not making proper electrical connection. One thing led to another until I decided to get A QUADRA ROM and solve the problem once and for all.

Multiple ROMs Reside at the Same Address

The QUADRA ROM is a small board for the COMMODORE computer that allows four Roms to reside at the same address. It is manufactured by a company called MICROM in TORONTO. This is very handy since now I could have all my Roms present in the computer at the same time and choose the one I needed at the time. This seemed all fine and dandy until my collection of roms grew to six. I was very happy to know that the QUADRA ROM could be stacked therefore allowing seven Roms to reside at the same address. I placed the second QUADRA ROM into the first socket of the first one I had installed. Now I could select the second board just as if it were a Rom and then select the Rom I wanted to use on board number two. There was no need for any buffering since the seven Roms will not draw enough current to warrant it. The QUADRA ROM is flexible in that it will allow both 2k (2716's) and 4k (2532's) to be used whereas some other similar products will not. A friend of mine is using his QUADRA ROM so that he may use more than one character generator in his 8032.

Choice of Switches Available

Installation of the board is extremely simple although well documented nevertheless and I am sure that anyone could install one without any trouble. (IF YOU ARE REALLY SQUIRMISH I AM SURE YOUR DEALER WOULD INSTALL IT.) It sits on a component platform that plugs into the Rom socket that you wish to use it for. The platform has small but sturdy insertion pins so your main socket will not be damaged by the device. The board itself consists of four empty sockets, one dip switch, an integrated circuit, three resistors and the component platform with a standoff. The Roms may even be switched in and out without powering down your computer which in itself is a big time saver. An exception to the last statement is a rom that uses the IRQ unless you choose to reset it yourself before switching the Rom out. It has been completely reliable for me and many friends that I know are using it.

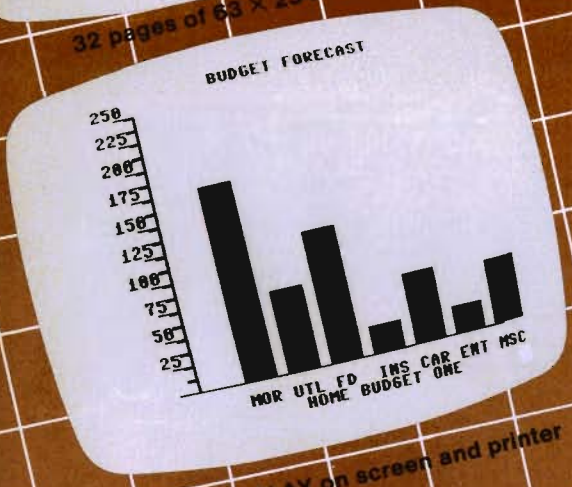
I mentioned dip switch because the board that I have uses an internal switch for the selection of the Roms. The board is also available with an external switch for the people who don't like to peek under the cover of their computers. A lot of business men choose the external switch over the internal. The integrated circuit is being used to decode a binary number from 0 to 3 for the selection of the Roms. Since the decoder really doesn't care how it gets it's information you could very easily hook up two wires to your parallel port and select the Rom you want via software. I choose not to do this since I am not sure what some of the Roms are doing for the software. I would hate to find out that after spending an hour or so with any given program that the Rom toggles the control line and switches in another Rom. If you are using your own software then this could not inadvertently happen.

When we get to the bottom line I guess the price is the real seller of this device. It lists for $39.95 which is a bargain any way you look at it. Other similar devices on the market have sold for as much as $106. There have been a few that also sold for approximately the same price but only allowed two Roms or only allowed you to use 2k chips. It seems that most of these have slowly disappeared but the QUADRA ROM lives on.

I believe that the QUADRA ROM was only available in Canada before but some good resources have told me that it has just been picked up by a new marketing company and will be available in the States very shortly. I would keep my eyes open for the future ads, especially in magazines such as this one since it seems an obvious place that a company would want to advertise a product for COMMODORE use.

In summary I highly recommend this well built device for any one who uses software utilizing Roms and for just $39.95—THE PRICE IS RIGHT.□

32 pages of 63 × 254 cells



GRAPHIC DISPLAY on screen and printer

View as many as FOUR pages at one time

the foxiest Calc Result™

PLANNING and FORECASTING TOOL AVAILABLE

For the COMMODORE 64™ with disk drive

We started with the best that standard spreadsheet programs could offer.

Then we added features designed to create a planning tool more useful than ever before.

The Result?

CALC RESULT! The most powerful, understandable and economical spreadsheet program on the market today.

Thirty-two pages, graphics and the ability to view up to four pages (spreadsheets) at once make CALC RESULT the spreadsheet program that outfoxes them all!

Calc Result Features:

- A three dimensional spreadsheet with 32 pages of 63 × 254 cells, offering unrivaled flexibility
- Graphic display on screen and printer
- The ability to view as many as four pages at once through a window and split screen. This allows you to compare spreadsheets!
- Help function on-line to make Calc Result's features easy to use
- Color coordinated cells that speed calculations
- IF-THEN-ELSE with AND, OR and NOT-ELSE functions in each cell give you unlimited possibilities for decision making
- Timesaving full function editing
- Flexible column width printouts for formatting reports
- Utilization of memory only in cells that are active
- Replicate, copy and move commands that save time
- Consolidation of spreadsheets to get the "bottom line"
- Protection of cells containing formulas
- Ability to load VisiCalc™ files

Distributed by:

COMPUTER MARKETING SERVICES INC.

300 W. Marlton Pike • Cherry Hill, N.J. 08002 • 609-795-9480

"Our products outfox them all!"

Commodore 64 is a trademark of Commodore Business Machines
VisiCalc is a trademark of VisiCorp.
Calc Result is a trademark of Handic Software, AB.

PEDISK II FLOPPY DISK SYSTEM:

A Product Review

by Louis F. Sander
Pittsburgh, PA

The PEDISK II is an inexpensive and expandable disk drive system for Commodore PET/CBM computers. If you're thinking about a disk drive for one of those machines, you ought to look into PEDISK II.

Unlike the Commodore drives, which use the IEEE port, the PEDISK II plugs into a ROM socket inside the PET/CBM. To install the PEDISK II, you remove one of the Commodore ROMs and plug it into the PEDISK II controller board (Figure 1). The board then plugs into the vacant ROM socket, and a cable connecting the drive or drives plugs into it. Four additional connections inside the PET are made by high-quality clip connectors. The PEDISK manual gives clear, step-by-step instructions for fitting everything together, and none of the steps are difficult at all. The controller board also contains a ROM of its own, which must be matched to the ROMs and memory size of the host machine.

Either 5¼" or 8" drives can be used with the controller board, and it is a simple matter to expand from one to three drives on a system. All you do is get the proper cable and plug in the extra drives. The PEDISK system is also available for SYM and AIM computers, and disks made on one type of computer can be easily read on any of the others. If you have 8" drives, a standard IBM format is used, allowing you to exchange disks with many other machines.

The DOS, or Disk Operating System, provided with the PEDISK is designed for simplicity and speed. It has all the most useful features, with few frills, so if your ambition is to explore and work with the DOS itself, your task is a relatively easy one. Reading and writing information to the PEDISK are considerably faster than

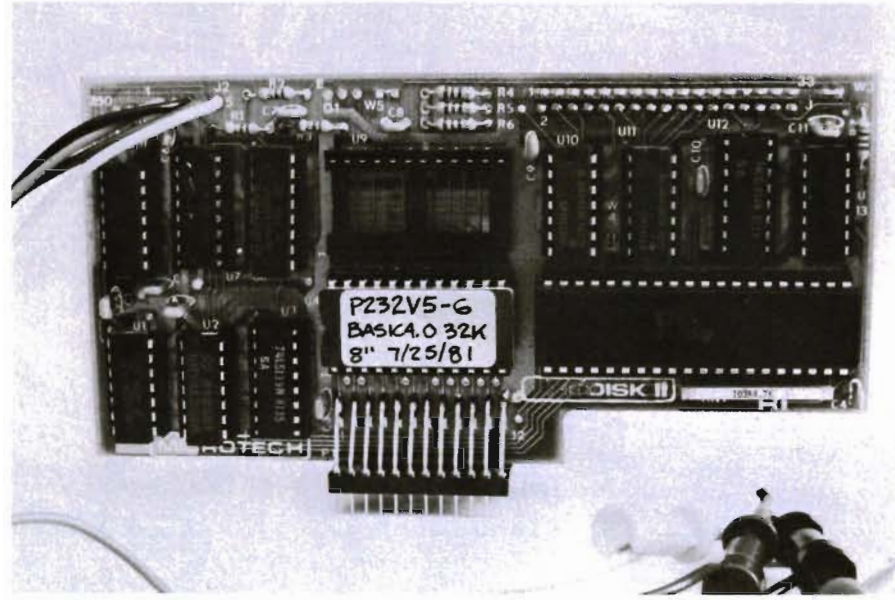


FIGURE 1—PEDISK II Controller Board

the same operations with Commodore drives. For those who want to use data files, the PEDISK supports both the sequential and the relative varieties.

To activate the disk, you do a simple SYS 59904 from your keyboard, which is rewarded by a short welcome message. At this point you have eight BASIC commands available to you, for performing the most commonly needed functions. !SAVE saves a program to disk. !LOAD loads it, and !RUN loads and runs it. !LIST gives a directory of all programs on the disk, while other similar commands are used for file handling.

The !SYS command moves the system into the so-called "PDOS Mode," in which you have more direct control over what is going on, at the machine language level. In PDOS mode, single keystrokes can be used to save or load machine language programs, to examine memory or disk sectors, etc. Using this mode, I have worked out several disk utilities that were rewarding to write and helpful to use.

Like most manuals for computer hardware, the one with the PEDISK is somewhat difficult to fathom at first. The functions of some commands and operations are not immediately obvious, and the first-time user is likely to spend some time scratching his head. But with effort comes understanding—most of the mystery soon disappears, and the manual quickly becomes a useful guide to working with the system. There is a very useful PEDISK Newsletter, published several times each year, which gives further hints, programs, and instructions.

Other documentation, available at nominal cost, is a Programming Manual, essential for machine language dabblers, and DOS Source Listings, handy for those who **really** want to become expert.

Lots of software is available in PEDISK II format, including the famous MAE 6502 assembler, VISICALC,

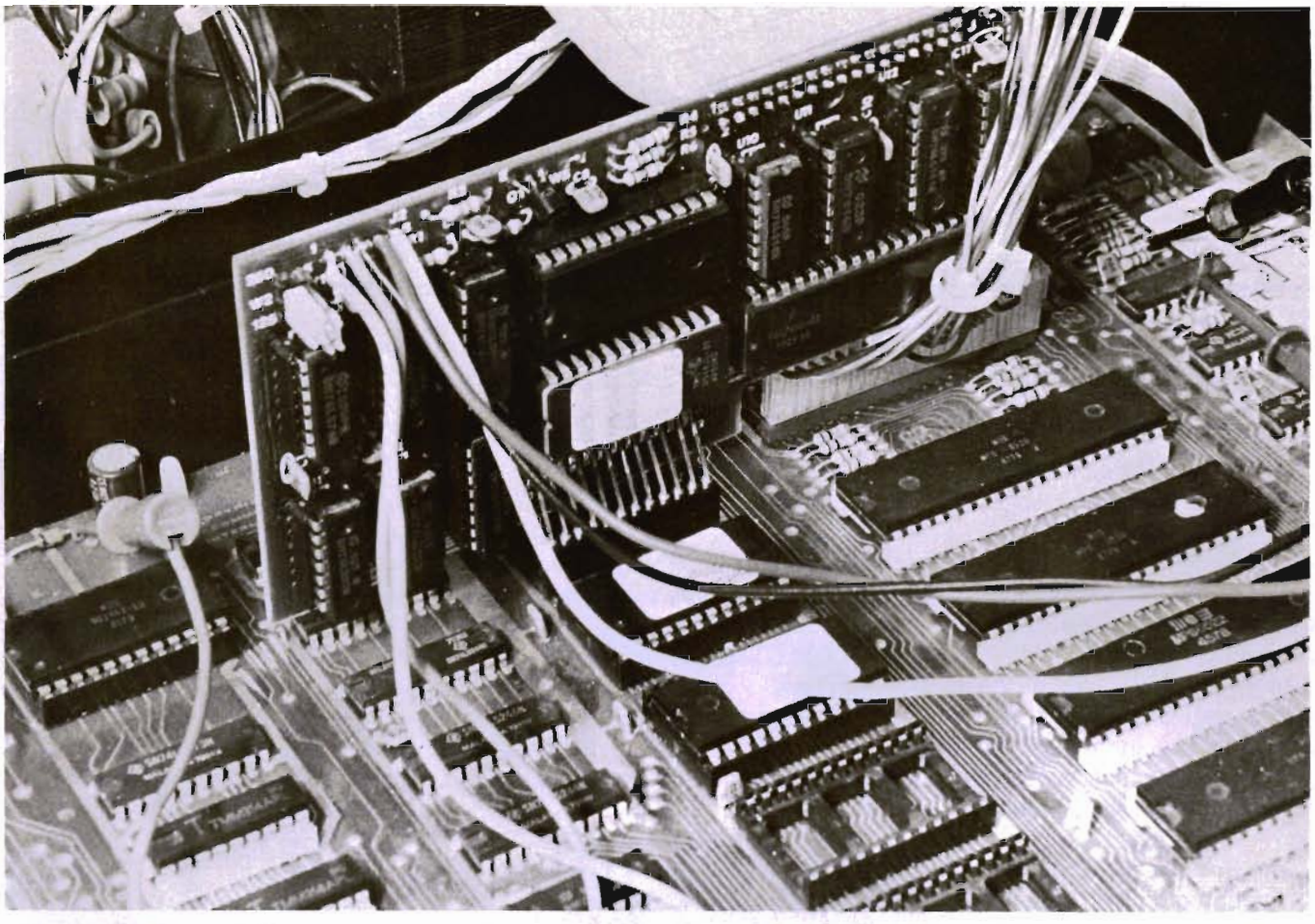


FIGURE 2—PEDISK II Controller board Installed in PET Logic Board

word processors, various utilities, etc. There is also an informal user group whose activities include software swapping. But if you plan to swap software with Commodore disk owners, you won't be able to do it by swapping disks, since Commodore and PEDISK formats are incompatible. I get around that problem by swapping on cassette tapes, which has been quite satisfactory for my purposes.

In summary, the PEDISK II is a very nice way to move beyond the cassette stage, especially if you want to save money on a multi-drive system, or if you want to learn about disk operating systems in an easy and straightforward way. Its only real shortcoming is its incompatibility with Commodore diskettes, but for me, at least, that is more than outweighed by its advantages. I'm glad I bought my PEDISK.

The PEDISK II is available in several configurations from dealers or from Microtech, P.O. Box 102, Langhorne, PA 19047.□

FIGURE 3—PEDISK II with 8″ Disk Drive

Parachute Landing

by K.T. Adkins
Mt. Sinai, NY

Parachute Landing is a very easy game to play, but can become rather frustrating. It is a game well suited to the screen size of a VIC-20 and can certainly be modified for use on other computers. It was created using an unexpanded VIC-20.

The theme of the game may be simply stated. As the character * the player lands in the middle of a forest, presumably by parachute. He must then find his way out of the forest without stepping on one of the 15 randomly placed land mines. Points are scored for the most steps taken to leave the forest without getting blown up.

The version shown here is intended for keyboard control. When RUN, the title appears followed by instructions for the player. The construction of the program is as follows:

As one can see from the PRINTed version accompanying this article, lines 4 to 19 will display the title followed by the instructions.

Lines 99 to 140 fill the screen with green spades used to simulate trees.

Lines 150 to 180 determine the random location of the 15 land mines. Of course, more or less land mines could be used.

Lines 190 to 290 determine one of four random locations in the center area of the forest where the parachute lands. This may be modified if the reader would prefer to have the parachute land anywhere in the forest.

Lines 300 to 360 display the moves made by the player, adding 100 points to the score each time a successful move is made without hitting a land mine. As noted earlier, if the player escapes from the forest by a longer route, the scores achieved will be higher. However, taking a longer route increases ones chances of hitting a land mine, in which case, all score points are lost.

Lines 400 to 420 allow the player to choose another game.

Lines 500 to 509 check to see if a move resulted in hitting a land mine.

Lines 510 to 520 check to see if a move resulted in a successful escape from the forest.

Lines 600 to 613 display the escape message together with the current score and the high score.

Lines 700 to 705 create the explosion which results from hitting a land mine.

Lines 706 to 710 display the appropriate message resulting from the explosion mentioned above.

The program is by no means complex nor is it difficult to understand. It is presented primarily for the beginning programmer as an illustration of what can be accomplished by someone who has had a VIC-20 for only three months. As one can see, only a small amount of color and sound are used, but additional color and sound can easily be added. Try, for example, replacing line 10 with the instructions GOSUB 1000 and then adding the following lines to the program:

```
1000 T = 36876: V = 36878
1010 POKE V,15
1020 READ P: IF P = 1 THEN POKE V,0: RETURN
1030 READ R
1040 POKE T,P: FOR N = 1 TO R: NEXT
1050 POKE T,0: FOR N = 1 TO 20: NEXT
1060 GOTO 1020
1070 DATA 215,250,215,250,225,250
1080 DATA 228,250,231,500,231,125
1090 DATA 231,125,232,250,219,250
1100 DATA 219,250,228,500,1
```

```
1 Z=0:X=0:S=42:CL=144:HS=0
2 DIMA(15),AA(15)
4 PRINT"□    ************"
5 PRINT"     *          *"
6 PRINT"     * PARACHUTE *"
7 PRINT"     *  LANDING  *"
8 PRINT"     *          *"
9 PRINT"     ************":PRINT:PRINT"
  BY TOM ADKINS"
10 FORZZ=1TO4000:NEXTZZ
11 PRINT"□   AS THE CHARACTER *,
   YOU PARACHUTE INTO THEMIDDLE OF A FOREST."
12 PRINT"   YOU MUST FIND YOUR WAY OUT OF
   THE FOREST."
```

```
13 PRINT:PRINT"   WHEN THE BOARD IS  COMPLETE, YOU MAY HIT ANY KEY";
14 PRINT" TO BEGIN THE  GAME."
15 PRINT:PRINT"   TO MOVE THE *, USE THE FOLLOWING KEYS:"
16 PRINT:PRINT"        Y=UP"
17 PRINT"   G=LEFT  H=RIGHT"
18 PRINT"        B=DOWN "
19 PRINT:PRINT"   BE CAREFUL! THERE  ARE 15 LAND MINES."
20 FORKK=1TO11000:NEXTKK
99 PRINT"□":PRINT"■"CHR$(147);
100 FORI=1TO23
110 FORJ=1TO22
115 IFI=23ANDJ=22THENPRINTCHR$(157)CHR$(148);
120 PRINT   CHR$(97);
130 NEXTJ
140 NEXTI
150 FORM=1TO15
160 W=INT(RND(1)*16):P=INT(RND(1)*16)
170 A(M)=W:AA(M)=P
180 NEXTM
190 GETB$:IFB$=""THEN190
200 P=11:W=11:T=INT(RND(1)*4)+1
210 ONTGOTO220,230,240,250
220 W=W+1:GOTO260
230 W=W-1:GOTO260
```

THE QDI 40/80 VIDEO CARTRIDGES

Quantum Data, Inc. produces two 40/80 Video Cartridges for the Commodore VIC-20 computer. The Video Cartridge which does not contain memory, and the Video Combo Cartridge which contains 16K RAM composed of eight 6116 CMOS memory chips.

The 40/80 Video Cartridge or the 40/80 Video Combo Cartridge is the means to upgrade the VIC-20 computer to a 40 × 24 or an 80 × 24 character display. This provides a wealth of new uses for the VIC-20 and with the appropriate software you can now accomplish quality word processing and various business functions that previously were difficult to achieve with only the VIC's standard 22 character video display. Both Cartridges feature a screen printing routine and a terminal emulator routine which are written in BASIC so that you can add these capabilities to your programs.

Either Cartridges can be plugged into the memory expansion port of the VIC-20 or an expansion chassis. The 40 character mode may be easily viewed on most standard T.V. sets but a monitor is required for the 80 column mode to provide the necessary additional resolution.

VIDEO CARTRIDGE $159.95
VIDEO COMBO CARTRIDGE $259.95

Call (714) 553-1945 to place your order today!

Ask for other VIC-20 hardware and software peripherals!

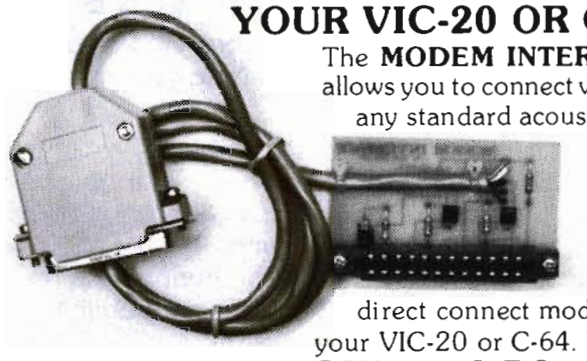
QUANTUM DATA, INC.
14252 Culver Drive, Suite A, Box 285, Irvine, CA 92714

Items in stock ready for immediate delivery.
Visa or Mastercard accepted. Above prices retail in U.S. dollars. Shipping and handling not included.
VIC-20 is a trademark of Commodore Business Machines

Circle No. 36

```
240 P=P+1:GOTO260
250 P=P-1
260 IFP=11ANDW=12THENX=7934:V=38654:POKEV,CL:POKEX,S
270 IFP=11ANDW=10THENX=7932:V=38652:POKEV,CL:POKEX,S
280 IFP=12ANDW=11THENX=7955:V=38675:POKEV,CL:POKEX,S
290 IFP=10ANDW=11THENX=7911:V=38631:POKEV,CL:POKEX,S
300 GETC$:IFC$=""THEN300
305 POKE36878,15:POKE36876,220:POKE36876,0
310 Z=Z+100
320 IFC$="Y"THENV=V-22:POKEV,CL:X=X-22:POKEX,S:P=P-1:GOTO500
330 IFC$="G"THENV=V-1:POKEV,CL:X=X-1:POKEX,S:W=W-1:GOTO500
340 IFC$="B"THENV=V+22:POKEV,CL:X=X+22:POKEX,S:P=P+1:GOTO500
350 IFC$="H"THENV=V+1:POKEV,CL:X=X+1:POKEX,S:W=W+1:GOTO500
360 GOTO300
400 PRINT"WANT TO TRY"
401 PRINT"AGAIN (Y OR N)";
402 INPUTE$
410 IFE$="Y"THEN99
420 END
500 FORL=1TO15
501 IFP=AA(L)ANDW=A(L)THEN700
509 NEXTL
510 IFP=0ORW=0ORP=23ORW=22THEN600
520 GOTO300
600 PRINT"■"
610 PRINT"YOU'VE ESCAPED!":PRINT:PRINT
611 IFZ>HSTHENHS=Z
612 PRINT"YOUR SCORE
    IS"Z
613 PRINT"HIGH SCORE
    IS"HS
614 Z=0:GOTO400
700 POKEV-23,28:
    POKEV-22,28:
    POKEV-21,28
701 POKEV-23,28:
    POKEV-22,28:
    POKEV-21,28
702 POKEV-1,28:POKEV
    +1,28:POKEV+21,28
703 POKEV,28:POKEV+
    22,28:POKEV+23,28
705 GOSUB900
706 PRINT"■"
710 PRINT"YOU'VE
    BEEN BLOWN AWAY":
    Z=0:GOTO400
900 POKE36877,220
910 FORD=15TO0STEP-1
920 POKE36878,D
930 FORDD=1TO300
940 NEXTDD
950 NEXTD
960 POKE36877,0
970 POKE36878,0
980 RETURN
```


CONNECT ANY MODEM TO YOUR VIC-20 OR C-64



The **MODEM INTERFACE** allows you to connect virtually any standard acoustical or direct connect modem to your VIC-20 or C-64. Works with the Microconnection, DC Hayes or CAT. Compatible with autodial/autoanswer modems. No soldering, just plug it in. Comes with a BASIC autodial terminal program. $21.95 Postpaid. Add $1.75 extra for shipping outside the U.S., Canada, or Mexico. VISA or MASTER-CARD welcome.

FOR CHARGE OR C.O.D. ORDERS

1-800-227-3000 TOLL FREE
1-800-792-0990 IN CALIFORNIA
ASK FOR OPERATOR 225

For check order, additional information or service, call or write:

BYTESIZE MICRO TECHNOLOGY
PO BOX 21123 - DEPT. A - SEATTLE, WA 98111
(206) 236-BYTE

DEALER INQUIRIES WANTED

News Releases

The Mail List

The most powerful mailing list program available for the VIC-20 and Commodore 64 has just been released. Galactic Software presents The Mail List! This program has numerous capabilities, and it is menu-driven to allow for easy use of all this capabilities. To name just a few of its features: it allows for both sorting and searching on any of the 10 fields; its multiple printing capabilities allow the user to print single labels, multiple labels, labels for the whole list, printouts of the whole list and much more; it also allows for printing of business or personal mailing labels; and all these printing capabilities can be done on almost any printer. To top all that, this program performs all these activities very quickly. The Mail List is available from Galactic Software in both a cassette and a diskette version, both at an economically low price.

For more information, call (408) 247-4434 or write: GALACTIC SOFTWARE, PO Box 10516, San Jose, CA 95157.☐ Circle No. 49

Payroll System—New from GAAP Software

This is a comprehensive payroll system designed exclusively for the Commodore 64. This system maintains an employee master file, generates reports for management and tax purposes, calculates and prints computerized payroll checks with full deduction detail. It's designed and developed by professional accountants. Dealer demo diskette available.

- Gross wages calculated by regular, overtime, double time, holiday, vacation, sick hours, other pay taxable, other pay non-taxable, and temporary rate.
- 7 fixed voluntary deductions and 3 miscellaneous.
- 4 digit employee number.
- 100 employees per disk. (1541) (500 to 1000, 8050-8250 respectively.)
- 7 different pay and deductions frequencies.
- Departmental recapping of all deduction and expenses.
- All routines menu driven.
- YTD and QTC 941 reporting.
- Password projected master files.
- Federal and State tax tables. (User maintainable)
- Check reconciliation.
- Void/Manual check entry.

Contact GAAP Software, PO Box 1343, Waukesha, WI 53187 or call (414) 544-5249.☐ Circle No. 50

CCI Mini-Retailer 64™

CCI will make this same package available for retailers with fewer transactions and limited number of inventory items. This software will run on one or more of the 1541 disk drive at about 1000 inventory items per 1541. This configuration does not require an IEEE-488 adapter. This will provide small businesses and home/business operations with a TOTAL SYSTEM COST UNDER $3,000 including cash drawer. Available in mid-1983.

Clockwork Computers, 8704 Bradgate Road, Alexandria, VA 22308, (703) 780-6010. Marketing: 4612 Holly Ridge Road, Rockville, MD 20853, (301) 924-5509 or (301) 924-4157.☐ Circle No. 51

CCI Bottom Liner™

Written for 64/1541

This package is intended to aid individuals, families and businesses to account for a variety of INCOME; such as straight sales, installment sales, real estate capital gains, dividends, interest, reimbursements by employer, and reimbursements by health insurer and EXPENSES; such as stock purchases, contributions, utilities, medical, dental, unreimbursed business expenses, entertainment, interest, travel, parts, supplies, mailing/postage, labor, materials, automobile, rent, and tax deductable life insurance. Summary totals from this system can go directly to provide profit and loss, net work, and data can go directly to the IRS forms. Suggested list price is $98.75. Now accepting orders for mid-1983 delivery.

Clockwork Computers, 8704 Bradgate Road, Alexandria, VA 22308, (703) 780-6010. Marketing: 4612 Holly Ridge Road, Rockville, MD 20853, (301) 924-5509 or (301) 924-4157.☐ Circle No. 52

Avalon Hill Fires 3 More Inter-Ballistic Missiles

Avalon Hill has expanded its line of IBM P.C.® computer software to eleven titles with the release of three new explosive programs. From the company known as "The Thinking Man's Gamemaker," these new microcomputer games promise to fire-up your New Year's Sales.

For Armchair Quarterbacks

Avalon Hill has announcced the addition of COMPUTER FOOTBALL STRATEGY to its line of IBM P.C.® software. A challenging game of professional football that pits your skills against the computer, or a live opponent. You can be either the offensive or defensive play caller in this all-skill strategy game. FOOTBALL STRATEGY is a computerized adaption of

Avalon Hill's popular board game of the same name.

Nearly sixteen years ago before Avalon Hill became the exclusive game maker for "Sports Illustrated," the magazine had this to say; "An honest-to-Pete challenge to the man who knows he would have been a great pro quarterback if only he had had the chance."

FOOTBALL STRATEGY is ready to run on the IBM P.C.® with 48K memory. The price of the diskette is $21.00.

Combat in Vietnam

VC is the name of the game, based on the controversial war in Vietnam. You have been in 'Nam for 90 endless days. You are ready for a massive search and destroy mission. Under your command, is the air-mobile and heavily armed 1/509th Air Cavalry and the 9/15th Field Artillery. As advisor to the Army of the Republic of Vietnam can you defeat the enemy, that can hide amongst the people, and where the politics of terrorism and friendship can turn the people you want to save, against you?

VC is ready to run on diskette for the IBM P.C.® computer with 48K memory. The price is $25.00.

Future War

B-1 NUCLEAR BOMBER rounds out this New Year's bash. The IBM P.C.® version places you in the cockpit of a Supersonic Bomber, on a mission over the Soviet Union. You swallow hard, as your eyes scan the sky for another Russian MIG. You must fly the plane to the target city, bomb it, and return home. Your only chance to get through the stiff Russian defenses, is to rely on the superior technology of your ECM (electronic counter measures) and self-defense missiles.

B-1 NUCLEAR BOMBER is ready to run on diskette for the IBM P.C.® computer with 48K memory. The price of the diskette is $21.00.

You are the target, with these 3 new IBM P.C. games from Avalon Hill. MIDWAY CAMPAIGN, COMPUTER STOCKS AND BONDS, DRAW POKER, VOYAGER, GALAXY and ANDROMEDA CONQUESTS round out the line of AH's IBM P.C. compatible software, so arm yourself and enjoy the explosion.

The Avalon Hill Game Company, 4517 Harford Road, Baltimore, MD 21214, (301) 254-5300.☐ Circle No. 53

VIC-20® Commodore 64® to Parallel Printer Interface

The SPI board provides the VIC-20/ Commodore 64 with direct BASIC use of the parallel bus. When pugged into the VIC-20/Commodore 64, the card gives "invisible" access to this bus.

The SPI has several features and flexibilities:

A. The SPI requires no driver software on the VIC-20 or Commodore-64, making it compatible with virtually every program written for use with the 1515 or 1525 printers.

B. The SPI will, if desired, automatically send a line feed with each carriage return printed. This satisfies the requirements of some printers that do not have automatic line feed. This mode can be selected with either software OR hardware control.

C. The SPI will, if desired, automatically convert "Commodore ASCII" into standard ASCII. Most parallel interface printers today use standard ASCII, making this feature very desirable. This mode can also be selected with either software OR hardware control.

D. The SPI will, if desired, automatically suppress its software selected conversion, via a hardware selection (a switch).

E. The SPI will, if desired, automatically suppress line feeds that are sent after a carraige return. Some printers recognize line feeds and some software sends a line feed with every carriage return. This feature helps to prevent the double spacing that this may cause.

F. The SPI connects directly to the VIC-20 OR Commodore 64, works directly through the serial port using the serial port driver software (already built into the computer), and is completely interchangable between the two computers.

G. The SPI can be any of 4 device numbers (4,5,6 or 7) on the serial bus. This allows the SPI to be used with another printer or another SPI at the same time.

'Commodore 64' and 'VIC-20' are trademarks of Commodore Business Machines, Inc. MICRO SYSTEMS DEVELOPMENT, INC., 11105 Shady Trail, Suite 104, Dallas, TX 75229, (214) 241-3743.☐ Circle No. 54

Synapse Software Moves to New Facilities

Synapse SOFTWARE, leading designers of home computer software, have moved to new facilities. Due to skyrocketing sales, the quadrupling of their line with 32 new programs, and increases in sales and marketing staff, Synapse has relocated in 30,000 feet of combined office, production and warehouse space in Richmond, CA.

A relatively young company in the computer software category, Synapse accumulated early successes with such game programs as Chicken, Shamus, and Protector II. They rapidly garnered a position as a leading third party supplier of programs for Atari 400 and 800. Now, having amassed one of the largest stables of program designers in the industry, Synapse is poised to launch 32 dramatic new game, educational and utility programs, for all of the leading hardware systems (VIC 20, TI99/4A, Commodore 64, IBM-PC, Apple II, and the Radio Shack Color Computer). The slated new releases are to include Pharoah's Curse (a multi-screen Egyptian adventure), Fort Apocalypse, Necromancer (the game that allows your computer to cast spells) and Shamus: Case II (the long awaited sequel to the graphic adventure classic). New utilities will include Trend Manager, advanced renditions of FileManager + and numerous home management and business packages.

Contact: Synapse, 5221 Central Avenue, Richmond, CA 94804, (415) 527-7751.☐ Circle No. 55

MSD Disk Drive

The MSD Disk Drive is a Commodore compatible disk drive designed to interface to the various Commodore computers such as the PET, VIC-20, and the C64. The disk drive is compatible to the model 4040, 2031, 1540, and 1541 disk drives and recognizes programs generated on any of these disk drives. The capacities disk drive recognizes the full instruction set of the Commodore drives. In addition to this compatibility the MSD Disk Drive offers more RAM area within the disk unit, both a serial and an IEEE bus interface, and more importantly, a software reconfigurable operating system capable of handling disk formats other than the Commodore format. The following technical specifications apply to the MSD Disk Drive:

Physical dimensions:
- Height: 4.5"
- Width: 6.0"
- Depth: 12.0"

Disk Parameters:
- 5.25 inch single-sided, double density diskette media
- Number of tracks—35
- Number of sectros per track—17 to 21 (variable)
- Sector size—256 bytes
- Number of sectors per disk—683

Capacities:
- User sectors per disk—667
- Disk capacity—174,848
- Data capacity—168,656
- Relative data capacity—167,132
- Program capacity—168,656
- Directory capacity—144 Filenames

Electrical interface:
- Power requirements:
  - Input voltage—120 volts + /- 10%
  - Frequency—50 or 60 Hertz
  - Power—30 watts

Computer interface:
- Commodore type SERIAL bus or
- Commodore type IEEE bus

System features:
- 16K ROM based operating system
- 16K RAM area
- 6511Q Microprocessor
- Power on self test diagnostics
- External AC receptacle
- Reconfigurable operating system for other disk formats

PET, VIC-20, and C64 are trademarks of Commodore Business Machines, Inc.

Micro Systems Development, Inc. 11105 Shady Trail, Suite 104, Dallas, TX 75229, (214) 241-3743.□

Circle No. 56

ASERT® Overview Aid for Search and Retrieval of Test

ASERT® is an operator oriented, virtually crashproof information Management System that operates on the Commodore computer. The format for the record area of most commercial Data Managers consists of a number of **FIELDS** into which the required data is placed. The ASERT® program has gone beyond this limitation to include an area of **Free Text** for unusual, confidential, or other data, which cannot be categorized.

ASERT® also contains a section which allows for the creation of up to 180 **Searchwords.** This section permits the user to create **Search Criteria,** that is; to locate **Records** which **"Must Have", "Must not Have"** or **"Might Have"** a particular combination of characteristics that satisfy specific needs. In other words, all **Searchwords** as well as the **Variable Functions** are user determined.

ASERT® allows you to print **Labels** for identification or mailings. **User Defined Reports** is another feature of the **ASERT®** program. These reports can be printed on the basis of **Entry Order, Sort Order, Success Lists, or any sub-set of these.**

ASERT® creates a **Sequential File** which can be accessed by **Word-Processing** and **Accounting** programs.

ASERT® has **Statistical** capabilities. A report of totals, based on the **Searchwords** held by **all** your records or on records in your **Success Lists,** can be created. **ASERT®** gives the number of records that are coded with each of the **Searchwords,** the number of

POWERBYTE SOFTWARE™

Presents

APPLICATION SOFTWARE

Business and Home

for the

• Commodore 64

• Vic 20 and TRS 80 CC

65 Applications Available including:

THE EDITOR - Advanced Word Processor with Powerful Editing Features (64 & 8K Vic 20)	$34.95
THE ACCOUNTANT - General Ledger, Income Statement & Balance Sheet	$29.95
ACCOUNTS RECEIVABLE/PAYABLE - Create Journal for Current Accounts & Record of Paid Accts.	$21.95

BUSINESS INVENTORY	$19.95	AT HOME INVENTORY	$12.95
ORDER TRACKER	$19.95	CHECKBOOK BOOKY	$12.95
MY PROFIT MARGIN	$16.95	THE STOCK TICKER TAPE	$16.95
BILLING SOLVER	$19.95		
CASH FLOW MODEL	$16.95	UTILITY BILL SAVER	$12.95
THE CLIENT TICKLER	$19.95	THE BAR CHART	$8.95
INCOME & EXPENSER	$15.95	MOTHER'S RECIPES	$12.95
BUSINESS APPOINTMENTS	$16.95	THE MAILMAN	$12.95
		GRADE MY KIDS	$15.95

AND MANY, MANY MORE!!

FOR CASSETTE OR DISC ($10.00 Extra - 64 & Vic 20)

• FREE CATALOG

WITH INTRODUCTORY SPECIALS

POWERBYTE SOFTWARE

2 CHIPLEY RUN
WEST BERLIN, NJ 08091
(609) 346-3063

VISA

Circle No. 47

records that are not, as well as a **Percentage Ratio** is readily available through **ASERT®** .

ASERT® has **Sort Routines.** This option will organize your entire file according to any of the thirty (30) **Record Fields.** You can **Sort** your file alphabetically or numerically (e.g. by name, payroll number, zip code, etc.).

All **Important Instructions** are displayed on the screen in what is known as a **Menu Format.** When **Critical** decisions are to be made, **Fail-Safe** commands minimize the risk of losing data.

ASERT® is sold with **"Demo"** records which allow the user to experiment with the system before setting up his **Office File** and **Record Format.**

Specifications

Hardware Requirements—COMMODORE 8032, 8050 or 4040 Disk Drive. A full range of printer options. Plus COMMODORE 64.

Language—Compiled Basic 4.0 with **Machine Code Sort Routines.**

Number of Search Words—180.

Type of File Structure—Information Storage/Retrieval Method.

Sort—Any 30 Record Fields.

Search—Logical 'And', Logical 'Not,' Logical 'Or'—In any combination.

For more information write or call Geneva Technologies Corp., 14 Commerce Drive, Cranford, NJ 07016, (201) 276-1144.☐ Circle No. 57

VIC ROM Add-On

The VIC Rabbit is a cartridge which plugs into the back of the VIC-20 Computer. No tools are required since it just plugs in. The VIC Rabbit contains software which provides for high-speed LOAD and SAVE on the VIC cassette deck. for example, the **VIC cassette takes 2 minutes, 40 seconds** to LOAD/SAVE an 8,000 byte program and the VIC disk drive takes about 22 seconds. **VIC Rabbit requires just 32 seconds!** Incredible isn't it—Cassette almost as fast as the disk and at only $39.95. The Rabbit is very reliable and has been available for the older Commodore computers for over 2 years. If you are tired of the long wait to LOAD and SAVE programs from cassette, then you need the VIC Rabbit.

Since the Rabbit is an extension of the operating system, the normal VIC LOAD, SAVE and VERIFY commands can still be used. Think of Rabbit as providing an additional recording mode—thus you have two LOAD commands (Commodores and Rabbits) and two SAVE commands.

The VIC Rabbit also contains a connector on one end so that you can simultaneously use expansion memory or another cartridge.

The VIC Rabbit software is contained in a ROM on the cartridge. 12 Rabbit commands provide not only high-speed LOAD/SAVE but other useful functions. The Rabbit commands are as follows:

12 Rabbit Commands

SS—Save with short leader
SL—Save with long leader
L —Load a program
V —Verify a program
E —Load and then run
T —RAM Memory Test
D —Convert decimal # to hex #
H —Convert hex # to decimal #
Z —Toggle character set
K —Kill the Rabbit
* —Go to monitor
G —Go to Machine Language Program

Example: L "STAR TREK", 2 or T 1,400,1FFF

VIC Rabbit and Comprehensive Manual—$39.95.☐ Circle No. 58

Protect Software with MODEL ISO-11

Severe AC Power Line Spikes, Surges and Hash are prevalent in many MicroProcessor installations. Program execution is plagued with unexplained crashes, memory loss or other glitches. Disks, printer and processor often interact, aggravating the problem.

ELECTRONIC SPECIALISTS recently announced MODEL ISO-11 is designed to protect software from these severe electrical problems. Complementing the popular SUPER-ISOLATOR line, the MODEL ISO-11 features two individually dual-Pi filtered AC socket banks (6 sockets total). Heavy-duty spike/surge suppression is incorporated in the design. Equipment interactions are eliminated, disruptive or damaging line spikes and hash are controlled, and programs operate more smoothly.

The MODEL ISO-11 SUPER-ISOLATOR controls power line Spikes and Hash while providing ultra-smooth program operation. $115.95.

Contact: ELECTRONIC SPECIALISTS, INC., 171 South Main Street, PO Box 389, Natick, MA 01760, (617) 655-1532.☐ Circle No. 59

J Systems Corp.

J Systems Corp. announces the immediate availability of its new PET Joystick Interface. This versatile interface card adds joystick/paddle capabilities to all PET/CBM computers. Device enables the PET to accept inputs directly from 2 Apple joysticks/4 Apple game paddles or 2 Atari joysticks. Interface is complete and ready to plus into the user port. All modes of operation are software-selectable. The device features short access time (less than 10 milliseconds/joystick) and high resolution digitization (greater than 8 bits). This makes the interface ideal, not only for joysticks/paddles, but also, for connecting any four resistive sensors to the PET/CBM. Fast machine language input routines, callable from a BASIC program, are included.

The price of the PET Joystick Interface is $69.95. This price includes the card, power supply, documentation and sample software. VISA and MASTERCARD are welcome. The device can be ordered directly from: J Systems Corp., 1 Edmund Place, Ann Arbor, MI 48103, (313) 662-4714.☐

Circle No. 60

The Master Memory Map™

Commodore 64—$14.95
VIC-20—$9.95

People have come to expect quality products from Educational Software, Inc. April marks the release of the popular reference book, The Master Memory Map™, for the Commodore 64™ and the VIC 20™.

The book is a guide, for both beginners and experts, to most memory locations in the computer and their functions. By simply altering the contents of the locations with PEEK and POKE statements, you can get some very amazing and creative effects with your computer.

Written in a friendly and concise manner, the 300 page Master Memory Map covers a rainbow of subjects. The memory locations are grouped into several sections including: How to PEEK and POKE, Paddles and Joysticks, Color Locations, Single and Multiple Sound Registers, Graphics Registers, Sprites, Character Graphics REgisters and a host of others. There is also a section on how to make sounds and sprites. The manual is loaded with illustrations and plenty of examples written in BASIC and explained in "Earthling Language" not computerese.

In addition, Educational Software will be putting out a series of Tricky Tutorials™ for the Commodore 64. These lessons offer complete manuals along with many samples that are already typed in and running. Scheduled for release are: The Basics of Animation, High Resolution Graphics, a Sprite Tutorial, and Character Graphics.☐ Circle No. 61

MICROSPEC

Quit Playing Games . . .
Disk Based Software to Make Your Computer Get Down to Business

Disk Data Manager—Create and manage your own data base. Allows you to create, add, change, delete, search, sort, print, etc. Up to 1200 records on a single disk.
VIC 20. . . 59.95 CBM 64 . . . 79.95

Payroll System—Full featured, complete payroll system. Even prints checks.
VIC 20. . . 89.95 CBM 64 . . . 99.95

Mailing List—Up to 1200 records on a single disk. Presorts by Zip Code. Prints on stock up to four labels wide.
VIC 20. . . 44.95 CBM 64 . . . 54.95

Inventory Package—Maintains quantity on hand, cost, sales price, reorder point, etc. Generates suggested reorder, sales report, and sales analysis.
VIC 20. . . 79.95 CBM 64 . . . 99.95

General Ledger—Up to 75 accounts! Generates Balance Sheet, Income Statement, Update Report, etc.
VIC 20. . . 89.95 CBM 64 . . . 99.95

Checkbook Manager—Up to 25 expense categories. Tracks all outstanding checks until they are paid.
VIC 20. . . 49.95 CBM 64 . . . 49.95

CONTACT US FOR ALL YOUR DISK BASED SOFTWARE NEEDS
Call for specifics on Hardware Configurations. Send Self-Addressed Stamped Envelope for Catalogue of Games and other Applications
DEALER INQUIRIES WELCOME

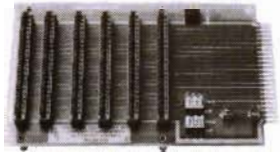
VISA
2905 Ports O'Call Court
Plano, Texas 75075
(214) 867-1333
MasterCard
VISA and MASTERCARD Accepted

Circle No. 28

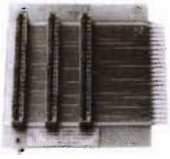
VIC-20 and CBM 64
EXPANDER BOARDS

4 Slot for the 64. Toggle switches and reset switch.
P/N C64 $69.95

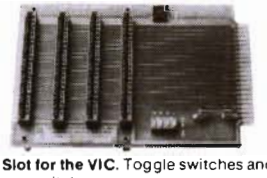
PTI offers the finest selection of expander boards available for the VIC-20 and CBM 64. The design features, quality construction, and competitive prices make any of them an exceptional value. New products are being added monthly, so write for complete catalog.



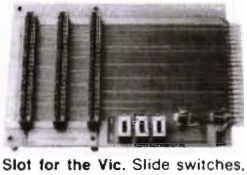
6 Slot for the VIC. Toggle switches and reset switch.
P/N V36 $79.95



Slot for the VIC. No switches, reset, or fuse.
P/N V13 $49.95



4 Slot for the VIC. Toggle switches and reset switch.
P/N V24 $69.95



3 Slot for the Vic. Slide switches, no reset switch.
P/N V23 $59.95

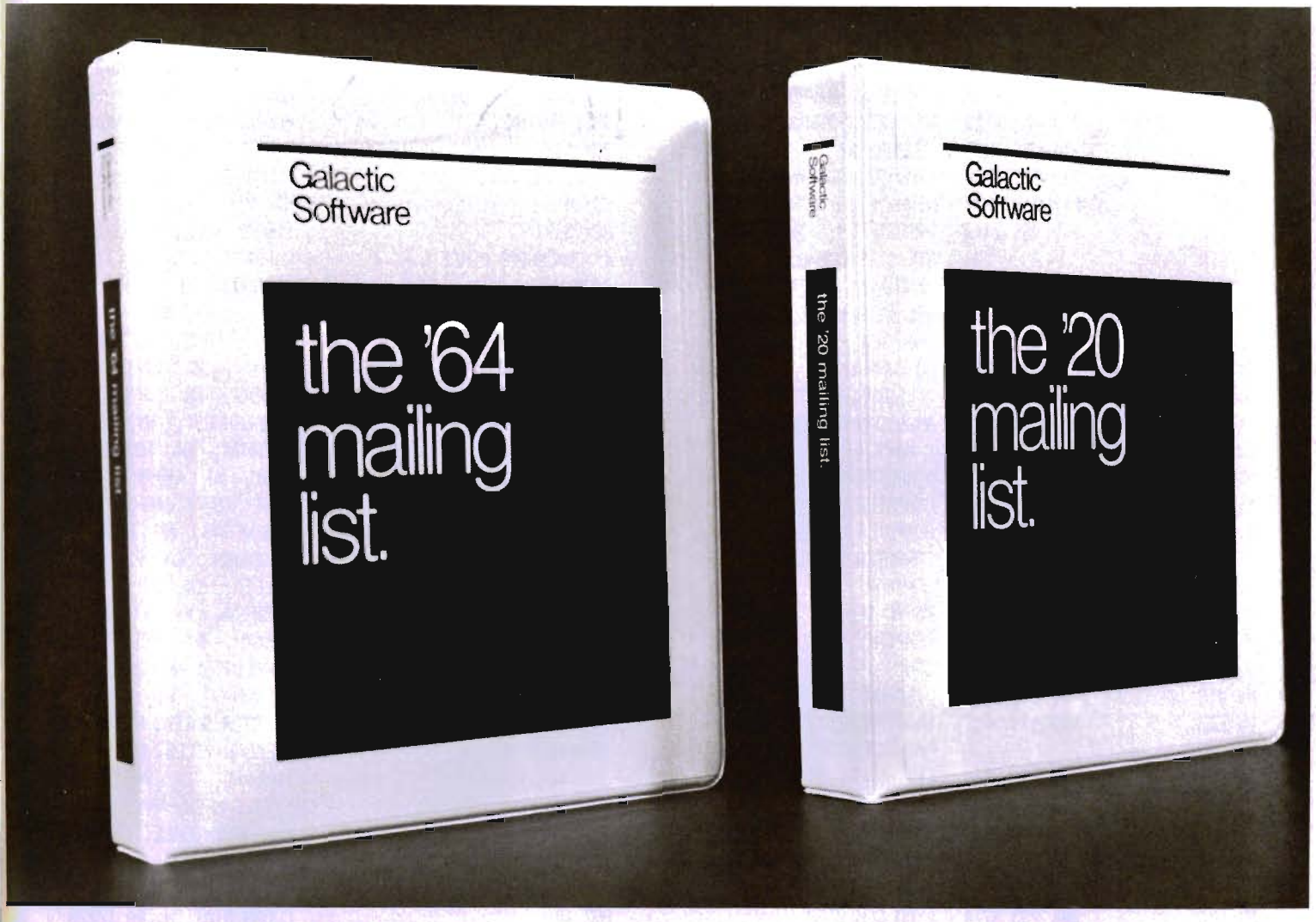
PRECISION TECHNOLOGY, INC.
COMPUTER PRODUCTS DIVISION
P.O. BOX 15454
SALT LAKE CITY, UTAH 84115
(801) 487-6266

See your dealer, or place your order direct
VISA-M/C-CHECK-COD

Circle No. 33

KEY: SORT	TELEPHONE	NAME	STREET ADDRESS	CITY / STATE / ZIP
1 KEY LISTING		H: = HARDWARE MANUFACTURERS	P: = PERIODICALS	O: = OTHER
2 KEY LISTING		S: = SOFTWARE WRITERS	D: = WHOLESALE DISTRIBUTORS	M: = MAIL ORDER HOUSES
D: ALP	800 438 8676	ALPHA ET CETERA, LTD.	BOX 231	SHELBY, NC 28150
D: AVS	800 638 1688	AVS	7566 MAIN STREET	SYKESVILLE, MD 21784
D: ICS	801 373 2981	ICS MICRO WHOLESALE	BOX 1243	PROVO, UT 84603
D: SOE	213 670 9461	SOFTSEL	8295 SOUTH LA CIENEGA	INGLEWOOD, CA 90301
D: SOF	800 828 7250	SOFTWARE DISTRIBUTION SERVICES	1280 MAIN STREET	BUFFALO, NY 14209
H: ARF	318 988 2478	ARFON MICROELECTRONICS, U.S.	111 RENA DRIVE	LAFAYETTE, LA 70503
H: BUS	413 567 8584	BUSINESS COMP. SYS. OF NEW ENG	BOX 2285	SPRINGFIELD, MA 01101
H: CAI	517 687 7343	CAI INSTRUMENTS	152 E. SAGINAW ROAD	SANFORD, MI 48643
H: CEN		CENTURY MICRO	7881 LA RIVIERA DR. SUITE 131	SACRAMENTO, CA 95826
H: DIG	503 295 5890	DIGITAL INTERFACE SYSTEMS	BOX 8715	PORTLAND, OR 97207
H: DYN	214 542 6812	DYNAMIC TECHNOLOGIES	BOX 351	ALLEN, TX 75002
H: DYT	813 384 1539	DYTEK	BOX 241	PINELLAS PARK, FL 33565
H: ECX	415 944 9277	ECX COMPUTER CO.	2678 NORTH MAIN STREET	WALNUT CREEK, CA 94526
H: EXA	800 538 8559	EXATRON	181 COMMERCIAL ST.	SUNNYVALE, CA 94086
H: FER	317 297 0842	FERRIS ASSOCIATES	BOX 68421	INDIANAPOLIS, IN 46268
H: GLO		GLOUSTER COMPUTER BUS CO.	6 BROOKS ROAD	GLOUSTER, MA 01930
H: INT	714 641 0181	INTEGRATED CONTROLS	1240-L LOGAN AVENUE	COSTA MESA, CA 92626
H: MIC		MICRO-STAR	5633 EMIGRATION CANYON	SALT LAKE CITY, UT 84108
H: MIS	303 475 0083	MISSING LINK PRODUCTS	BOX 6460	COLORADO SPRINGS, CO 80934
H: OXF		OXFORD COMPUTER SYSTEMS	HENSINGTON RD. WOODSTOCK	OXFORD OX7 1JR ENGLAND
H: PAR	415 651 3160	PARSEC RESEARCH	DRAWER 1766-P	FREMONT, CA 94538
H: PER	312 961 2347	PERSONAL PERIPHERAL PRODUCTS	BOX 3423	AURORA, IL 60505
H: PRE	801 487 6266	PRECISION TECHNOLOGY	2970 SOUTH RICHARD ST.	SALT LAKE CITY, UT 84115
H: RAM		RAM/RBC SYSTEMS	BOX 351	MALDEN, MA 02148
H: RVR		RVR SYSTEMS	BOX 265	DEWITT, NY 13214
H: SL (SEND SASE)	313 846 6666	SLAGH SYSTEM SERVICES	BOX 53	DEARBORN, MI 48121
H: SUN		SUNSHINE PERIPHERALS	1229 EAST 28TH STREET	BROOKLYN, NY 11210
H: VIP	714 527 8264	VIP ENTERPRISE	919 N. CAMBRIA ST.	ANAHEIM, CA 92801
HM: MI	214 484 7836	MICRO-SYSTEMS DEVELOPMENT	11105 SHADY TRAIL SUITE 103	DALLAS, TX 75229
HS: APR	805 484 3604	APROPOS TECHNOLOGY	350 N. LANTANA SUITE 821	CAMARILLO, CA 93010
HS: CAR	316 685 9536	CARDCO	3135 BAYBERRY	WICHITA, KS 67226
HS: COM	609 795 9480	COMPUTER MARKETING SERVICES	300 W. MARLTON PIKE SUITE 26	CHERRY HILL, NJ 08002
HS: COS	617 961 5700	COMPUTER SOFTWARE ASSOCIATES	50 TEED DRIVE	RANDOLPH, MA 02368
HS: COW	602 249 0611	COMPUTER WORKS	2028 WEST CAMELBACK	PHOENIX, AZ 85015
HS: DAT	714 770 2366	DATA 20 CORP.	20311 MOULTON PARKWAY STE. B10	LAGUNA HILLS, CA 92652
HS: DES	213 923 9361	DATA EQUIPMENT SUPPLIES	8315 FIRESTONE BLVD.	DOWNEY, CA 90241
HS: ELC	714 623 8314	ELCOMP PUBLISHING	53 RED ROCK LANE	POMONA, CA 91766
HS: HYP		HYPERTECH	1820 NE 142ND ST. PENTHOUSE 7	MIAMI, FL 33181
HS: MET	503 232 1712	METARESEARCH, INC.	1100 SE WOODWARD	PORTLAND, OR 97202
HS: MIC	303 934 1973	MICRO WORLD ELECTRONIX	3330 S. WADSWORTH BLVD. #C-105	LAKEWOOD, CO 80227
HS: OEM	305 465 9363	O.E.M. INC.	2729 SO. US # 1 SUITE 12	FORT PIERCE, FL 33450
HS: OPT		OPTIMIZED DATA SYSTEMS	BOX 595	PLACENTIA, CA 92670
HS: PRO	303 936 4407	PROGRESSIVE PERIPHERALS & SFTW	6340 W. MISSISSIPPI AVE.	LAKEWOOD, CO 80226
O: ALI		THE ALIEN GROUP	27 W. 23RD ST.	NEW YORK, NY 10010
O: ANV	213 575 8614	ANVIL CASES	4128 TEMPLE CITY BLVD.	ROSEMEAD, CA 91770
O: CAR		CARRY COMP	24687 ARIC WAY	ELKHART, IN 46517
O: CIE	714 757 4849	COMPUTER INFO EXCHANGE	BOX 158	SAN LUIS REY, CA 92068
O: COM	800 848 7548	COMPUTER CASE COMPANY	5650 INDIAN MOUND COURT	COLUMBUS, OH 43213
O: CRE		CREATIVE COMPUTING CATALOG	39 E. HANOVER AVE,DEPT HA1X	MORRIS PLAINS, NJ 07950
O: MAC	619 452 5151	MACRO DYNAMICS	8950 VILLA LA JOLLA DR. #1200	LA JOLLA, CA 92037
O: MAD	608 255 5552	MADISON COMPUTER	1825 MONROE	MADISON, WI 53711
O: MIC	408 374 4364	MICRO MITTENS	BOX 10246	SAN JOSE, CA 95157
O: NAT		NATIONAL VIC-20USERS GROUP	BOX 34575	OMAHA, NE 68134
O: NVA		NATIONAL VIC ASSOCIATION	9 CRABAPPLE LANE	NANUET, NY 10954
O: PMP		PM PRODUCTS	4455 TORRANCE BLVD. #177	TORRANCE, CA 90503

ENTER THE GALACTIC EXPERIENCE WITH



We wouldn't settle for second best, so why should you? In this day, too many people are compromising quality for price. We feel that we have the alternative. Announcing THE MAILING LISTS, the most powerful programs of their kind.

By being completely menu-driven, these programs are friendly and very easy to use. With each record containing name, address, city, state, zip code, telephone number, and several comments, you not only have a complete mailing list but also a small data base manager. With capabilities reaching into alphabetizing upon entry, sorting and searching on all fields, printing labels and printing complete records, you start to feel the Galactic Experience.

Currently there are four versions to cover anybodies needs.

These are:

The mailing list	VIC-20*	tape $25.95
The mailing list	VIC-20*	Disk $27.95
The mailing list	64 *	tape $27.95
The mailing list	64 *	Disk $29.95

To order, send check or money order to:

Galactic Software
P.O. Box 10516
San Jose, CA 95157

or phone (408) 247-4434 for COD

or

see your local dealer
dealer inquiries invited

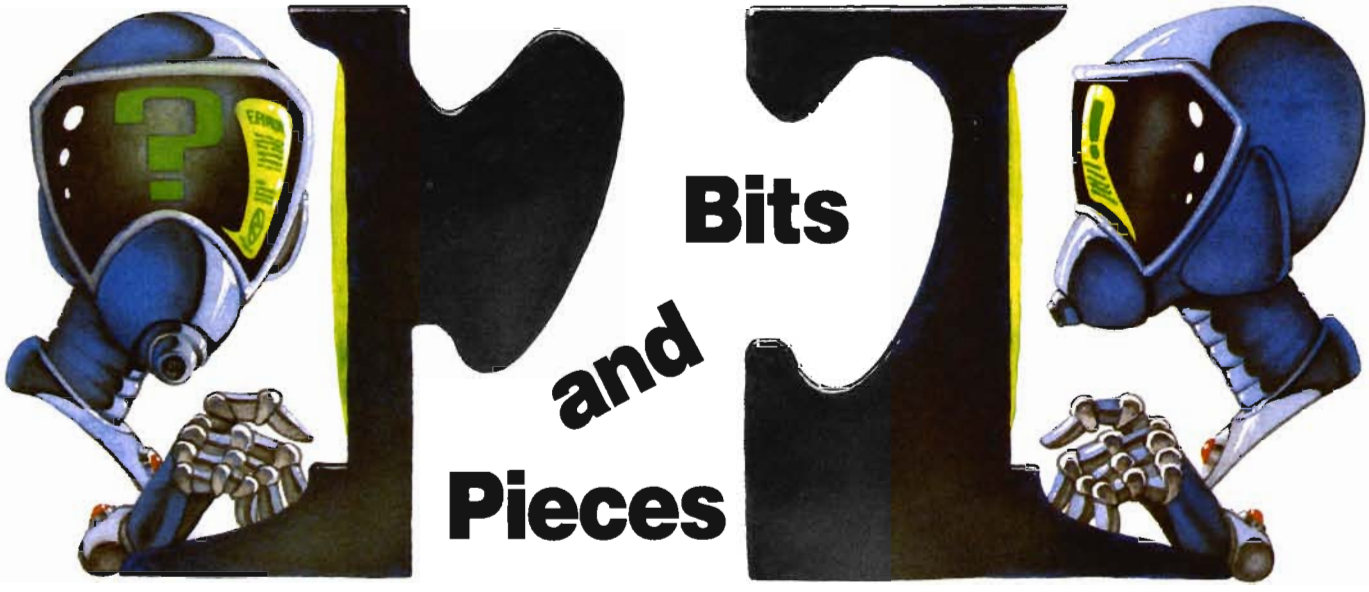
*VIC-20 and 64 are trade marks of Commodore Business Machines.

Circle No. 18

KEY: SORT	TELEPHONE	NAME	STREET ADDRESS	CITY / STATE / ZIP
O: SEX	805 498 6984	VIC 20 SOFTWARE EXCHANGE	763 S. BOXTHORN	NEWBURY PARK, CA 91320
O: SOF	615 457 5068	SOFTWARE TO GO	RT. 3 BOX 309 A 52	CLINTON, TN 37716
O: TES	213 247 6486	TORREY ENGBERG SMITH CO.	BOX 1075	GLENDALE, CA 91209
O: TOR		TORONTO PET USERS CLUB	381 LAURENCE AVE. WEST	TORONTO, ONT CAN M5M 1B9
P: COA	800 426 1830	COMMANDER	P.O. BOX 98827	TACOMA, WA 98498
P: COG	800 334 0868	THE COMMODORE GAZETTE	BOX 5406	GREENSBORO, NC 27403
P: COO	215 687 9750	COMMODORE-MICROCOMP. MAGAZINE	487 DEVON PARK DRIVE	WAYNE, PA 19087
P: FOX	713 473 6723	FOXFIRE SYSTEMS, INC.	3811 NEWTON	PASADENA, TX 77503
P: JOU	214 482 6679	JOURNAL 20	BOX 1149	VAN ALSTYNE, TX 75095
P: LOA	913 762 4730	LOAD 20 MAGAZINE	550 GRANT AVE.	JUNCTION CITY, KS 66441
P: MID	217 864 5320	MIDNITE SOFTWARE GAZETTE	635 MAPLE	MT. ZION, IL 62549
P: PRO	919 489 2198	PROGRAMMER'S INSTITUTE	BOX 3191	CHAPEL HILL, NC 27514
P: STR		STRICTLY COMMODORE	47 COACHWOOD PLACE N.W.	CALGARY, ALTA CAN T3H 1E1
P: VIC VICKIE		JOHN ROSENGARTEN	3822 NORTH BELL AVENUE	CHICAGO, IL 60618
PS: BY VIC-NIC NEWS		THE BYTE HOUSE	BOX 981	SALEM, NH 03079
M: AA8 (CAT $1)	313 669 3110	AARDVARK-80	2352 S. COMMERCE	WALLED LAKE, MI 48088
M: ABC	215 822 7727	AB COMPUTERS	252 BETHLEHEM PIKE	COLMAR, PA 18915
M: ALL		ALLEGIANCE ENTERPRISES	868 96TH AVE. N.E.	BLAINE, MN 55434
M: AME		AMERICAN PERIPHERALS	122 BANGOR STREET	LINDENHURST, NY 11757
M: CMA	404 981 5939	C MART	BOX 77286	ATLANTA, GA 30357
M: COE	313 528 1554	COMPUTER EXPRESS	BOX 569	TROY, MI 48099
M: COM		COMPUTER MAIL ORDER	EAST (800) 233-8950	WEST (800) 648-3311
M: COO	800 634 6766	COMPUTER OUTLET	1095 EAST TWAIN	LAS VEGAS, NV 89109
M: COS		COMPUTER SPECIALTIES	1253 BROADWAY	EL CAJON, CA 92021
M: COT	800 558 8803	COMSTAR	BOX 1730	GOLETA, CA 93116
M: COU	316 684 4660	COMPU SENSE	812 S. LIGHTNER	WICHITA, KS 67218
M: COW	516 621 1362	COMPUWAY, INC.	24 LUMBER ROAD	ROSLYN, NY 11576
M: CPM (CAT. $1.25)		CPM	BOX 19137	CHARLOTTE, NC 28219
M: DIS	414 231 1696	DISCOUNT SOFTWARE HOUSE	BOX 93	WINNEBAGO, WI 54985
M: EAS	919 924 2889	EASTERN HOUSE	3239 LINDA DRIVE	WINSTON SALEM, NC 27106
M: EAV		EAV SOFTWARE	17 MARBLE AVENUE	PLEASANTVILLE, NY 10570
M: EKT	415 489 1532	EKTYPE OFFICE SYSTEMS	1655 WHIPPLE ROAD	HAYWARD, CA 94544
M: EMB	212 961 9806	EMBASSY COMPUTER PRODUCTS	BOX 88	LITTLE NECK, NY 11363
M: HAI	800 645 9187	HARRISON COMPUTER CENTER	2263 BROADHOLLOW ROAD	E. FARMINGDALE, NY 11735
M: HAR	800 221 8927	HARMONY VIDEO & ELECTRONICS	2357 CONEY ISLAND AVE.	BROOKLYN, NY 11223
M: JMC		JMC	1025 INDUSTRIAL DRIVE	BENSONVILLE, IL 60106-1297
M: LYC	800 233 8760	LYCO COMPUTER	BOX 10	COGAN STATION, PA 17728
M: MAI	800 752 1341	MAIL COMP	9434 CHESAPEAKE DRIVE	SAN DIEGO, CA 92123
M: MAR	918 664 4120	MARCO POLO CO.	4681 S. 83RD E. AVE.	TULSA, OK 74145
M: MIM	800 841 0860	MICRO MANAGEMENT SYSTEMS, INC.	2803 THOMASVILLE ROAD	CAIRO, GA 31728
M: MIS		MICROSIGNAL PUBLICATIONS	BOX 22	MILLWOOD, NY 10546
M: MIW	201 838 9027	MICRO-WARE DISTRIBUTORS	BOX 113	POMPTON PLAINS, NJ 07444
M: MOO		MOOSEWARE, INC.	BOX 17868	IRVINE, CA 92713
M: MTG	800 343 0854	MTG TECHNICAL SALES	281 NEEDHAM STREET	NEWTON, MA 02164
M: OLY	800 421 8945	OLYMPIC SALES	216 SOUTH OXFORD AVENUE	LOS ANGELES, CA 90004
M: OPT	916 621 1090	OPTOMAM CONSUMER PRODUCTS	BOX 1038	PLACERVILLE, CA 95667
M: PER	315 478 6800	PERSONAL COMPUTER SYSTEMS	BOX 1073	SYRACUSE, NY 13201
M: PR (SEND SASE)	602 886 1505	PRICKLY-PEAR SOFTWARE	9822 EAST STELLA ROAD	TUCSON, AZ 85730
M: PRG	301 488 7719	PROGRAMS INTERNATIONAL	MORAVIA CENTER INDUSTRIAL PARK	BALTIMORE, MD 21206
M: PRI	800 343 1078	P.R.I.C.E.	67 TEED DRIVE	RANDOLPH, MA 02368
M: PRO	312 382 5244	PROTECTO ENTERPRIZES	BOX 550	BARRINGTON, IL 60010
M: PRS	800 424 2738	THE PROGRAM STORE	4200 WISCONSON AVE. NW	WASHINGTON DC 20016
M: PYR	609 386 9363	PYRAMID COMPUTERWARE	278 WARREN STREET	EDGEWATER PARK, NJ 08010
M: QUE	800 232 2224	QUEUE CAT. #11	5 CHAPEL HILL DRIVE	FAIRFIELD, CT 06403
M: RDE		RDE SERVICES, GAMES DEPT.	3580 WARRINGHAM	WATERFORD, MI 48095
M: ROC	303 371 2430	ROCKY MOUNTAIN MICRO, INC.	10890 E. 47TH	DENVER, CO 80239
M: SAV	800 241 2682	SAVE	1782 MARRIETTA BLVD. N.W.	ATLANTA, GA 30318

KEY: SORT	TELEPHONE	NAME	STREET ADDRESS	CITY / STATE / ZIP
M: SJB		SJB DISTRIBUTORS	10520 PLANO ROAD SUITE 206	DALLAS, TX 75238
M: SOF	800 828 2838	THE SOFTWARE CONNECTION	5133 VISTA DEL ORO	FAIR OAKS, CA 95628
M: SOU	214 484 7836	SOUTHWEST MICRO SYSTEMS	2554 SOUTHWELL	DALLAS, TX 75229
M: SUN		SUNRISE ELECTRONICS	7057 LOMPOC COURT	CITRUS HEIGHTS, CA 95610
M: SWC	503 257 9464	SW COMPUTERS	1125 N.E. 82ND	PORTLAND, OR 97220
M: TEL	800 255 2000	TELE SOFT, INC.	BOX 3456	TROY, MI 48084
M: TIS		TOTAL INFORMATION SERVICES	BOX 921	LOS ALAMOS, NM 87544
M: UST	619 224 8016	U.S. TECHNOLOGIES	BOX 7735	SAN DIEGO, CA 92107
M: WOR		WORLD ELECTRONICS	177 27TH STREET	BROOKLYN, NY 11232
M: ZEP	215 387 5266	ZEPHER MICROS	323 S. 43RD ST. SUITE C	PHILADELPHIA, PA 19104
S: 3GC	503 357 9889	3G COMPANY	RT. 3, BOX 28A	GASTON, OR 97119
S: ABA	616 241 5510	ABACUS SOFTWARE	BOX 7211	GRAND RAPIDS, MI 94510
S: ACA		ACADEMY SOFTWARE	BOX 9403	SAN RAFAEL, CA 94912
S: ART		ARTWORX SOFTWARE COMPANY	150 N. MAIN ST.	FAIRPORT, NY 14450
S: AVA	301 254 5300	AVALON HILL GAMES	4517 HARTFORD ROAD	BALTIMORE, MD 21214
S: BEC (CAT. $2)	617 536 5116	BOSTON EDUCATIONAL COMPUTING	78 DARTMOUTH ST.	BOSTON, MA 02116
S: BEH	408 438 5649	BEHAVIORAL ENGINEERING	230 MT. HERMON RD. #207	SCOTTS VALLEY, CA 95066
S: BRI	415 455 9139	BRILEY SOFTWARE	BOX 2913	LIVERMORE, CA 94550-0291
S: BRO	415 456 6424	BRODERBUND SOFTWARE	1938 FOURTH STREET	SAN RAFAEL, CA 94901
S: CAC		CACTUS COMPUTING	BOX 261	BOUSE, AZ 85325
S: COD	805 683 1585	THE CODE WORKS	BOX 550	GOLETA, CA 93116
S: COMM	313 685 0113	COMMODATA COMPUTER HOUSE	P.O. BOX 325	MILFORD, MI 48042
S: COMP	602 855 3357	COMPUTERMAT	BOX 1664	LAKE HAVASU CITY, AZ 86403
S: COS	714 861 1265	COSMIC COMPUTERS UNLIMITED	228 N. PROSPECTOR'S ROAD	DIAMOND BAR, CA 91765
S: CRE	415 948 9595	CREATIVE SOFTWARE	201 SAN ANTONIO CIRCLE #270	MOUNTAIN VIEW, CA 94040
S: DOU	402 334 7870	DOUBLE E ELECTRONICS	200 NORTH 115TH STREET	OMAHA, NE 68154
S: DTC		DTC SOFTWARE	BOX 916	JANESVILLE, WI 53547
S: EAR		EARTHWARE	BOX 30039	EUGENE, OR 97403
S: EDU		EDUFUN/MILLIKEN	1100 RESEARCH BLVD.	ST. LOUIS, MO 63132
S: EPY		EPYX / AUTOMATED SIMULATIONS	1043 KIEL COURT	SUNNYVALE, CA 94086
S: FOX	408 988 6666	FOX VIDEO GAMES, INC.	4701 PATRICK HENRY DR. BLDG 9	SANTA CLARA, CA 95050
S: FRE		FRENCH & SILK SMOOTHWARE	BOX 207	CANNON FALLS, MN 55009
S: FSH		FREDERICK SCHEPER	8347 DOCK ROAD	PASADENA, MD 21122
S: GLA		MARTIN GLASSER	1218 BIRCH CIRCLE	EGLIN AFB, FL 32542
S: GPM		GP MICROSYSTEMS	72-31 67TH PLACE	GLENDALE, NY 11385
S: GRU (SEND STAMP FOR CAT.)		R. GRUSKIEWICZ	417 SUSQUEHANNA AVENUE	WYOMING, PA 18644
S: HAL		J. HALLIDAY	302 DOGWOOD CIRCLE	LAFAYETTE, GA 30728
S: HAR		HARLI SOFTWARE	1740 GARDEN BRIAR COURT RR#2	THUNDAR BAY ONT CAN P7C4V1
S: HES		HUMAN ENGINEERED SOFTWARE	71 PARK LANE	BRISBANE, CA 94005
S: INT	213 328 9422	INTERESTING SOFTWARE	21101 SO. HARVARD BLVD.	TORRANCE, CA 90501
S: ISA		ISA SOFTWARE	14114 DALLAS PARKWAY SUITE 530	DALLAS, TX 75240
S: K8S		K8 SOFTWARE	BOX 248 C	CANTON, CT 06019
S: KER		KERR SOFTWARE	1390 S. NEWTON	DENVER, CO 80219
S: LEO	614 846 1823	HARRY F. LEONARD	5556 CHERRYWOOD ROAD	COLUMBUS, OH 43229
S: LIG	415 327 3280	LIGHTNING SOFTWARE	BOX 11725	PALO ALTO, CA 94306
S: LIT	414 273 5460	LITTLE WIZARD DISTRIBUTING	1211 LAMBETH RD. SUITE 4	WAUKESHA, WI 53186
S: LOG	805 687 0205	LOGOS SOFTWARE	3192 LAUREL CANYON ROAD	SANTA BARBARA, CA 93015
S: LUN	408 378 7793	LUNA SOFTWARE	BOX 26922	SAN JOSE, CA 95159-6922
S: MAC		MAGIC CARPET	BOX 35115	PHOENIX, AZ 85069
S: MAN	507 345 7048	MANTRONICS SOFTWARE DESIGN	360 PIERCE PLAZA	NO. MANKATO, MN 56001
S: MAR		MARIAH COMPUTING	BOX 513	COLUMBIA, MO 65207
S: MER	213 316 0945	MERLIN ENTERPRISES	BOX 2876	TORRANCE, CA 90509
S: MIDI		MICRO-DIGITAL	752 JOHN GLENN BLVD.	WEBSTER, NY 14580
S: MID		MIDWEST MICRO ASSOCIATES	BOX 6148	KANSAS CITY, MO 64110
S: MIED	612 926 2292	MICRO-ED, INC.	BOX 24156	MINNEAPOLIS, MN 55424
S: MIGR	815 965 2464	MICROGRAMS	BOX 2146	LOVES PARK, IL 61130
S: MIIN		MICRO INFORMATION SYSTEMS	BOX 73	WAYNE, NJ 07470

KEY: SORT	TELEPHONE	NAME	STREET ADDRESS	CITY / STATE / ZIP
S: MIMA		MICRO-MANIA	BOX 4110	ELKHART, IN 46514
S: MIPH	212 646 0140	MICROPHYS PROGRAMS	2048 FORD STREET	BROOKLYN, NY 11229
S: MISI		MICROSIGNAL	900 EMBARCADERO DEL MAR UNIT A	GOLETA, CA 93117
S: MISP	214 867 1333	MICROSPEC LTD.	2905 PORTS O'CALL COURT	PLANO, TX 75075
S: MIS	408 338 9546	MIS	250 FERN ROCK WAY	BOULDER CREEK, CA 95006
S: MOR		L. MORRIS	2401 WENGERT #26	LAS VEGAS, NV 89104
S: MWS		MW SOFTWARE	BOX 126	URBANA, IL 61801
S: NEL	612 738 1080	NELSON SOFTWARE	2232 ODGEN COURT	ST. PAUL, MN 55119
S: NEW	604 929 7347	NEW HORIZONS GROUP	#3-119 CHARLES ST.	N. VANCOUVER, BC CAN V7H 1S1
S: NIB		NIBBLES + BITS, INC.	BOX 2044	ORCUTT, CA 93455
S: NOR	218 834 3600	NORTHLAND ACCOUNTING, INC.	606 SECOND AVE.	TWO HARBORS, MN 55616
S: NUF	503 878 2113	NUFEKOP	BOX 156	SHADY COVE, OR 97539
S: PAR	219 885 0611	PARR PROGRAMMING	2664 TYLER STREET	GARY, IN 46407
S: PMS	612 633 0891	PM SOFTWARE	4400 ARDEN VIEW COURT	ST. PAUL, MN 55112
S: PRA		PRACTICAL APPLICATIONS OF CAL.	P.O. BOX 255768	SACRAMENTO, CA 95825
S: PRI(SEND SASE)	602 886 1505	PRICKLY-PEAR SOFTWARE	9822 EAST STELLA ROAD	TUCSON, AZ 85730
S: PRO	301 366 0010	PROFESSIONAL MICRO SERVICE	100 WEST 22ND STREET	BALTIMORE, MD 21218
S: PRS		P.R. SOFTWARE	BOX 169	S. SAN FRANSISCO, CA 94080
S: PUB	513 698 5638	PUBLIC DOMAIN	5025 SO. RANGELINE ROAD	WEST MILTON, OH 45383
S: QBF	212 925 8290	QUICK BROWN FOX	548 BROADWAY SUITE 4F	NEW YORK, NY 10012
S: QUM	716 338 2145	QUMAX / GRW LABORATORIES	BOX 17010	ROCHESTER, NY 14617
S: RAK		RAK ELECTRONICS	BOX 1585	ORANGE PARK, FL 32073
S: RAN	904 837 7201	RANDOM ACCESS COMPUTERS	BOX 1453	BENNING, FL 32541
S: RAP	413 549 3744	RAPIDWRITER	91 LONG HILL ROAD	LEVERETT, MA 01054
S: RAR		RAR-TECH	BOX 761	ROCHESTER, MI 48063
S: RAY	408 338 9848	RAYMAC SOFTWARE GROUP	495 BAND ROAD	BOULDER CREEK, CA 95006
S: SCE		SCIENTIFIC & EDUCATIONAL SFTW.	BOX 54	DAYTON, OH 45420
S: SCH	212 505 3000	SCHOLASTIC, INC.	730 BROADWAY	NEW YORK, NY 10003
S: SCI		SCIENTIVIC SOFTWARE	525 LOHNES DRIVE	FAIRBORN, OH 45324
S: SIE	209 683 6858	SIERRA ON-LINE, INC.	SIERRA ON-LINE BUILDING	COARSEGOLD, CA 93614
S: SIR	916 366 1195	SIRIUS SOFTWARE	10364 ROCKINGHAM DR.	SACRAMENTO, CA 95827
S: SKL		SKYLIGHT SOFTWARE	22 MILLER STREET	BELFAST, ME 04915
S: SKY	415 965 1735	SKYLES ELECTRIC WORKS	231E SOUTH WHISMAN ROAD	MOUNTAIN VIEW, CA 94041
S: SMI	408 738 1751	D. SMITH & CO.	1164 ANDOVER DR.	SUNNYVALE, CA 94087
S: SO4		SOFT 4 YOU	BOX 3259	RESTON, VA 22090
S: SOF		SOFTWARE CITY	BOX 313	CLOSTER, NJ 07624
S: SOS		SOFT-SELL	BOX 1226	LAFAYETTE, GA 30728
S: SUB		SUBURBAN ELECTRONICS	6224 TRANSIT ROAD	DEPEW, NY 14043
S: SUS	312 394 5165	SUSIE SOFTWARE	BOX 300	PROSPECT HEIGHTS, IL 60070
S: SYN	416 221 8000	SYNTAX SOFTWARE, INC.	33 ELMHURST AVE. SUITE 502	WILLOWDALE ONT CAN M2N 6G8
S: TAY	402 464 9051	TAYLORMADE SOFTWARE	8053 EAST AVON AVENUE	LINCOLN, NE 68505
S: TEA		TEACHWARE	3277-B ROSWELL RD. SUITE 450	ATLANTA, GA 30305
S: TEL (CAT$.50)	416 263 8064	TELEGAMES SOFTWARE	HAMPTON, BOX 152	ONTARIO, CANADA L0B 1J0
S: THO	800 526 7843 X291	THORN EMI VIDEO	1370 AVENUE OF THE AMERICAS	NEW YORK, NY 10019
S: TOT	415 943 7877	TOTL SOFTWARE	BOX 4742	WALNUT CREEK, CA 94596
S: TRO	213 671 8440	TRONIX PUBLISHING	701 WEST MANCHESTER BLVD.	INGLEWOOD, CA 90301
S: TSA	609 346 3063	TSASA	2 CHIPLEY RUN	WEST BERLIN, NJ 08091
S: UMI	714 594 1351	UNITED MICROWARE INDUSTRIES	3503-C TEMPLE AVE.	POMONA, CA 91768
S: VIC	215 576 5625	VICTORY SOFTWARE	2027-A SJ RUSSELL CIRCLE	ELKINS PARK, PA 19117
S: VID	408 263 9858	VIDEO WIZARDS, INC.	292 CHARCOT AVENUE	SAN JOSE, CA 95131
S: VOY	415 343 8955	VOYAGER SOFTWARE	BOX 1126	BURLINGAME, CA 94010
S: WES		WESTERN NEW ENGLAND SOFTWARE	BOX 31	WILBRAHAM, MA 01095
S: WIL		WILLIAM ROBBINS	BOX 3745	SAN RAFAEL, CA 94912
S: WUN	503 899 7549	WUNDERWARE	BOX 1287	JACKSONVILLE, OR 97530
S: ZIM	213 217 0877	ZIMAG	14600 S. BROADWAY	GARDENA, CA 90248



Big Programs in your VIC/PET/64

Ron Gunn's article, "Big Programs In Your VIC/PET/64," is the most easily understood description I have seen on program overlays. An additional technique makes overlays even easier.

As Ron noted, string variables that are assigned within one program segment must be assigned anew when another segment is loaded. This is because the variable's pointer is pointing to the area of the program where the variable was assigned. When another segment is loaded, the pointer will still be looking for the string at the original address. The string will now be garbage, because the new program segment has other material in that area.

The following routines demonstrate a solution to this. Now the variables won't have to be assigned in later segments of the program.

```
100 DIM A$(3)
110 Z$ = "AARDVARK": A$(0) = Z$
120 Z$ = "BABOON": A$(1) = Z$
130 Z$ = "CAMEL": A$(2) = Z$
140 Z$ = "DEER": A$(3) = Z$

or

100 DATA AARDVARK, BABOON, CAMEL, DEER
110 DIM A$(3)
120 FOR K = 0 TO 3
130 READ Z$: A$(K) = Z$
140 NEXT
```

In each of these routines, the pointer for Z$ still points to the area where the latest Z$ was assigned. However, the A$(x) = Z$ operation cannot assume that Z$ will always be the same. So, A$(x) is stored in string memory and pointers for A$(x) point to those locations—beyond the text area of any new program segment. (Remember, Ron said that the first program segment must be longer than any other.)

Terrell D. Abendroth
114 Parker Court
Fort Bragg, NC 28307

Editors:

Reference: Article *Bytes, Bits & Binary* in Feb. 83 issue. Location: top of 3rd column, p. 50.

Reference is made to Hex number 1B15.

The Decimal Counterpart (457) of the above number seemed low. Using my TI Programmer Calculator, I arrived at a 6933 value.

I believe the following notations confirm this:

16^3	16^2	16^1	16^0
1	B	1	5

4096 + 2816 + 16 + 5 = 6933

I'm certain you received many comments about this.

Respectfully,
Lou Ferrara
Camp Hill, PA 17011

RE: Debugging & Fixes of Programs, "Gobble," Feb. 83 issue.

Typographical error in line 100, should read: 100 if J0 AND PEEK(L + 1) <> 160 THEN POKE L,32:L = L + 1:GOSUB600: POKEL,81

Omission and typographical error in line 9010, should read: 9010 POKE DD, 127: PEEK(P2)AND128: J0 = −(P = 0)

I altered subroutine as follows: 8025 PRINT"{CLR}{HOME} SCORE = "; PT;"{HOME}"; SPC(12)" HI = ";HS

Changed 8030 to read: 8030 PRINT"{HOME}{3 DOWN} {2 RIGHT} ANOTHER GAME?"

Make it more informative and challenging.

H.H. Blakney
406-1535 Nelson Street
Vancouver, BC V6G IM2

(Question???)

I have over 100 programs for the Commodore PET 2001 (all 2.0 basic). The first two programs that I converted manually took several hours each. With your short "Petsim" program (pg. 49 in the January issue of COMMANDER) I am able to run all of them that don't have Peeks and Pokes into places other than the screen.

This brings me to my question. When I load programs that have Peeks and Pokes into other locations using the "Petsim" program, I get one of the following with different numbers for different programs.

SYNTEX ERROR IN 17192

or

SNYTEX ERROR IN 4499

It seems like it is a different number for each program. The programs do not have these statement numbers. Thus my question is what are these numbers and how do I trace them to the statement number that is causing the problem?

I have tried a PET emulator program and it did not help at all.

Any help you can offer will be appreciated. Contact: John E. Hand, 405 Fairhaven Dr., Hurst, TX 76053.□

Subwar 64™ Loading Hints

When loading either diskette or cassette always load and run "SETUP 64" before other sections are loaded and run. **Do not attempt to load** "SUBCOM 64," but use the selections described in your owners manual.□

Cassette for Subwar 64™

Some problems were experienced with loading cassette tapes onto the 64. We found the new Commodore cassette drive is more critical to tape alignment. Datasette alignment can be checked in accordance with Commodore's cassette head azimuth and gain adjustment and Commodore test tape (part no. 320142). In any event, CCI will immediately replace the cassette at no charge if it will not load properly. Just let us know, and please return the deficient tapes. If the user contacts us we replace directly to the user, with notification to the dealer.

We are confident that we have corrected any previous problems and cassettes marked version 2 or greater should load correctly.

Clockwork Computers, 8704 Bradgate Road, Alexandria, VA 22308, (703) 780-6010. Marketing: 4612 Holly Ridge Road, Rockville, MD 20853, (301) 924-5509 or (301) 924-4157.□

Laws of Computer Programming

- Any given program, when running, is obsolete.
- If a program is useful, it will have to be changed.

Clockwork Computers, 8704 Bradgate Road, Alexandria, VA 22308, (703) 708-6010.□

Screen Clean-up for the VIC-20 and the C-64

On screen clean-up for the VIC-20 and Commodore 64. Find a large ferrite loop (toroid), about 1" to 1½" in diameter. Loop the cable from your modulator three or more times through the ferrite. This will help reduce, interference from your computer to the TV. If the ferrites are hard to find, check Radio Shack for part #273-1571 (25 assorted ferrites for $1.98).

Please don't get the wrong idea. Commodore machines are the best around, bar none! If you are new at using your computer, start out with software for YOUR system. Try to learn something from each program by changing things a little bit. Then try converting some simple programs from another system. Some of the best practice comes from entering a program from a non-Commodore program listing. Remember, your computer will aid you in learning at your own speed. There is no one pushing you except yourself. Enjoy!□

Converting Programs Between PET, VIC-20 and Commodore 64

© Public Domain

On PET to VIC-20, VIC-20 to PET, PET to 64, VIC-20 to 64 and back again! What fun! There is no one rule-of-thumb to use. Anyone trying to convert programs between the various machines had better know each unit inside out. PET basic programs will LOAD in a VIC-20 and Commodore 64, but that doesn't mean the program will RUN.

One of the major problems for VIC-20 owners trying to use PET or 64 basic programs is screen width, 23 columns vs. 40 columns. PRINT statements will "look funny" and some POKEs may bomb VIC's basic. Even VIC isn't compatible with itself! With its "floating" screen a program written with POKEs to the screen for a 3.5K system may not work with extra memory because the VIC screen will move from 1024 ($0400 hex) in a "bare" VIC to 4096 ($1000 hex) on an expanded VIC. Color memory also moves.

Commodore 64 users can use many of PET or CBM programs so long as simple basic is used. Screen PEEKs and POKEs are fairly easy to convert. PET's screen memory starts at 32768 ($8000 hex) and end at 33767 ($83E7 hex). 64's screen starts at 1024 ($0400 hex) and ends at 2023 ($83E7 hex). All you have to do is find all the basic statements using numbers between these ranges and subtract 31744 in each case. Then add color, sound, sprites and figure out what all those other PEEKs & POKEs are supposed to do. Easy, right?

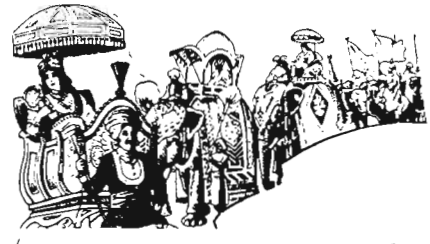
PET owners trying to use 64 programs will, after finding the program, see what at first glance may seem to be many misplaced basic "words." This is the result of PET's basic trying to make sense of 64's basic tokens. The result is a fairly messed up program.□

Back-up Copies

© Public Domain

Cassette fun. When making a backup copy of programs from tape or loading a program for the first time, make sure the program is loaded correctly. This can be done by typing: PRINT ST :followed by pressing the RETURN key directly on the screen without any line numbers. A number value will be printed. This number divided by two will tell you how many load errors your machine corrected during the loading of the program. A value of zero (0) means that the program in memory is a perfect copy of what is on the tape. A value of less than 32 means that the program was loaded, but corrections were made. If there are more than 32 errors, you will see: LOAD ERROR? :printed on the screen. When this happens, all you can do is rewind the tape and try LOADing again. The reserved variable: ST :is used in all LOAD, SAVE, READ and WRITE operations to tape, disk or other peripherals. So by PRINTING ST we can see if an error happened during the operation. This works with ALL Commodore machines. Place the cassette, or disk for that matter, as far from the TV or monitor as possible! Many load error problems are caused by placement of the cassette. Also, get and use a tape head demagnetizer. Clean the tape heads regularly. Some tape load problems can be solved by gently bending the little felt spring pad out, not much or the spring will pop out and ruin the tape. The extra pressure created will help. When you do get a good load, make a copy, quick! It may not work again. Buy and use some kind of tape, or disk, storage box. Dust, fingerprints, pop, hair and small children can help to destroy your programs. Protect them. Also, avoid power transformers, flourescent lamps, speakers, TV sets, screwdrivers or anything that even looks magnetic! Tapes and disks suffering from amnesia are useless.□

Join the parade to



Micro-Ed

educational software

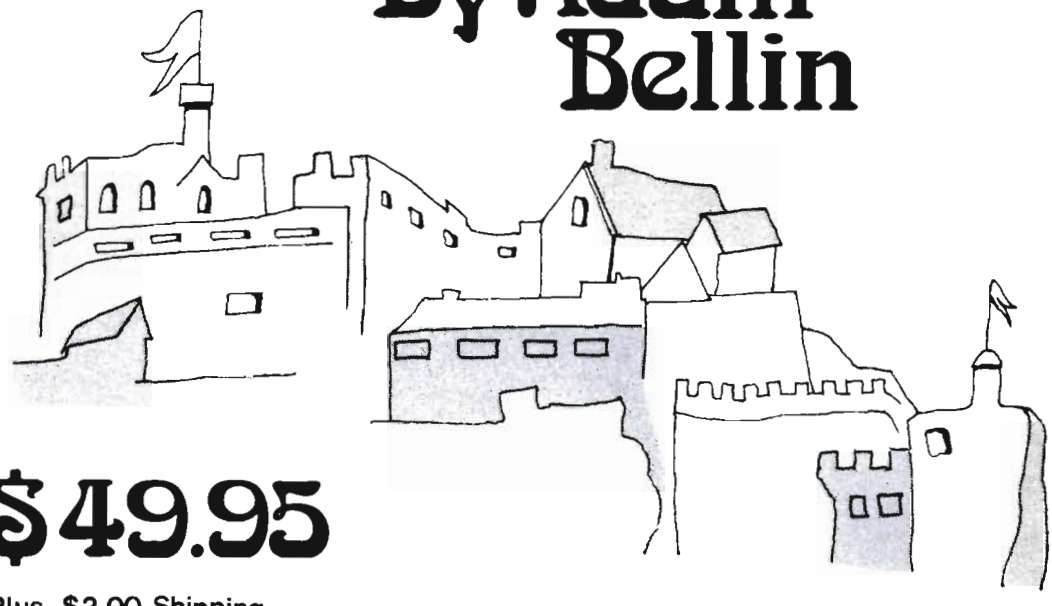
Send for free catalogs
Specify: Pet • VIC
• Commodore 64
telephone us at
612-926-2292

Micro-Ed Inc.
P.O. Box 24156
Minneapolis, MN 55424

Circle No 26

Sorcerer's Apprentice

By Adam Bellin



$49.95

Plus $2.00 Shipping

TOTAL GRAPHICS FOR COMMODORE™ 64

- 16 COLORS
- HIGH RESOLUTION
- AUTO FILLS
- MEMORY MOVE
- MICROVIEW
- AUTO LINES
  - RECTANGLES
  - TRIANGLES
  - CIRCLES
  - ELLIPSES

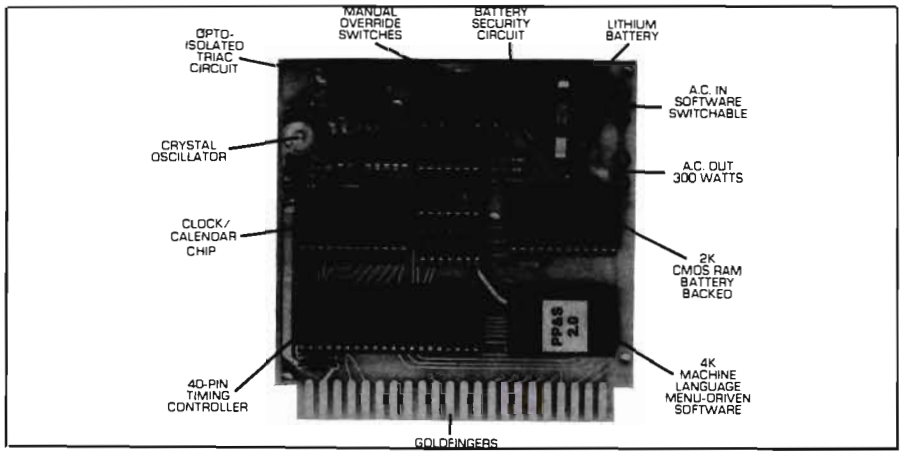
EVENT HORIZON SOFTWARE

P.O. box 1327 New York, NY 10028 212 535-0697

Dealer inquiries invited

Circle No 16

New Products



Auto Clock

Retail Price: $129.00
Compatable With: VIC-20
Manufacturer:
Progressive Peripherals & Software
6340 W. Mississippi Ave.
Lakewood, CO 80226
Contact: Steve Spring
(303) 934-1973

The manufacturer describes AUTO CLOCK (AC) as a Realtime Intelligent Controller. AC is a plug-in cartridge which has many functions. The device is powered by an onboard lithium battery, allowing it to operate independent of the VIC. It is menu driven and comes with a 20 page user manual which gives programming examples for each function. There is even a 3 page section devoted to machine language applications. The user may load a program of up to 2K in length into AC. After presetting the timing functions, the program can be downloaded and run. (Including calling other programs.) 19 subroutines may be called by the user program, including all time/date/calendar and alarm functions. AC can switch up to 300 watts of power under program control. It can even turn the VIC on and off. The date and time may be displayed anywhere on the screen, even while writing a program. The product is purported to be easy to use by VIC novices.

The warranty period is 90 days covering parts and labor. Dealer inquiries are invited.☐ Circle No. 62

Luna Mailing List

Retail Price: $37.95
Compatible With: C-64
Manufacturer:
Luna Software
Box 26922
San Jose, CA 95159-6922
Contact: Lou Ryan, (408) 378-7793

LUNA SOFTWARE has announced a menu driven, full-featured mailing label program for the C-64. Two of its most powerful features are the ability to alphabetize all records, and sort on any record in the data base. Other useful features include the ability to search on any criteria, print labels one or two wide, change colors on the screen, and add data into any of four comment fields. The user may print multiple copies of the same label. Up to 663 labels may be stored on each disk by using an advanced random access-like file structure. Data disks may be backed up on tape. A VIC-20 version is scheduled for release soon. Luna Mailing List comes on diskette with an extensive manual, and supports most printers.

Watch for a review of this product in an upcoming Commander.☐ Circle No. 63

Discover "Moondust" on Retail Shelves

Creative Software is pleased to announce the release of "Moondust", by Jaron Lanier. This new Science-Fantasy game will be available for the Commodore 64 on May 1. VIC-20 owners can play "Moondust" after June 1.

Authored by imaginative music and software composer, Jaron Lanier, "Moondust" takes game-playing to new heights with its fusion of hypnotic color graphics and mesmerizing computer-generated music. These aesthetic elements are incorporated into a challenging game theme: the player must drag trails of multi-colored moondust (dropped by the friendly spacewalker) through the heart of glowing concentric circles.

Creative Software, dedicated to publishing a full-line of consumer software programs, is in its 5th year on the

Peninsula. Contact Kari Curtis at 230 East Caribbean Drive, Sunnyvale, CA 94086, (408) 745-1655.☐ Circle No. 64

Powerbyte Software Releases Home and Business Hardware

Powerbyte Software is pleased to announce the release of its business and home application hardware for the Commodore 64, VIC-20 and TRS 80 color computer.

Over 60 applications are available for each computer ranging in price from $8.95 to $34.95 for cassette versions. Disc versions are also available. Programs titles include in part: The Accountant, Accounts Receivable/Payable, Business Inventory, The Order Tracker, The Bidder-My Profit Margin, Business Calendar, The Billing Solver, The Client Tickler, Vicky Calc, The Bar Chart, Taxman-Income and Expenser, New Worth Statement, The Stock Ticker Tape, The Mailman, Checkbook Booky, Home Budget, The Club Lister, Medical Records, Supper Shopper, Dear Diary, Mother's Recipes, Track My Weight, Jogger's Logger, Grade My Kids, Nuismatic Phanatic, Lightning Sort, Golf Scorecard, Math a Magician and many, many more.

Also available is "The Editor"—an advanced word processor for the Commodore 64 and 8K VIC-20.

A free catalog with description of software is now available by writing to Powerbyte Software, 2 Chipley Run, West Berlin, New Jersey 08091, or calling 609-346-3063. Dealer inquires are encouraged.☐ Circle No. 65

Creative Software to Release Four New Titles

Creative Software, the largest independent publisher of VIC-20 software in the U.S., is pleased to announce the release of four new titles. In keeping with its commitment to provide a full-line of software for entry-level computers, the four new programs expand the home application, home education and game categories:
gories:

RAT HOTEL—game cartridge for the VIC-20. You are the rat. And Waldo, the maintenance man at the Holen Paradisio doesn't like rats. Start on the top floor of the hotel and scurry to safety through the boiler room floor. Waldo will chase you on his atomic elevator. Sound confusing? Try figuring it out if you're a rat!

PIPES—home education cartridge for the VIC-20. Learning can be fun and PIPES is your proof. Try connecting all of the houses in Gilroy to the main water supply. Be frugal though, you only have so much pipe to use and so much money to spend. Sound easy? Only in your "pipe" dreams!

HOME OFFICE—home application cassette for the VIC-20. A word processor and data base on a beginner's budget! This economical software package will help you get organized by introducing you to the powerful applications of personal computing.

SPILLS & FILLS—home education cartridge for the VIC-20. How much is too much? How much is too little? Drill your perspective and ration skills by filling up and spilling out an accurate amount of liquid. Brilliant colors and bubbling sound effects make this learning experience a truly entertaining one.

Contact: Kari Curtis at 230 East Caribbean Drive, Sunnyvale, CA 94086, (408) 745-1655.☐ Circle No. 66

Business Software for Commodore Computer

Legal Plus

Cimarron's LEGAL PLUS software package for the Commodore 8000 series computers is specifically designed to help manage the in-house operation of the law firm by reporting and storing information on the daily activities of the legal staff.

LEGAL PLUS automatically stores data from as many as ten lawyers, 1050 clients, and 1,100 matters on every disk. Information in these Client, Matter and Log files is processed to produce reports on both the firm's and the individual attorney's activities. By-product reports, including activity analyses, aging report, charges and payments journal, and client and matter listings provide detailed management information without additional effort.

LEGAL PLUS also features pre-billing review of account status, and statements can be printed individually or *en toto*. Revisions and adjustments are completed quickly and easily, so information is always accurate and up-to-date.

- No programming knowledge required.
- Automatic "prompts" guide the user through each entry.
- 144 different statement formats. A statement can be printed according to the precise specifications of the attorney.
- Seven fee code options.
- 36 activity code options.
- Trust and Retainer Fund accounting.

Wordcraft Ultra

Wordcraft ULTRA gives you all the text creation and editing power you need for reports, memos, proposals and correspondence. Revisions, formatting and printing can all be done quickly and easily with high-quality, professional results.

- Page layouts of up to 117 characters and 98 lines in length.
- Screen display of finished document format.
- Normal tab, decimal tab and indentation features included.
- Automatic centering and right-justified, ragged left margins.
- Automatic header, footer and page numbering.
- Character, word, and paragraph deletion and insertion.
- Block movement of text from anywhere in line.
- Horizontal scrolling.
- Merges data files with standard forms.
- Half-line movement for subscripts and superscripts.
- Character string search and replace.
- Automatic underlining and emboldening.
- Proportional spacing capabilities.
- As many as eight users on a single disk drive without additional hardware.
- "Goto" page feature.

The Executive Suite

Cimarron's powerful information management system, THE EXECUTIVE SUITE, offers the business exe-

Circle No 10

BASIC COMPILER
AND ASSEMBLER
FOR ATARI® & COMMODORE 64®

THE BASM BASIC COMPILER AND ASSEMBLER FOR ATARI/COMMODORE 64 produces programs that run up to 130 times faster than Atari/Commodore BASIC. Uses the syntax of BASIC with ASSEMBLY LANGUAGE data types and addressing modes. Has the efficiency of ASSEMBLY, but cuts program development time by 2 to 3 times. Produces highly efficient ROMable binary files. Programming features: IF-ELSE-ENDIF; WHILE-ENDWHILE; DEF-ENDDEF. Utility libraries; graphics; disc access; debugging aid. Editor included. Block-structured capability. Eases the transition from BASIC to ASSEMBLY LANGUAGE programming. Eliminate the tedium of calculating the logistics of ASSEMBLY Syntax. In-line standard 6502 ASSEMBLER. The next step in the evolution of the small computer BASIC language.

Available soon for APPLE II®

Dealer inquiries invited.

BASM requires 32K, disk. Price $99.95 plus $2.00 for shipping (add $1.50 for C.O.D.). In Calif. add 6½% tax. Specif., Atari or Commodore. Send check or money order to:

COMPUTER ALLIANCE

21115 Devonshire St., #132D, Chatsworth, CA 91311 / (213) 368-4089

Circle No 3

VIC-20 ATARI

CHILD DEVELOPMENT SERIES

(for the 3.5K VIC and 16K ATARI)

ALPHA-BECi—$16.95
Twenty-six screens with letters/pictures/labels 'built' on the screen

NUMER-BECi—$16.95
Number recognition, object counting, object grouping, and number/size/shape discrimination.

BECi is composed of professionals dedicated to providing non-trivial educational materials for the home computer. In addition to our own software, we carry a full line of evaluated hardware and software. Send $2 (refundable) for our catalog.

Send check or money order to:
BOSTON EDUCATIONAL COMPUTING, INC.
78 Dartmouth Street, Boston, MA 02116
(617) 536-5116 *MA res. add 5% tax

WANNA KNOW A SECRET?

WORD PROCESSING Full capability word processing. Word-oriented—not a line editor. Menu-driven. For VIC: TOTL TEXT 2.0 $25.00
More powerful versions include footnotes, headings, footing, keyboard input, special printer control and more. For VIC + 16K or 24K: TOTL TEXT 2.5 $35.00
For C-64: TOTL TEXT 2.6 $40.00

MAILING LIST and LABELS Easy editing, automatically sorted, optimal non-printing data line(s), browse and select functions. Menu-driven.
For VIC or 64: TOTL LABEL 2.0 $20.00

KEYWORD CROSS REFERENCE Students and authors: keep track of reference notes and bibliographies. Quick reference by keyword. Requires printer.
For VIC: RESEARCH ASSISTANT 2.0 $30.00
For C-64: RESEARCH ASSISTANT 2.0 $35.00

TIME MANAGEMENT Keep track of activities by date (and time). Screen inquiry by date, person, project. 56 different bar chart formats available.
For VIC: TOTL TIME MANAGER 2.1 $30.00
For C-64: TOTL TIME MANAGER 2.6 $35.00

BUSINESS ACCOUNTING Accounts receivable and payable. Inventory and expense tracking, print invoices, statements, reports. Disk only.
For VIC and C-64: Inquire for price.

TOTL Software for
VIC 20* and COMMODORE 64*
the best deal in town!

All programs work with disk and/or tape; adaptable for 40 or 80 column formats and most printers. VIC programs require minimum 8K expansion

(Be sure to specify machine when ordering)

ANNOUNCING THE ONE MEGABYTE Fuzzy DISKETTE

A Revolutionary New Concept in User Support —A soft-sectored novelty pillow no serious computer user should be without. $25.00 including full documentation!

Mail Orders: Send check or money order (Calif. residents add 6% sales tax) to:

TOTL software inc.

1555 Third Ave., Walnut Creek, CA 94596
MasterCard VISA **Call (415) 943-7877**

*VIC 20 and COMMODORE 64 are trademarks of Commodore Business Machines.

Circle No. 46

cutive unlimited assistance in the solution of important business problems and decisions.

THE EXECUTIVE SUITE combines two important programs for the Commodore 8000 series computers: The Manager and Wordcraft ULTRA. The Manager is a very powerful Data Base Management system for inventory control, job costing, basic accounting, budgeting, forecasting, statistics, personnel management, administrative management and a host of other projects via user-defined files. Data may be recalled by any criteria, full reports may be generated and no programming experience is required to utilize the full potential of The Manager.

Dental Accounting System

The DENTAL ACCOUNTING SYSTEM (DAS) for the Commodore 8000 series computers offers the small-to-medium dental office or clinic an in-house automated systems approach to handling receivables, invoicing, aging and revenue analysis according to standardized procedures.

Additionally, DAS can provide valuable assistance to the practice by producing a series of lists and reports ranging from treatment plans in progress to morbidity indices.

- Unlimited number of patients.
- Open item entry invoicing system manages multiple-visit recordkeeping.
- Displays and/or prints treatment plans.
- Recall lists by patient and data.
- Aged receivables reports by guarantor and carrier.
- Prints industry-standard insurance forms and SuperBills.

Also available are Job Costing, Medical Accounting, Time Scheduling and Mail List Management. □

Circle No. 67

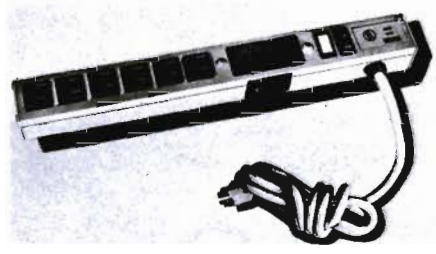
Multi-User Arcade Software from Synapse

The first and only genuine multi-user arcade space adventure is about to hit the market.

SURVIVOR, from Synapse Software pits as many as 4 players against enemy space fortresses simultaneously. Aside from hi-res graphics, and rapid arcade action, SURVIVOR offers the unique advantage of allowing each player to perform separate, individual functions: Navigator, Propulsion Engineer, Fore Gunner and Aft Gunner. Players work in concert to defeat attacking fleets, dodge meteors and weave through the corridors of several fortresses, knocking out gun emplacements. SURVIVOR can be played by 1, 2, or 3 players as well.

True Multi-user action is just one of the innovations from Synapse as they launch 32 new home computer programs in early 1983.

SURVIVOR demo discs, sample boxes and free P.O.P. materials are available. Contact: Synapse, 5221 Central Avenue, Richmond, CA 94804, (415) 527-7751. □ Circle No 68



Clipstrip™ II Model CSC-15-6 Transient Voltage Protected Strip

DYMARC is pleased to announce another new product, the CLIPSTRIP™ II.

The CLIPSTRIP™ is the best selling product in the DYMARC line and has set standards for both quality and performance and we've just made the CLIPSTRIP™ even better by adding UL listed common mode rejection. Transient voltage protection for both common and normal mode is necessary for certain devices and in "hostile" environment where transients are causing equipment damage as spikes enter on the ground terminal.

The CLIPSTRIP™ II is the natural extension of the CLIPSTRIP™ which has provided the power protection demanded in today's electronic systems.

The CLIPSTRIP™ II provides necessary protection as the sensitivity (voltage break down) of integrated systems electronics has decreased to less than 8 volts. The lowering of the sensitivity increases the noise immunity particularly in the LSI type electronics where the sensitivity is the millivolt range. This sensitivity is more severe in the common mode.

The CLIPSTRIP™ II provides both command *and* normal mode protection. Common mode protection is required in today's electronics such as switching power supplies. Switching power supplies, which are built into most of today's computers, demand to be current fed. As the frequency of the current is increased there is an increase in the impedance in the safety-ground path generating common mode voltage.

In fact, fast edges caused by lightning, load switching, SCR controls, etc. is converted into common mode transients. In many situations these conversions do not cause a problem but since today's computer electronics are typically referenced to ground these systems demand common mode protection the CLIPSTRIP™ II provides.

The physical specifications for the CLIPSTRIP™ II are the same as for the CLIPSTRIP™ with the exception being the operational LED indicator which is green instead of red.

Dymarc Industries, Inc., 21 Governor's Court, Baltimore, Maryland 21207. (301) 298-9626, (800) 638-9098. □ Circle No 69

BPI's Business Accounting System

BPI Systems announces a simple and easy to use business accounting system. With BPI, the small business computer user spends more time making profitable business decisions and less time worrying about computer operations.

First time computer users don't need prior computer experience or any computer knowledge to operate BPI's Business Accounting System. Even though the BPI system is sophisticated and comprehensive, it's easy to learn. That's because the owner's manuals are written in clear, ordinary business and accounting language.

The BPI system in a practical, nonsense program. It was designed

by business and accounting professionals for use in many kinds of business. It operates quickly and easily so you have rapid access to your accounting records. The result for you is a decrease in clerical/operator time and faster, more profitable responses to everyday business questions.

For maximum flexibility, the BPI Business Accounting System is actually composed of five individual systems: General Ledger, Accounts Receivable, Inventory Control, Payroll and Job Cost. These systems function independently and are available separately or they can interface with one another as one comprehensive accounting system. This given the user immediate capabilities in specific areas such as Accounts Receivable, General Ledger or Inventory Control. And, it provides for the addition of other systems when you need them. So whether your need is in just one accounting area or for a complete, integrated accounting system, BPI is ready, right now. And, with BPI continually improving and expanding its systems, you're assured the proper service and support to keep your accounting system well ahead of the demands upon it.

The Systems—The BPI Business Accounting System is designed around five independent but interfacing systems. Each of these systems usually can be installed and in operation in the same day.

General Ledger—This basic bookkeeping system will:

- Standardize data input.
- Post ledgers, prepare financial statements (including the Balance Sheet and the Profit and Loss Statement), and close the books.
- Print detailed ledgers for accounts receivable and accounts payable as well as for the general ledger.
- Keep monthly, quarterly and year-to-date payroll earnings records for every employee.
- Alert the operator to data entry errors.
- Make back-up disks for safekeeping.

Accounts Receivable—This system offers you the important choice of either "balance forward" or "open item" account detailing. And, it will:

- Detail each item on the accounts receivable ledger with amounts and dates.
- Print an alphabetical listing of all accounts, cross-indexed to their account numbers.
- Analyze the account activitiy for one account or more, at any time.
- Automatically produce an Aged Trial Balance for early account collection and business planning.
- Customize your statements with your company name, address logo, etc.; and provide one statement line for customized payment terms; two others for your message or advertising.
- Handle an unlimited number of accounts on multiple disks.
- Interface with the General Ledger and Inventory Control Systems.

Inventory Control—BPI's Inventory Control System allows you to know your exact inventory at any moment. It will:

- Cost your inventory by the FIFO, LIFO or AVERage methods.
- Create inventory records which detail vendor/product information and adjust inventory averages or declines automatically.
- Write P.O.'s., receive merchandise into inventory, prepare price labels and handle sales using regular and discounted pricing.
- Track low balance items in inventory and automatically write P.O.'s to prevent shortages.
- Safeguard you from entering duplicate or incorrect orders.
- Record vendor invoices and debit or credit the appropriate ledger account for each item.
- Enter and prepare sales invoices and debit the appropriate department's Cost of Sales account.
- Interface with Accounts Receivable and General Ledger.

Payroll—This time-saving system handles payrolls with a mix of salaried, hourly, and commissioned employees. Its tax tables include federal, state (all 50 states), city (all U.S.) and District of Columbia tax rates. This system is designed to make payroll processing fast and easy. It allows you to:

- Automatically compute and print payroll checks for window envelope mailing.
- Choose from three options for hourly computations and four options for commission computations.
- Assign multiple gross wage amounts.
- Choose from six customized payroll deductions with seven options each.
- Compute net pay automatically in seconds per employee.
- Charge salaries, commissions, and hourly wages to departments.
- Interface with Job Cost and General Ledger.

Job Cost—This job costing system works well for businesses that require individual job costing. It lets the user:

- Calculate extensions and footings automatically.
- Print a completed estimate for review.
- Avoid most errors and omissions with its user prompts.
- Automatically charge costs to appropriate jobs.
- Provide automatic retainage.
- Enter labor costs automatically.
- Report income on the Completed Job basis or the Percentage of Completion basis.
- Prepare projected profit/loss reports for an unlimited number of different jobs.
- Interface with Payroll and General Ledger.

BPI Systems, Inc., 3423 Guadalupe, Austin, TX 78705. (512) 454-2801. □

Circle No. 70

Micro Systems Development, Inc.

Now you can advance your VIC-20 and your COMMODORE 64 to the higher levels of personal computing.

All of these devices are actually interfaced to the VIC simultaneously through the use of various MSD peripheral devices!

1. Cassette Player (Either the VIC Datasette or standard cassette player).
2. RS-232 Acoustic Modem
3. COMMODORE 8050 Dual Disk Drive.
4. COMMODORE 4040 Dual Disk Drive.

5. COMMODORE 2031 Single Disk Drive.

6. Letter Quality Printer, IEEE-488 Interface.

7. High Speed Dot Matrix Printer, RS-232 Interface.

8. Color Monitor.

These and many more exciting applications await the computer user through the use of our peripheral devices . . . whether your requirement is exciting games, personal computing, education, business, or software development, we have the peripheral devices for you.□

Commodore 64 IEEE Interface Cartridge

The CIE Cartridge (IEEE-488 to COMMODORE 64) unit provides the COMMODORE 64 user with normal CBM/PET control over the IEEE-488 bus. When plugged into the COMMODORE 64 expansion port, the card is "transparent" to the expansion connector. This means the user can plug other peripherals into the "64" without interference. There are approximately 1K bytes of interface software on the board. When the interface is called it maps itself into a protected area at the top of the COMMODORE 64 memory.□

VMC/CMC Monitor Cable

This cable assembly allows the VIC-20 and/or the COMMODORE 64 to interface with a monitor instead of a TV The VCM/CMC provides separate Video and Audio Output. This enables the sound output to go directly into a stereo system for unmatched audio quality. The VMC/CMC is great for music programs and applications where a TV is not desired (business, education, etc.). Our CMC allows the COMMODORE 64 user to have high quality resolution on black and white monitors.□

VAC Audio Cassette Interface

Plugs directly into the VIC cassette port and provides input/output and remote control of a standard audio cassette recorder. Save and load programs using your own cassette unit. The VAC works with all existing VIC cassette programs . . . no modification to recorder required. All the VIC cassette commands are maintained.□

VT40 Terminal Emulator

This is a convenient cartridge which allows the VIC-20 to display 40 columns of characters when used in conjunction with the RS-232 port. The VT40 is a complete cartridge that requires no additional memory. Just plug the cartridge in, turn on the power, and the VIC-20 becomes a terminal! By connecting the VIC-20 to a modem, the VIC-20 becomes a 40 column 'dumb' terminal capable of communicating with various bulletin boards and computer networks across the country. The VT40 can even be used to 'talk' to other computers! Various setup parameters such as baud rate, parity, duplex, and number of bits per character can be modified through a 'menu' format.

Micro Systems Development, Inc., 11105 Shady Trail, Ste. 104, Dallas, TX 75229.□ Circle No. 71

VIC-WRITER

VIC-WRITER is a powerful but inexpensive general purpose Word Processor.

Why word processors?

Word processors allow the user to quickly and easily create letters, memos, notes, reports, term papers, manuals, poetry and any other written information, using the memory of the computer as a pencil and paper. The computer's terminal acts as a window through which the user views the information as it is entered. The outstanding advantage of using VIC-WRITER is that acts not only as a pencil and paper but as a perfect eraser and automatic typewriter.

VIC-WRITER allows the user to quickly and easily make any number of alterations to the text. VIC-WRITER has more functions than any other known microcomputer word processor. With VIC-WRITER assisting in the entry of text, providing a 10 page memory and performing an enormous number of editing/composing functions, the preparation of writing data is far faster and **outstandingly more accurate** than if it were prepared by hand.

It can by used to read, write and create sequential text files for any purpose; writing letters, creating data files, assembling programs as text, and any other application where text manipulation is needed.

Any existing sequential files can be read from disk or cassette by VIC-WRITER. VIC-WRITER alllows the user to record or retrieve text using the VIC ASCII or standard ASCII character set, thus eliminating conversion problems if peripherals cannot handle the VIC or CBM ASCII.

VIC-WRITER's text buffer will automatically set itself to the maximum size allowed by the memory of the computer (the text buffer is the area in memory where the VIC-WRITER stores the test currently being edited). With the standard version of the VIC-WRITER, there **10680 bytes available** in the text buffer.

VIC-WRITER is designed for easy use and tailored for personal computers. The screen is like a window onto the text file which can be moved up or down to allow any part of the text to be viewed and edited. Unformatted text is entered at the keyboard, and allowed to wrap around the screen continuously as far as desired. The user need only enter a RETURN where each printed paragraph is to end.

Formatting is automatically done on printout as specified by the user. Line length, margin width, size of indent, optional right justificaton and other parameters can be specified, and may be changed from one paragraph to the next.

There are no distinct "modes" of operation, thus all editing functions can be called at all times with one or two keystrokes. The VIC-WRITER has as large a text buffer as the computer's memory will allow, and its reaction time is so fast that **even excellent typists will not be able to get ahead of it.**

Skyles Electric Works, 231E South Whisman Road, Mountain View, CA 94041, (415) 965-1735.□ Circle No. 72

BUSICALC Now Available

A Honey of an Electronic Spreadsheet

Why electronic spreadsheet programs? Electronic spreadsheet programs allow the user to create a gridsheet, spreadsheet, worksheet, or any other table of information, using the memory of the computer as pencil and paper. The computer display or terminal acts as a window through which the user views the information as it is entered. Textual information (such as headings), numerical values, and formulas can easily be entered into the spreadsheet. For use with Commodore 64, VIC-20, PET/CBM 40 columns, CBM 80 column/SuperPet.

Your Computer Drone for Repetitive Calculations

The outstanding advantage of using a computer is that it acts not only as a pencil and paper but as a perfect eraser and an automatic calculator. The user can quickly and easily make any number of alterations to the data within the table. The BUSICALC will evaluate any formula using the data that have been entered. Further, it retains the formulas and displays the resulting value. With BUSICALC controlling the entry of data, providing a comprehensive memory, and performing arithmetic, the preparation of a spreadsheet is faster and more accurate than if it were prepared by hand.

Sting Removed from Prices

BUSICALC 20—$49 for the VIC-20
BUSICALC 64—$69 for the CBM 64
BUSICALC 40—$79 40 column PET/CBM
BUSICALC 80—$89 80 column CBMs and SuperPets

BUSICALC available now from your local dealer. Call (800) 227-9998 for the name of your nearest dealer. (CA, Canada, AK and HI, please call (415) 965-1735.) Skyles Electric Works, 231G South Whisman Road, Mountain View, CA 94041. ☐ Circle No 73

SKYLIGHT SOFTWARE

22 B MILLER STREET BELFAST, MAINE 04915
(207) 338-1410

Software & Accessories for the VIC-20

— CARDCO —

CARDBOARD/6: 6 Slot Expansion	$84.99
CARDPRINT: Parallel Printer Interface for Vic or 64	$67.99
CARDRITER: Light Pen with 6 good programs Vic or 64	$33.99
CARDADAPTER: Play Atari VCS Games on your Vic	$76.99
CARDBOARD/3S: slot exp.-fused-switched-reset button	$33.99
CARDETTE/1: Use standard cassette recorders on VIC	$33.99

— HES —

GRID RUNNER: Avoid Droids Weapons and Annihilate them	$33.99
AGGRESSOR: Space Battle – Nine Levels	$33.99
PROTECTOR: Transport Citizens to Safety in New City	$36.99
SHAMUS: Search Rooms for the Shadow – Avoid Droids	$33.99
QUEEN'S BEDROOM: Look for Royal Treasure – Avoid Guards	$33.99
ROBOT PANIC: Battle your way through the Cosmos	$33.99
PIRATES PERIL: Adventure – Sensational Sound & Animation	$33.99
SKIER: Down Hill Skiing – Hit Flags, Avoid Trees, 3 Levels	$14.99
MAZE OF MIKOR: Steal Warlocks Gold – Evade Demon	$14.99
VICTREK: Great Sound & Graphics	$14.99
LASER BLITZ: Destroy Enemy Craft with Flying Saucer	$14.99
TORG: Destroy the Suicide Attackers	$14.99
RAID ON ISRAM: Fly across Desert – Destroy Fuel, Rockets	$16.99
TURTLE GRAPHICS: Easy to Learn Computer Language	$33.99
VIC FORTH: Interactive Threaded Interpreted Language	$49.99
HES MON: Mach Language Monitor – Assembler	$33.99
HES WRITER: Surprisingly Complete Word Processing Cart	$33.99

— GEMINI-10 by STAR —

A FULL-FEATURED DOT MATRIX PRINTER AT AN AFFORDABLE PRICE. 100 CPS. 9-wire User Replaceable Print Head; Friction & Tractor Feed; Dot Addressable Graphics; Normal, Italic and Proportional Characters; 2.3K Buffer; – 10, 12, 17, 5, 6, 8.5, CPI; Super Sub Scripts; ~~$359.99~~ **$299.99** plus $10.00 Shipping and Handling.

— CREATIVE SOFTWARE —

TERRAGUARD: Destroy the aliens before they land	$33.99
SPILLS & FILLS: Develop ratio and perspective skills—fun	$33.99
PIPES: Hook all homes to water with limited pipe & cash	$33.99
VIDEOMANIA: Kill aliens with zapper before they get you	$33.99
RAT HOTEL: Move from top to bottom floors—watch Waldo	$33.99
APPLE PANIC: Set Traps for Deadly Apples Before they get you	$33.99
ASTRO BLITZ: Like Defender – Creative Computing Rates this #1	$33.99
BLACK HOLE: Avoid Space Debris & Gravity of Black Hole	$33.99
CHOPLIFTER: Fight off Jets, Tanks, Sams to Rescue Hostages	$33.99
SERPENTINE: Battle of the Serpents	$33.99
HOUSEHOLD FINANCE: 2 Tapes – 4 Programs	$28.99
LOAN ANALYZER: Loan Calculations – Amortization Table	$12.99

— MISCELLANEOUS —

QUICK BROWN FOX: Professional Word Processing Cart	$55.99
TOTL TEXT 2.0: Cass – Basic Word Processor	$19.99
TOTL TEXT 2.5: Cass. – Advanced Word Processor – Req. 8K Exp.	$29.99
TOTL LABEL: Cass. – Mailing List	$16.99
RESEARCH ASSISTANT: Cass.–Notekeeping for Term Papers, etc.	$24.99
ROAD TOAD: Cass. – Like Frogger	$12.99
MILLIPEDE: Cass. – Like Centipede	$12.99
ACCOUNTANT: 2 Tapes – G.J – B.S. – Inc. Statement	$24.99
ACCOUNT REC/PAY: 2 Tapes	$18.99
BUSINESS INVENTORY: Tape	$16.99
RIVER RESCUE: Rescue 3 Explorers lost in Jungle	$33.99
MUSIC COMPOSER: Enter plus Edit Score – Save and Load	$24.99
GALACTIC BLITZ: Cass – 15 Different Patterns	$19.99
SIDEWINDER: Cass. – 8K Exp. Required	$24.99
SWARM: Cass – The fastest you've seen	$24.99
SKY PILOT: Fly WW1 Plane against choice of German Planes	$10.49
DUNGEONS OF KAL: Adventure – Cass	$10.49
BASEBALL: Cass. – Manage any Team in History	$10.49
FOOTBALL: Cass. – Req. 8K Exp. – All '81 NFL Teams	$12.99
GALACTIC CONQUEST: Req. 8K Exp. – Strategy Game – 1 to 6	$13.99
MARTIAN RAIDER: Intergalactic ships in attack on Mars	$19.99
SHARK TRAP: Snare the sharks with atomic net or die	$19.99
MULTI-SOUND SYNTHESISER: Compose your own kind of music	$19.99

— COMMODORE —

SPECIAL — **VIC-20 COMPUTER** — SPECIAL

COMPLETE WITH LIBRARY OF 25 PROGRAMS
VIC LIBRARY OF 15 GAMES
VIC INFORMATION MANAGEMENT (data-base)
PLUS 9 DEMONSTRATION PROGRAMS
ONLY **$199.99** plus $10.00 shipping & handling

COMMODORE 64 COMPUTER
~~$499.99~~ **$489.99** plus $10.00 Shipping and Handling

— * ADD $10.00 FOR SHIPPING & HANDLING EACH ITEM MARKED WITH * —

8K RAM EXPANDER	$ 47.99
16K RAM EXPANDER	$ 77.99
***COLOR PRINTER PLOTTER:** Draws charts & graphs in 4 colors	$189.99
DATASETTE: store user written or prerecorded programs	$ 66.99
***VIC DISK DRIVE:** Fast hi capacity storage–170K disk	$339.99
***VIC 1525 PRINTER:** Tractor feed dot matrix printer–30 cps	$339.99
VIC SUPER EXPANDER: 3K Ram + graphic, multicolor, & music.	$ 54.99
VIC PROGRAMMERS AID: 20 commands to program easier	$ 48.99
VIC-MON: fast way to write machine language programs	$ 48.99
***VIC 14" MONITOR:** give Vic it's own tube for best color	$269.99
VIC AVENGER: Like space invaders–Action arcade cartridge	$ 24.99
SUPERSLOT: colorful slot machine–Works like the real thing	$ 24.99
SUPER ALIEN: Can you capture the aliens before they get you	$ 24.99
JUPITER LANDER: Pilot lem–Excellent graphics	$ 24.99
DRAW POKER: Cassino style poker in a cartridge	$ 24.99
MIDNIGHT DRIVER: Night driving simulation–Thrills, Spills?	$ 24.99
RADAR RAT RACE: challenging game of wit, strategy, & reflexes	$ 24.99
MOLE ATTACK: Keep the moles underground where they belong	$ 24.99
PIRATE COVE ADVENTURE: Find Long John Silver's treasure	$ 33.99
MISSION IMPOSSIBLE ADV: Nuke reactor may be doomed	$ 33.99
THE COUNT ADVENTURE: Love at first bite–Dracula strikes again	$ 33.99
VOODOO CASTLE ADV: You are Count Chnsti's only hope	$ 33.99
SARGON II CHESS: rated best computer chess by the experts	$ 33.99
GORF: Midway's incredible arcade game–4 different games in 1	$ 33.99
OMEGA RACE: Ultimate space game–All features of Bally/Midway	$ 33.99
SEA WOLF: Sink all enemy destroyers, freighters, PT boats	$ 24.99
CLOWNS: See the amazing clowns jump–Bally/Midway classic	$ 24.99
RECREATION SIX-PACK: Six games on tape	$ 49.99
HOME CALC SIX-PACK: Personal finance–word proc–cass	$ 49.99
MATH IMPROVE SIX-PACK: Help children improve math–cass	$ 49.99
PROGRAMMER'S REF GUIDE: Tips for all levels-Basic-Mach.	$ 14.99
INTRO TO BASIC PROGRAMMING: tutorial book & tape	$ 21.99
BASIC PROGR -PART TWO: Continuation of above-book-tape	$ 21.99

SKYLIGHT SOFTWARE

TAPE #1 – Canon Duel – Breakout – Runaround – Stockcar – Space
TAPE #2 – Target Pistol – Space Duel – B29 – Tank – Roadblock
TAPE #3 – Sub Hunt – Blockade – Indy 500 – UFO – Jungle Driver
TAPES #1, #2, #3 ONLY **$9.99 EACH**

VIC GAME LIBRARY – ALL 15 GAMES ON ONE TAPE **$25.00**
Vic Information Management – 10 Commands **$12.99**

— UMI —

SPIDERS OF MARS: Destroy Spiders, Bats, Dragon Flies	$33.99
METEOR RUN: Avoid Meteors and Enemy Torpedos	$33.99
OUTWORLD: Protect your Outerspace Community	$33.99
CLOUDBURST: Protect Earth from Acid Rain & Cloud Hoppers	$24.99
SATELLITES & METEORS: Watch out for the Black Hole	$33.99
BUT!: Cart. 3K RAM plus Programming Aids	$59.99
VI-DATA: Powerful data base-format screen & print output	$25.99

— WICO —

JOYSTICK: Bat handle–2 fire buttons–6 leaf switch assembly	$ 24.99
REDBALL JOYSTICK: Heavy duty version of above	$ 29.99
JOYSTICK DELUXE: Rugged heavy duty-arcade quality	$ 33.99
TRACKBALL: Phenolic ball– 360 deg. movement–Arcade quality	$ 59.99
12 FOOT EXTENSION: Extend cord of any Atari-type controller	$ 7.49

ADD $2.00 FOR SHIPPING & HANDLING

MasterCard — PRICES REFLECT CASH DISCOUNT ADD 3% FOR CREDIT CARDS — VISA

(Please include all Card Information)
5% tax for Maine residents

SEND $1.00 FOR COMPLETE LIST (Refunded on first order)
OVER 200 ITEMS – SPECIFY VIC-20 OR COMMODORE 64

Circle No. 38

Commander Dealers

Given here, in zip code order, is a partial list of the Charter Dealers who will be carrying the COMMANDER. We will provide updates for this list in following issues as a service to provide our readers with a local source at which they will find information, hardware, or software for their Commodore Computers.

U.S.A.

Puerto Rico
The Micro Computer Store
1408 Avenue Jesus T. Pinero
Rio Piedras, PR 00921
(809) 781-0350
Manager-Owner: Julio C. Martinez

Massachuttes
Tycom Associates
68 Velma Avenue
Pittsfield, MA 01201
Manager-Owner: Dave Tyburski

Northshore News Co.
150 Blossom Street
Lynn, MA 01902
(617) 592-1300
Manager-Owner: Tom Mulken, Jr.

Computech Ltd
214 Derby Street
Salem, MA 01970
(617) 741-1724
Manager-Owner: Tim Bush

Omicron Corporation
1416 Providence Highway
Norwood, MA 02062
(617) 769-6867
Manager-Owner: Steve Gavrilles

Rhode Island
International Computer Services
165 Oyerville Avenue
Johnston, RI 02919
(401) 273-1001
Manager-Owner. Steve Lablanc

New Hampshire
Compu-Craft, Inc
17 Dunbar Street
Keene, NH 03431
(603) 357-3901
Manager-Owner. Richard Bishop

Echo Consulting Services
PO Box 1199
Conway, NH 03818
(603) 447-5455
Manager-Owner. George Epotien

Maine
Maine Micro Systems, Inc.
55 Center Street
Auburn, ME 04210
(207) 786-0696
Manager: Nancy Lecompte

Vermont
Computeam
205 Dorset Street
South Burlington, VT 05401
(802) 862-2802
Manager-Owner: Mark Robinson

Market Place
1 Main Street
Winoski, VT 05404
Manager-Owner Bob Howe

Connecticut
Multi-Business Computers Inc
28 Malborough Street
Portland, CT 06480
(203) 342-2747
Manager-Owner Bob Stasko

New Jersey
Micro Computer Services
61 Mountain Blvd.
Warren, NJ 07060
(201) 561-3111
Manager-Owner: Jerry Prevete

Computer Workshop
1200 Haddenfield Road
Cherry Hill, NJ 07013
(609) 665-4404
Manager-Owner: Charles Kolbe

NUBS Computer Center Inc
6 Ames Avenue
Rutherford, NJ 07070
Manager-Owner Robert Weigel

Software City
85 Godwin Avenue
Midland Park, NJ 07432
Manager-Owner. Arlene Destosito

Computerability, Inc.
441 Route 23
Pomton Plains, NJ 07444
(201) 835-0688
Manager-Owner. Dennis Mull

Wayne Computer Store
1459 Route 23
Wayne, NJ 07470
(201) 628-7318
Manager-Owner: Rick Delti

Software City
147 North Kinderkamack Road
Montvale, NJ 07645
(201) 391-0931
Manager-Owner: C.M Hatfield

Computer Workshop
1200 Haddenfield Road
Cherry Hill, NJ 08034
(609) 665-4404
Manager-Owner: Chris Kolbe

Electronic Service Assoc., Inc
Route 541 North
Medferd, NJ 08055
(609) 953-1200
Manager-Owner: John Handfield

Software-n-Such
Warren Plaza, Route 130
East Windsor, NJ 08520
(609) 443-8984
Manager-Owner: Paul Hammer

BB/The Computer Store
216 Scotch Road
Trenton, NJ 08628
(609)883-2050
Manager-Owner. Barry Brown

New York
Computer Center
31 East 31st
New York, NY 10016
(212) 889-8130
Manager-Owner: Elliot Rabinowitz

Leigh's Computer
212 East 85th Street
New York, NY 10028
Manager-Owner. Leigh Goldstein

CompTek
90 John Street
New York, NY 10038
(212) 962-6131
Manager-Owner: Frances Banks

Computer Emporium
37 North Street
Middletown, NY 10940
Manager-Owner: Kate Honders

Compu-Tech
511 Hempstead Avenue
West Hepstead, NY 11552
Manager-Owner. Jim Brewington

Software Emporium
151 Minola Avenue
Rosyln Heights, NY 11577
Manager-Owner: Sheldon Ostroy

B.C. Communications, Inc.
World Wide Electronics Dist.
207 Depot Road
Huntington Street, NY 11746
(516) 549-8833

Computer Headquarters
1245 Middle Country Road
Selden, NY 11784
(516) 698-9373
Manager-Owner Dale Lack/Kathy Lyons

Ray's Supply
190 Route 9
Cohoes, NY 12047
Manager-Owner: Bob Howe

Upstate Computer Shop
1823 Western Avenue
Albany, NY 12203
(518) 456-3019
Manager-Owner William J. Smith

Ray's Supply
350 Cornila Street
Plattsburgh, NY 12901
Manager-Owner. Bob Howe

Ray's Software
106 East Main Street
Mallone, NY 12953
Manager-Owner: Bob Howe

Future Distribution
Trimex Bldg.—Route 11
Mooers, NY 12958
(514) 861-2831
Manager-Owner: Phillippe Faure

Ray's Software
412 East Jenesee Street
Fayetteville, NY 13066
Manager-Owner: Bob Howe

Durmac Cash Registers
1628 Erie Blvd. East
Syracuse, NY 13210
(315) 472-4531
Manager-Owner: William McCarthy

Upstate Computer Shop
99 Commercial Drive
Whitesboro, NY 13492
(315) 768-8151
Manager-Owner: Tony Violante

Personal Computers, Inc
3251 Bailey Avenue
Buffalo, NY 14215
(716) 832-8800
Manager-Owner Frank C. Smeirciak

Pennsylvania
One Stop Computer Shope
65 North 5th Street
Lemoyne, PA 17043
(717) 761-6754
Manager-Owner Joanne Wright

Micro Age Computer Store
1352 Tilghman Street
Allentown, PA 18102
(215) 434-4301
Manager-Owner. Ed Eichenwald

Maryland
Professional Micro Service
100 West 22nd Street
Balto, MD 21218
(301) 366-0010
Manager-Owner James A. Breen

Tri-State Computers
1504 South Salisbury Blvd.
Salisbury, MD 21801
(301) 742-2020
Manager-Owner. Tom Weiland

Virginia
Virginia Micro Systems
13646 Jeff Davis Highway
Woodbridge, VA 22191
(703) 491-6502
Manager-Owner: Suart Mitchell

Unidyne Corp
536 Independance Blvd.
Virginia Beach, VA 23462
(804) 855-8037
Manager-Owner Vicki Knick

CALPRO—The World of Computers
3119 Waterlick Road
Lynchburg, VA 24502
(804) 237-3825
Manager-Owner: Walter Leroy Ashley

West Virginia
Computer Associates, Inc.
113 Hale Street
Charleston, WV 25301
(304) 344-8801
Manager-Owner Jeff Knapp

North Carolina
The Program Center
3400A West Wendover Avenue
Greensboro, NC 27407
(919) 855-8667
Manager-Owner Rupert Fenequito

Piedmont Microsystems Inc.
Route 3, Box 150 H
Frazier Professional Bldg
Newton, NC 28658
(704) 465-3600
Manager-Owner: Lorne Machael

Write For FREE Catalog — *Write For FREE Catalog*

NEW VIC SOFTWARE CBM 64

VISA* MasterCard

Great VIC Software

PARATROOPER a High Resolution game that doesn't let you make any mistakes. You are in your command. Helicopters fill the sky, (and we mean fill the sky!), dropping paratroopers. Your mission is to keep 3 paratroopers from hitting the ground on either side of your gun. But that's just the beginning. You score by hitting the helicopters or the paratroopers, but if you miss a shot it subtracts from your score. Therefore, you must make every shot count to make a high score! IT HAS FOUR FAST ACTION LEVELS TO CHALLENGE THE BEST PLAYER. The High Resolution graphics helicoptors are fantastic. They look exactly like helicopters! The paratroopers are super realistic. Their chutes open and then they drift down to earth. If this weren't enough the sounds are fantastic. There are helicopter blades whirring and you can hear the howitzer pumping shells. This game really show off the sound and graphic capabilities of your VIC. PARATROOPER IS OUR #1 SELLING ARCADE GAME, you've got to see this game to believe it. **$19.95**

SPACE PAK Can you survive? 3 space games with the sights and sounds of an arcade. The excitement builds as the action is un-ending. IBlast away at everything in sight. The alien attacks will stop at nothing to destroy you. Prepare for battle, there is no escape, only you can help. Can you survive? Hi-Res, color, graphics and sound. Joystick or keyboard. 3 Games — Rocket Race, Fence-A-Tron and Raiders. **$19.95**

COSMIC CRUZER Hot action and 3 challenging scenarios. Move your cruzer into the tunnel - fire missiles and drop bombs. Hit the fuel dumps to get more fuel. Move as quick as you dare to hit the surface-to-air missiles. If you are good enough you will make it to the asteroidz field and then try to destroy the base. No one has destroyed the base yet. Will you be the first. **$19.95**

VIC ALL STARS We took the best selling VIC programs and put them in a package to save you $35. If purchased seperately it would cost you $85. You get **Paratrooper, Target Command, Head On, Cattle Round-up, Snake Out, Trapper, Double Snake Out and Artillery.** All eight games for $49.95. Hurry because at this price they won't last long. Limited quantity. 8 Games. **$49.95**

COMMODORE 64 SOFTWARE

Let the COMPUTERMAT turn your 64 into a home arcade!

COLOR • GRAPHICS • SOUND ON CASSETTE

(Disk Versions Available — Add $5.00)

ARCADE PAK - $24.95
3 Programs
Head On
Alien Invasion
Target Command

EDUCATION PAK - $24.95
4 Programs
Geography Match
Math Adventure
Ruler & Micro

TREASURE PAK - $14.95
3 Programs
Adventure
Caves of Silver
Shuttle Voyage

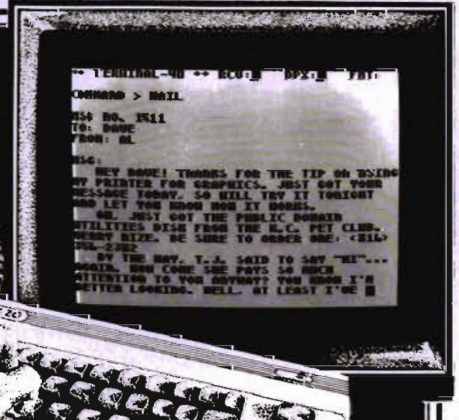
GAME PAK - $14.95
3 Programs
Dragon Chase
Deflect
Flip It

Joystick and Keyboard versions included.

COMPUTERMAT
Box 1664 • Dept. M • Lake Havasu City, Az. 86403
(602) 855-3357

TELECOMMUNICATIONS on the VIC and '64!

"A versatile and exceedingly well-done package." David Malmberg, MICRO
"Simply the best & nicest VIC terminal software I have seen." Greg Yob, CREATIVE COMPUTING



We created quite a flurry and earned *rave* reviews with *Terminal-40*, the unique software that transforms the VIC screen into a *40-column smooth-scrolling* display. And with features like a Receive Buffer and VIC printer dump, *Terminal-40* sets a new standard for personal modem communications with networks such as CompuServe and Source. Our *'64 Terminal* does the same quality job for the '64.

And now there's even MORE!!! *SuperTerm* for the VIC and '64 supports text storage to disk or tape and program UPLOAD/DOWNLOAD. *SuperTerm*, used with our Smart ASCII interface, also supports popular parallel printers.

Choose the one right for you. Call or write today for the "best", then . . .

REACH OUT and BYTE SOMEONE!

For the VIC:
Terminal-40 (req 8K exp) . . **$29.95**
SuperTerm (req 16K exp) . . . . ***Call***

For the Commodore 64:
'64 Terminal **$29.95**
SuperTerm . . . . . ***Call***

(On cassette. Requires modem.)

MIDWEST MICRO inc.
311 W. 72nd ST. • KANSAS CITY • MO • 64114

ORDER DESK: (816) 333-7200

Send for a free brochure describing our other quality products.

MAIL ORDER: Add $1.50 shipping and handling ($3.50 for C.O.D.); VISA/Mastercard add 3% (card# and exp. date). Missouri residents include 4.6% sales tax. Foreign orders payable U.S.$, U.S. Bank ONLY; add $5 shp/hndlg. **Dealer inquiries invited.**

Dealers, continued

Bob West Computers
54 West Main Street
Brevard, NC 28712
(704)883-2595
Manager-Owner: Sylvia West

Georgia

Cardinal Computers
903 North Gleenwood
Dalton, GA 30720
(404) 226-0502

Inagrated System, Inc.
3300 Buckeye Road NE, Suite 178
(404) 458-0713
Atlanta, GA 30341

Florida

COMPUTECH
1415 Timberlane Road
Tallahassee, FL 32312
(904) 893-1743
Manager-Owner: Dan Evans

Random Access Computers
296 Eglin Parkway
Fort Walton Beach, FL 32548
(904) 862-7763
Manager-Owner Joanne Dodd

Florida Book Store
1614 West University Avenue
Gainesville, FL 32604
(904) 376-6066

Skippers Inc.
217 SE 1st Avenue
Ocalm, FL 32671
(904) 732-3221
Manager-Owner. David Lee Skipper

Osceola Computer
1300 Dakota Avenue
Street Cloud, FL 32769
(305) 892-1501
Manager-Owner: Raymond Barrieau

Sigma Systems of Orlando
590 North Semoran Blvd
Orlando, FL 32807
(305) 273-2434
Manager-Owner: Tom Clance

Computer Specialties, Inc.
701 East Lincoln Avenue
PO Box 1718
Melbourne, FL 32901
(305) 725-6574
Manager-Owner: Otis P. Lutz

Micro Byte, Inc
13710 SW 56 Street
Miami, FL 33175
(305) 385-2108
Manager-Owner: Ed Silverman and Lyman Conover

Focus Scientific
224 North Federal Highway
Fort Lauderdale, FL 33301
(305) 462-1010
Manager-Owner: M. Rienhardt

The Software Connection
5460 North State Road 7, Suite 108
Fort Lauderdale, FL 33319

Business Machines
2821 Pinewood Avenue
West Palm Beach, FL 33407
(305) 655-4730
Manager-Owner: Robert Frazier, Jr.

The Software and Computer Store
1506 Gulf-to-Bay
Clearwater, FL 33515
(813) 442-8803
Manager-Owner. Charles Kautz

Alabama

Tricelin Corporation
Route 1, Box 128
Bankston, AL 35542
(205) 689-4999

Tennesee

American Computer Co.
1004-8th Avenue South
Nashville, TN 37203
Manager-Owner: Jane Maggard

Metro Computer Ctr.
416 West Main Street
Chattanooga, TN 37402
(615) 875-6676
Manager-Owner: Wayne F. Wilson

Mississippi

Sunrise Persons Supplies
901 South John Street
Corinth, MS 38834
(601) 287-4721
Manager-Owner: Felex Gathings

Kentucky

All Business Computers
Suite C-2317 Versailles Road
Lexington, KY 40504
(606) 253-2545
Manager-Owner Bud Walden

Stowehuewge Computer, Inc.
2026-29th Street
Ashland, KY 41101
(606) 359-0545

Ohio

Office Mart, Inc.
1151 East Main Street
Lancaster, OH 43130
(614) 687-1707
Manager-Owner. Pat Blake

Computers Plus of Ohio
1346 West 4th Street
Mansfield, OH 43351
Manager-Owner. Tom Young

Computers Plus of Ohio
127 West Waindot Avenue
Upper Sandusky, OH 43351
Manager-Owner: Roger Schoenberger

U-Compute
Parker Steele Bldg
429 Monroe
Toledo, OH 43606
Manager-Owner: Paul Doldner

The Computer Store of Toledo, Inc
18 Hillwyck Drive
Toledo, OH 43615
(419) 535-1541
Manager-Owner: Al and Jackie Miller

Computer Connection
2851 Broadway
Lorain, OH 44055
Manager-Owner: Terry Rieger

Mentor TV Inc
7516 Mentor Avenue
Mentor, OH 44060
Manager-Owner: William Tomkins

Computer Site
14763 Pearl Road
Strongsville, OH 44136
Manager-Owner: Bill Sero

Computer Corner Inc.
5104 Mayfield Road
Lyndhurst, OH 44124
(216) 423-5010
Manager-Owner: Ross Black

Computer Showcase
5855 Youngston-Warren Road SE
Niles, OH 44446
(216) 652-2571

Waltz Photo
438 Sixth Street
Canton, OH 44701
(216) 455-9421
Manager-Owner: Brad Zupp

Wards Computers, Inc.
868 Ohio Pike
Cincinnati, OH 45245
(513) 752-2882
Manager-Owner: Carl Ward

Computer Plus of Ohio
123 East Main Cross Street
Findlay, OH 45840
Manager-Owner Mike Deitelbach

Indiana

Allan's Jewelry & Loan Co.
130 East 10th Street
Anderson, IN 46016
(317) 642-7978
Manager. Jerry Rubenstein

McCarels Computers
1204 Meridian Plaza
Anderson, IN 46016
(317) 643-2662

AVC Corporation
2702 Applegate
Indianapolis, IN 46203
Manager-Owner Brent Enderle

Impair
342 Bosart
Indianapolis, IN 46201
(317) 353-9947
Manager-Owner Fred Imhausen

A Computer Store
2140 North Mithoefor Road
Indianpolis, IN 46229
(317) 898-0331
Manager-Owner: Skip Robbins

Computer Plus
1501 Joliet Street
Dyer, IN 46311
Manager-Owner: Nancy L. Gray and Ronald Piercy

Computer People
900 Highway 212
Michigan City, IN 46360
(219) 879-8557
Manager-Owner: Harry Hopkins

General Micro Computers
52303 Emmons Road
South Bend, IN 46637
Manager-Owner: John Levy

Computer Corner
6722 East State Blvd.
Fort Wayne, IN 46815
(219) 749-8338
Manager-Owner: Tom Kutina

Custom Software
3197 South 3rd Place
Terre Haute, IN 47802
(812) 234-3242
Manager-Owner: Vicki McEntaffer

Michigan

Micro Station Inc.
24484 West 10 Mile Road
Southfield, MI 48034
(313) 358-5820
Manager-Owner: Jerry Goldberg

Comm Data
320 Summit
Milford, MI 48042
(313) 685-0113

Roseville Computer
25929 Gratiot
Roseville, MI 48066
(313) 772-0760
Manager-Owner. Tom Potter

Allen Park Computer Center
7000 Roosevelt, Suite 109
Allen Park, MI 48101
(313) 383-8254
Manager-Owner: Sam Noble

Haney's Computer Center
15270 Gratiot
Detroit, MI 48205
(313) 839-1850
Manager-Owner. Paul M. Paul

Computer Mart
915 South Dort Highway
Flint, MI 48503
(313) 234-0161
Manager-Owner. Pat McCollem

Computer Connection
444 West Maumer Street
Adrian, MI 49221
(517) 265-7872
Manager-Owner: Ron Gamling

Newman A/V Communications, Inc.
400-32nd Street SE
Grand Rapids, MI 49508
(616) 243-3300

Computers and More
2915 Breton SE
Grand Rapids, MI 49508
(616) 243-3520
Manager-Owner Bill Slaughter

Newman A/V Communication
400-82nd Street SE
Grand Rapids, MI 49508
Manager-Owner Nancey M Isler

Computer Tutor
502 East Front
Traverse City, MI 49684
(616) 941-5320
Manager-Owner. Caroline Garrick

Iowa

Micro Computer Applications
111 East Church Street
Marshalltown, IA 50158
(515) 752-8845
Manager-Owner: Harold Montover

Gronert Computers, Ltd.
4505 Forest Avenue
Des Moines, IA 50311
(515) 255-0618
Manager-Owner: Frank Gronert

Cosmos Computers
1721 Grant Street
Bettendort, IA 52722
(319) 355-2641
Manager-Owner. Paul Rung

Wisconsin

Starting Computers
4020 North 128th
Brookfield, WI 53005

Majic Business Systems
3519 West Wanda Avenue
Milwaukee, WI 53221
(414) 282-8072
Manager-Owner: Dennis Woitekaitis

Computerland of Madison
6625 Odana Road
Madison, WI 53719
(608) 833-8900
Manager-Owner: James Sullivan

South Dakota

Computerland Rapid City
738 Street John Street
Rapid City, SD 57701
(605) 348-5384
Manager-Owner: John Mattson

Illinois

The Software Store, Inc.
1767 Glenview Road
Glenview, IL 60025
(312)724-7730
Manager-Owner: David Pokritis and Jeff Rayer

Digital World
711 Army Trail Road
Addison, IL 60101
(312) 628-9222
Manager-Owner: Sam Gunda

B-A Computer Systems
2 North Batavia Avenue
Batavia, IL 60510
(312) 879-2350
Manager-Owner: Robert Appel

Softwareland, Inc
420 West 75th Street
Downers Grove, IL 60516
(312) 852-6340
Manger-Owner. Maureen Quinn

Rozel Industries, Inc.
7360 North Lincoln Avenue
Lincolnwood, IL 60646
(312) 675-8960
Manager-Owner: Fred Whitlock and Becky Kowalsky

Fisher Scientific
4901 West Lemoyne Avenue
Chicago, IL 60651
(312) 378-7770
Manager-Owner: A.C. Heidrich

Kappel's Computer Store
125 East Main
Belleville, IL 62220
(618) 277-2354
Manager-Owner: Tom Kappel

Data Plus, Inc.
1706 Broadway
Quincy, IL 62301
(217) 222-65602
Manager-Owner: James Moore

Missouri

Micro Age Computer
11413 Olive Blvd.
Street Louis, MO 63141
(314) 567-7644
Manager-Owner. Norm Fisher

Common Wealth Computers
5214 Blue Ridge Blvd.
Kansas City, MO 64133
(816) 356-6502
Manager-Owner: Dick York

Kansas

Computer Business Machines
Officenter 357 South Lulu
Wichita, KS 67211
(316) 267-1150
Manager-Owner: Mrs. R. Santoscoy

Compusense
1001 South Washington
Witchata, KS 67211
Manager-Owner: J. Kendrick

Nebraska

Hobby Town
220 North 66th Street
Lincoln, NE 68505

Central Office Equipment
2020 Central Avenue
Kearney, NE 68847
(308) 234-2515
Manager-Owner: Byron Hanse

Louisiana

The Computer Center
111 C Rena Drive
Lafayette, LA 70503
(318) 988-2478
Manager-Owner: Robert Jones

Texas

Taylor Computer Systems
949 Melbourne Road
Hurst, Texas 76503
(817) 284-5251
Manager-Owner: Mike Taylor

Computer Home
431 East Avenue C
San Angelo, TX 76903
(915) 653-7488
Manager-Owner: Brent DeMoville

Texas Technical Services
3115 West Loop South, #26
Houston, TX 77027
(713) 965-9977
Manager-Owner: Phil Ray

I.T.S.
420 Plantation Drive
Lake Jackson, TX 77566
(713) 297-9016
Manager-Owner: I.K. Kelly, Jr.

The Computer Experience
125 Southbridge
San Antonio, Texas 78217
(512) 340-2901
Manger-Owner: Carolyn Roberts

Valley Computer Systems, Inc
1101 North Cage, Suite A1
Pharr, TX 78577

Software-N-Things
2141 West Anderson Lane
Austin, TX 78757
(512) 451-4347
Manager-Owner: John Krieg

Professional Computer Associates
5326 Cameron
Austin, TX 78723
(512) 459-1220
Manager-Owner: Steve Derosa

Computerland of Amarillo
2300 Bell Street
Amarillo, TX 79106
(806) 353-7482
Manager-Owner: Mark Trowbridge

Colorado

Whole Life Distributors
965 Washington Street #6
Denver, CO 80203
(303) 861-2825
Manager-Owner: Tom Tarbart

Zero Page, Inc.
2380 Naegele Road
Colorado Springs, CO 80904
(303) 633-0211
Manager-Owner: David C. Cooper

Idaho

Electronic Specialties, Inc.
8411 Fairview Avenue
Boise, ID 83704
(208) 376-5040
Manager-Owner: Terry Romero

Wyoming

Computer Concepts
3125 East Grand Avenue Street
Laramie, WY 82070

Utah

Computer Plus
1078 East Fort Union Blvd
Midvale, UT 84047
(801) 566-3902
Manager-Owner: Steve Whitzelor and Allen Vincent

Mnemonics Memory Systems
(DBA Mnemonics Computer Store)
141 East 200 South
Salt Lake City, UT 84111
(801) 266-7883
Manager: Rick Giolas

The Hi-Fi Shop
2236 Washington Blvd.
Ogden, Utah 84401
(801) 621-5244
Manager-Owner: Brent Richardson

Central Utah Electronics Supply
735 South State
Provo, UT 84601
(801) 373-7522
Manager-Owner: George S. Moore

Arizona

Computer Super Store
4001 East Thomas Road
Phoenix, AZ 85108
Manager-Owner: Richard Sarhan

Personal Computer Place
1840 West Southern Avenue
Mesa, AZ 85202
(602) 833-8949
Manager-Owner: Roger Smith

Computer Depot
1201 Iron Springs Road
Prescot, AZ 86301
(602) 778-7473
Manager-Owner: Brice Eldridge

New Mexico

Computer Super Store
1660 Eubank NE
Albergurque, NM 87112
Manager-Owner: Richard Saham

Nevada

PCS Computer
3900 West Charleston, Ste R
Las Vegas, NV 89102
(702) 870-4138
Manager-Owner: Mickey Cole

Harry's Business Machines, Inc.
323 West Street
Reno, NV 89501
(702) 322-4559
Manager-Owner: Gordon Foote

California

Opamp Tech Books
1033 North Sycamore
Los Angeles, CA 90038
(213) 464-4322
Manager-Owner: Alicion

Data Equipment Supply Corp.
8315 Firestone Blvd.
Downey, CA 90241
(213) 923-9361
Manager: Robert Johnson

Computer Place
23914 Crenshaw Blvd.
Torrance, CA 90505
(213) 325-4754
Manager-Owner: Wen T. Huang

Fyrst Byte
10053 Whittwood Drive
Whittier, CA 90603
(213) 947-9411
Manager-Owner: Darrell Miller

Game Room
5675 Kanan Room
Agora, CA 91301
(213) 707-0142
Manager-Owner: Jean Collier

General Computer Store
22323 Sherman Way Unit #7
Canogca Park, CA 91303
(213) 704-6600
Manager-Owner: Anita Broadway

HW Electronics
19511 Business Center Drive
North Ridge, CA 91324
(213) 886-9200
Manager-Owner: Ronda

Levity Distributers
6857½ Ben Avenue
North Hollywood, CA 91605
(213) 982-2514
Manager-Owner: Melinda Plesha

Data Systems West
421 West Las Tunas Drive
San Gabriel, CA 91776
(213) 289-3791
Owner: Frank J. Mogavero

Consumer Computers
8314 Parkway Drive
La Mesa, CA 92041
(714) 465-8888
Manager: Steve Scott

Calco Digital Equipment Inc.
1919 Aple Street
Oceanside, CA 92054
(714) 433-4119
Vice President: Ronald N. Paperno

20-64 Software Center
9829 Mira-Mesa Blvd
San Diego, CA 92131
(619) 695-0214
Manager-Owner: Larry Skaggs

Inland Electro Mart
8624 California Avenue
Riverside, CA 92504
(714) 687-3776
Manager-Owner: Jack

PEC
1440 South State College, Suite 6F
Anaheim, CA 92806

Quality Computer Center
801 South Victoria Street, #104
Ventura, CA 93003
(805) 642-1979
Manager-Owner: David Stewart

Jay-Kern Electronics
1135 Columbus
Bakersfield, CA 93305
871-5800
Manager-Owner: Don Taylor

Micro Pacific Computer Center
5148 North Palm
Fresno, CA 93704
(209) 229-0101
Manager-Owner: Mike Reinhold

J. Snell & Co., Inc.
657 Mission Street
San Francisco, CA 94105
(415) 421-5898
Manager-Owner: James Snell

Staceys Bookstore
219 University Avenue
Palo Alto, CA 94301

PC Computers
10166 San Pablo Avenue
El Cerrito, CA 94503
(415) 527-6044
Manager-Owner: Gary Guttebo

Computer Ideas, Inc.
1029 Tennessee Street
Vallejo, CA 94590
(707) 552-5076
Manager-Owner: J. Gavin

Fox Computer Co.
2678 North Main Street
Walnut Creek, CA 94596
(415) 944-9277
Manager-Owner: Stan Nielson

Albany Typewriter & Computer
923 San Pablo Avenue
Albany, CA 94706
(415) 526-1959
Manager-Owner: Bill Tichy

Idea Computers
301 North Santa Cruz Avenue
Los Cratos, CA 95030
(408) 354-1210
Manager-Owner: Tom Wolf

The Computer Room
230 Mt Herman Road
Scotts Valley, CA 95066
(408) 438-5001
Manager-Owner: Gary Guttebo

The Computer Center Stores
930 Town & Country Village
San Jose, CA 95128
(408) 246-5710
Manager-Owner. R. Reid, J. Barlow and N. Kinney

Dealers, continued

Inland Electro Mart
8624 California Drive
Riverside, CA 95204
(714) 687-3776
Manager-Owner: Jack

Educational Connection
1508 Coffee Road
Modesto, CA 95355
(209) 576-1611

Software Plus
6201 "C" Greenback Lane
Citnes Heights, CA 95610
(916) 726-4979
Manager Owner: Carolyn Webster

The Radio Place
2964 Freeport Blvd.
Sacramento, CA 95818
(916) 441-7388
Manager-Owner: Gary Stilwell

Ray Morgan Co.
554 Rio Lindo Avenue
Chico, CA 95926
(916) 343-6065
Manager: Dave Wegner

Computer Place
1698 Market Street
Redding, CA 96001
(916) 221-1312
Manager-Owner. John Fredricks

Radio Mart
1075 Cypress
Redding, CA 96001
(916) 241-3000
Manager-Owner: John Cokeley

Oregon

SW Computers
1125 NE 82nd
Portland, OR 97220
Manager-Owner. Jerry

Edu-Tech
1575 NW 9th
Corvallis, OR 97330
(503) 758-5577
Manager-Owner: L. Clark and W. Brown

Libra Book Inc.
856 Olive Street
Eugene, OR 97401
Manager-Owner: Larry West

Midland Cascade
61 West 8th Avenue
Eugene, OR 97401
Manager-Owner: Ron Isaacs

Ace-Tec
Highway 101 South Sypress Center
Bandon, OR 97411
(503) 347-9322
Manager-Owner: Ace Egnew

Washington

Compu-Play
1320 South 324th, Suite A-3
Federal Way, WA 98003
(206) 839-4453
Manager-Owner: Kevin Mitchell

Electronic Supermart
7040 South 180th Street
Kent, WA 98032
(206) 251-8484
Manager-Owner: Richard Thorp

Data Borne Computers
641 SW 152nd
Seattle, WA 98166
Manager-Owner: Richard Kantak

Programs Plus
16874 Southcenter Parkway
Seattle, WA 98188
(206) 575-1375
Manager-Owner: Nick Smith

Conti Electronics Ltd.
c/o Afcon
140-14th
Blaine, WA 98230
Manager-Owner: G.W. Harder

Computer Corner
1610 North Laventure
Mt. Vernon, WA 98273
(206) 428-1840
Manager-Owner: Kirk D. Shroyer

Technique Data Systems Inc.
3306 Hwy. 101 East
Port Angeles, WA 98362
Manager-Owner: Loren Larson

Computer +
2504 Jefferson Avenue
Tacoma, WA 98402
(206) 272-2329
Manager-Owner: David Dodd

Computer Town
1215 Center
Tacoma, WA 98409
(206) 272-2271

Nibles & Bytes
4020 South Steel Street, Suite 105
Tacoma, WA 98409
(206) 475-5938
Manager-Owner: John Clark

Reed Graphics Inc.
964 East 99th Street
Tacoma, WA 98445
Manager-Owner: Don Reed

The Electronics Shop
131 North Decator
Olympia, WA 98502
(206) 357-6304
Manager-Owner: Frank and Tim Linaham

Bits, Bytes and Nibbles, Inc.
209 Northtown Shopping Center
Spokane, WA 99207
(509) 487-1601
Manager-Owner: Richard Shulman

Alpha Computer Center
1341 D. George Washington Way
Richland, WA 99352
Manager-Owner: John Freer

Alaska

BG Systems Co.
204 East International
Anchorage, AK 99502
(907) 276-2986
Manager-Owner: Robert DeLoach

Micro Age Computer Store
2440 Seward Highway
Anchorage, AK 99503
(907) 279-6688
Manager-Owner: Jay Wisthoff

Canada

British Columbia

Book Shoppe
33-10th Avenue South
Cranbrook, BC V1C 2M9
(604) 426-3415
Manager-Owner: Tommy Wheeler

Dynamic Computer Systems
6-1960 Springfield Road
Kelowna, BC V1Y 5V7
(604) 860-7795
Manager-Owner: Wayne Henrickson

Sight & Sound Computer Center
657 Central
Prince George, BC V2M 1C6
(604) 562-0356
Manager-Owner: Jim Condon

Vulcan Computer Systems
20571 Fraser Highway
Langley, BC V3A 4G4
(604) 530-8572
Manager-Owner: Gord Tremain

Datum Electronics Ltd.
11-3000 Lougheed Highway
Port Coquitlam, BC V3B 1C5
(604) 464-4424
Manager-Owner: John Lim

Minitronics Coquitlam Center
1114-2929 Barnet Highway
Coquitlam, BC V3B 3R5
(604) 464-0633
Manager-Owner: Ross Watson

Village Computer Systems
17704-56th Avenue, #8
Surrey, BC V3S 1C7
(604) 576-8112
Manager-Owner: Ron Jasper

Minitronics
1440 Kingsway
Vancouver, BC V5N 2R5
(604) 872-3225
Manager-Owner: Bud Lam-Lim

Castle Data Systems Ltd.
670 East Broadway
Vancouver, BC V5T 1X6
(604) 872-2829
Manager-Owner: Ken Poole

Softcorner Developments
683 East Broadway
Vancouver, BC V5T 1X7
(604) 872-6601
Manager-Owner: Howard Schaefer

Conti Electronics
7204 Main Street
Vancouver, BC V5X 3J4
(604) 324-0505
Manager-Owner Greg Harder

621 Reading Center
621 West Pender
Vancouver, BC V6B 1W7
(604) 684-3814
Manager-Owner: Wilson Yau

Conti Computer Systems
1216 West Broadway
Vancouver, BC V6H 1G3
(604) 734-0606
Manager-Owner: Duncan Fraser

Mall Book Bazaar
850 Granville Street
Vancouver, BC V6Z 1K3
(604) 687-2213
Manager-Owner: Mike McCord

Owens & Sons Cash Register
2101 Government Street
Victoria, BC V8T 4P2
(604) 383-7134
Manager-Owner: Robert Owen and Glen Gray

Owens & Sons Cash Register
245 Fraser Street
Nanimo, BC V9R 5C2
(604) 753-4178
Manager-Owner: Wayne Wrigley

Dynamic Computer Center
3105-31st Avenue
Vernon, BC
(604) 860-7795
Manager-Owner: Chris Chambers

Minitronics Guildford Center
Surrey, BC
(604) 584-1033

Quebec

Systems Ormic Ltd.
909 DeBourgone
Ste-Foy, Quebec G1W 4S6
(418) 659-3858

Systems Ormic Ltd.
999 De Bouragogue
Sinte Foy, Quebec G1W 4S6
Manager-Owner: Yvon Labbee

Systems Ormic Ltd.
133 Ste-Germain
Rimouski, Quebec G5L 4B6

Systems Ormic Ltd
1500 Norte Dame
Trois-Rivieres, Quebec G9A 4X5

Caleq, Inc.
331 Sir Wilfred Laurier
St. Lambert, Quebec J4R 2L1
(514) 465-6055
Manager-Owner: Marcel Bourcier

Le Camelot
1191 Place Phillips Square
Montreal, Quebec H3B 3C9
(514) 861-5019
Manager-Owner: Francine Roseenthol

Ontario

Questar International, Inc
7270 Woodbine Avenue
Markam, Ontario L3R 4B9
(416) 475-8044

Electronics 2001
5529 Yonge Street
Willowdale, Ontario M2N 5C3
(416) 223-8400

Lichtman's News Agency
34 Adelaide Street West
Toronto, Ontario M5H 1P6

House of Computers
368 Eglinton Avenue West
Toronto, Ontario M5N 1A2
(416) 482-4336

Arkon Electronics
409 Queens Street West
Toronto, Ontario M5V 2A5
(416) 593-9653
Manager-Owner: Paul Perrin

Computer Circuit Ltd.
733 Richmond Street
London, Ontario N6A 3H2
(519) 672-9370
Manager-Owner: Wally Soloton

Lichtman's News Agency
Bayview Village Shopping Mall

Lichtman's News Agency
1430 Yonge Street
Toronto, Ontario

Alberta

Soft Option
Box 112, Station T
Calgary, Alberta T2H 2G7
Manager-Owner: David Evans

Computer World
4921-49th Street
Red Deer, Atlanta T4N 1V2
(403) 347-4280
Manager-Owner: David Todd

Kelley Software Dist. Ltd.
PO Box 11932
Edmonton, Alberta T5J 3L1
Manager-Owner: Tom Kelly

T.J.B. Microsystems, Ltd.
10991-124th Street
Edmonton, Alberta T5M 0H9
(403) 451-6262
Manager-Owner: John Atwood and Doug Poon

T.J.B. Microsystems, Ltd.
10458-82nd Street
Edmonton, Alberta
(403) 433-3161
Manager-Owner: John Atwood

Electro-T's
8770-170th Street
Edmonton, Alberta T5T 3J7
(403) 487-0144
Manager-Owner: Gerry Rush

Dico Post #9
103-9709 Franklin Avenue
Fort McMurray, Alberta
(403) 791-6664
Manager-Owner: Pat Erler

VIC-20 & C64

Exclusive needs... Exclusive source!

Southwest Micro Systems Inc

Hardware & Peripherals:

VIC-20 Color Computer[1]	$145.00
Commodore 64[1]	395.00
Commodore B128 Computer[1] (128K)	895.00
MSD Single Disk Drive[7] (VIC 1541 Compatible)	395.00
Star Gemini — 10 Printer w/cable interface[8]	399.00
Star Gemini — 15 Printer w/cable interface[8]	575.00
Amdex Color I Monitor w/cable[9]	340.00
CIE Cartridge (IEEE-488 for C64)	95.00
VIE Cartridge (IEEE-488 for VIC-20)	75.00
RS-232R Interface for VIC or C64	45.00
SPI Parallel Interface for VIC or C64	65.00
VPI VIC Parallel Interface	45.00
VEX-3 Expander for VIC	29.95
VEX-6 Expander for VIC	85.00
4 Slot Expander for C64	75.00
V3K Static RAM Expansion	35.00
V8K Static RAM Expansion	45.00
V16K Static RAM Expansion	85.00
V24K Static RAM Expansion	115.00
40/80 Col VIC Video Expander w/16K[10]	175.00
40/80 Col VIC Video Expander w/64K[10]	350.00
80 Col C64 Video Expander[10]	149.00
Z80 Video Pak for C64[10]	250.00
Light Pen for VIC or C64	25.00
VAC Audio Cassette Interface	29.95
VMC/CMC VIC & C64 Monitor Cables	15.00
Joy Stick (Arcade Quality)	25.00
Atari VCS 2600 Game Adapter	79.95

C64 Software Products:

EPYX-Temple of Apshai[3]		Disk	39.95
EPYX-Upper Reaches of Apshai[3]		Disk	19.95
EPYX-Curse of Ra[3]		Disk	19.95
EPYX-Sword of Fargoal[3]		Disk	29.95
EPYX-Crush, Crumble & Chomp[3]		Disk	29.95
Wordpro 3+ Wordprocessing[5]			75.00
Info Designs Soft Pack (G/L,A/R,A/P)[6]			475.00
Data Base for C64			95.00
Financial Spreadsheet for C64			135.00
Super Sprite	Cassette 35.00	Disk	35.00
Ultra Mail 64	Cassette 20.00	Disk	25.00
Personal Finance C64			75.00
Tax Qwik/Personal Tax Program for C64[11]			75.00
Quick Brown Fox C64[12]			55.00

VIC-20 Software Products:

VTE/CTE Terminal Program for VIC & C64	Cassette		8.95
	Diskette		12.95
VT-40 VIC 40 Col Terminal Communicator Cartridge with Downloading			45.00
VIC Super Expander[1]			49.95
VIC Programmers Aid Cartridge[1]			45.00
VIC Intro to Basic Part I & II[1]			45.00
Home Inventory[2]	Cassette 12.00	Disk	15.00
Household Finance[2]	Cassette 25.00	Disk	30.00
Logic Games[2]	Cassette		10.95
Action Games[2]	Cassette		15.00
City Bomber & Minefield[2]	Cassette		15.00
Black Hole Game[2]	Cartridge		29.95
Trashman Game[2]	Cartridge		29.95
Astroblitz Game[2]	Cartridge		29.95
Choplifter Game[2]	Cartridge		29.95
Serpentine Game[2]	Cartridge		29.95
Apple Panic Game[2]	Cartridge		29.95
Terraguard Game[2]	Cartridge		29.95
Videomania Game[2]	Cartridge		29.95
Spills & Fills[2]	Cartridge		29.95
Pipes[2]	Cartridge		29.95
EPYX-Invasion of Orion (16K Extra)[3]	Cassette		24.95
EPYX-Datestones of Ryn (16K Extra)[3]	Cassette		19.95
EPYX-Rescue at Rigel (16K Extra)[3]	Cassette		29.95
EPYX-Crush, Crumble & Chomp (16K Extra)[3]	Cassette		29.95
EPYX-Plattermania[3]	Cartridge		39.95
Heswriter for VIC-20[4]	Cartridge		39.95
HES-MON for VIC-20[4]	Cartridge		39.95
HES-Turtle Graphics[4]	Cartridge		39.95
VIC-20 Data Base			75.00
Wordprocessing for VIC-20			49.95
Quick Brown Fox VIC-20[12]			55.00

Immediate delivery on all items.
Dealer inquiries invited.

[1]Commodore Int. [2]Creative Software [3]EPYX Software [4]Human Engineered Software [5]Professional Software [6]Info Designs Software [7]MSD Inc. [8]Star Micronics, Inc. [9]Amdex Corp. [10]Data 20 Corp. [11]Geneva Tech. Corp. [12]Quick Brown Fox Inc.

Yes, Please send me:

QTY.	MODEL#	NAME	PRICE
TOTAL	(In Texas, add 5% sales tax)		

Your Name _____
Address _____
City _____ State _____ Zip _____
payment method: Check ☐ Card-Exp. Date _____
Master Card # _____
Visa # _____
American Express # _____
Signature _____

Southwest Micro Systems Inc. • 2554 Southwell • Dallas, Texas 75229 • (214) 484-7836

Circle No. 87

Distributors

New Hampshire
Verham News Corp.
75 Main Street
West Labnon, NH 03784
Manager-Owner. Shelley Seward

New York
Hudson County News Company
1305 Patterson Plank Road
North Bergin, NJ 07047
Manager-Owner: James Cohen

Imperial News Co., Inc.
255 Pinelawn Road
Melville, NY 11747
Manager-Owner: Irwin Salbe

Morlock News Co., Inc.
496 Duanesburg Road
Schenectady, NY 12306
Manager-Owner: Joe Hopfenspirger

Manson News Dist., Inc.
634 South Avenue
Rochester, NY 14620
Manager-Owner: Joseph T. Rapone

Empire News of Jamestown
Johns Place—
Warren Jamestown Blvd.
PO Box 2029 Station A
Jamestown, NY 14701
Manager-Owner: David H. Goeckel

West Virginia
Valley News Service
1919 Garfield Avenue
Parkersburg, WV 26101
Manager-Owner: Dan Stephan, Jr.

Georgia
Family Reading Service
1209 Toledo Drive
Albany, GA 31705
Manager-Owner: Tom Green

Florida
Sun News Co.
3600-75th Terr North
Pinellas Park, FL 33565
Manager-Owner: Wendy Menne

Indiana
Elkhart City News & Bookstore
519 South Main Street
Elkhart, IN 46516
Manager-Owner: George Forman

Michigan
Michiana News Service Inc.
2232 South 11th Street
Niles, MI 49120
Manager-Owner: Ted S. Majerek

Ohio
Brunner News Agency
217 Flanders Avenue
Lima, OH 45802
Manager-Owner: Thomas and
James Brunner

Iowa
Iowa Periodicals Inc.
3301 SW McKinley
Des Moines, IA 50305

Wholesale Distr. Inc
Highway 61 North
Burlington, IA 52601
Manager-Owner. John Sandell

Wisconsin
Northern Wisconsin News Co.
Route 3, 4838 South John Paul Road
Milton, WI 53563

Montana
Northwest News
101 South California
Missoula, MT 59801
Manager-Owner: Ken Grinsteiner

Illinois
Central Illinois Periodicals
501 Kenyon
Champaign, IL 61801
Manager-Owner: Craig Tharp

Austin Periodical
Highway 37 North
Johnston City, IL 62951
Manager-Owner: Bob Austin

Mississippi
Cowley Distr.
732 Heisinger Road
Jefferson City, MS 65101
Manager-Owner. John Cowley

New Mexico
Rio Grande News Co.
2505 Commercial NE
Albuquerque, NM 67101
Manager-Owner: E.A. Shepard

Kansas
M.S. News Company
901 East Morris
Wichita, KS 67211

Nebraska
Nelson News
4651 F Street
Omaha, NE 68117
Manager-Owner: W.H. Palmer

Colorado
Mountain States News Dist.
208 Racquet Drive
Fort Collins, CO 80522
Manager-Owner: R.E. Carlson

California
Pomona Valley News Agency
10736 Fremont
Ontario, CA 91762
Manager-Owner. Jay Bogg

Peninsula News Company
1944 Leslie Street
San Mateo, CA 94403
Manager-Owner: Jim Harter

Milligan News Co.
150 North Autumn Street
San Jose, CA 95110
Manager-Owner: Jack Gillis

Tower Books
2538 Watt Avenue
Sacramento, CA 95821

North Area News
2163 Fulton Avenue, #12
Sacramento, CA 95825
Manager-Owner: Tom Holey

Oregon
Fred Bay News Company
3155 NW Yeon Avenue
Portland, OR 97210
Manager-Owner: Robert Bay

Palmer Distributing, Inc.
350 SW Wake Robin Avenue
Corvallis, OR 97333
Manager-Owner: Richard L. Palmer

Midland Cascade
61 West 8th Avenue
Eugene, OR 97401
Manager-Owner: Ron Isaacs

Washington
Rainier News Inc.
1122 Bost SW
Everett, WA 98203
Manager-Owner: Ken Swensen

Lesnick News Co.
2442 Mottman Road SW
Tumwater, WA 98502
Manager-Owner: Ken Heidal

User Clubs

New Hampshire
TBH VIC-NIC CLUB
PO Box 981
Salem, NH 03079
Contact—J. Newman
Publication—VIC-NIC NEWS
Interests—VIC-20 Exclusively

New York
National VIC Association
9 Crabapple Lane
Nanuet, NY 10954
Contact—Michael Kleinert
(914) 623-8929

Kentucky
The Commodore Connection
1010 South Elm
Henderson, KY 42420
Contact—Jim Kemp
(502) 827-8153
Interests—VIC, CMB 64, PET

Ohio
Central Ohio PET User's Group
107 South Westmoor Avenue
Columbus, OH 43204
Contact—Philip H. Lynch
(614) 274-0304
Interests—Support of all Commodore Products

SW Ohio VIC Users Club
659 Carthage Avenue
Cincinnati, OH 45215
Contact—Tom E. Harris
761-7510

Public Doman Inc.
5025 So. Rangeline Road
West Milton, OH
Contact—Bill Munch

Indiana
The VIC Indy Club
PO Box 11543
Indianapolis, IN 46201
Contact—Linda Kropzer
(317) 878-3342

Michigan
Michigan's Commodore-64 Users Club
14342 Stephens
Warren, MI 48089
Contact—Doug Schwartz
(313) 776-5835 or
Chuck Ciesliga
(313) 773-6302
Newsletter—Sprite 64 (published monthly)
Interests—All uses of Commodore 64 Computer

South Dakota
VIC-64 Users Club
203 East Sioux Avenue
Pierre, SD 57501
Contact—Larry J. Lundeen
(605) 224-4863

Illinois
The Fox Valley PET User's Club
833 Willow Street
Lake in the Hills, IL 60102
Contact—Art Dekneef
(312) 658-7321

Chicagoland C-64 Users Club
190 Oakwood Drive
Woodale, IL 60191
Contact—Russ Hurlbut
(312) 860-2015

Texas
Commodore (Houston) Users Group
8738 Wildforest
Houston, TX 77088

California
Commodore Interest Association
c/o Computer Data
14660 La Paz Drive
Victorville, CA 92392

Amateurs and Artesian
PO Box 682
Cobb, CA 95426
Contact: B. Alexander KR6G

Washington
A.T.S. VIC-20 Computer Club
7906 34th Avenue SW
Seattle, WA 98126
Contact—Ken Gazaway
(206) 935-2697
Publication—For VIC-20 only

Central Washington Commodore User's CLub
1222 South 1st Street
Yakima, WA 98902
Contact—Bob Wood or Tim McElroy

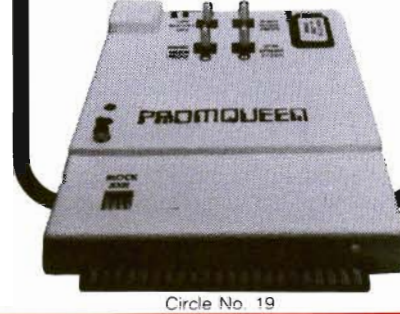
Canada
Winnipeg PET Users
9-300 Ennis Killeo
Winnipeg, Manitoba, Canada R2V 0H9
Contact: Larry Nevfeld

A Giant Step for the computerist

THE PROMQUEEN

Opens up the world of modern electronics. Now – a complete microdevelopment system in a cartridge using the Commodore VIC-20. You get HEXKIT 1.Ø for general purpose 8 bit microprocessor software development, a 4K ROM emulator for testing program in circuits under development plus an EPROM programmer for making hard copy of programs. All-in-one cartridge with 100 page tutorial manual. **$199.00**

Gloucester Computer, Inc.
1 Blackburn Center,
Gloucester MA 01930
Phone 617-283-7719



Circle No. 19

Advertising Index

1	Aardvark	5
2	Academy Software	2
3	Boston Educational Computing, Inc.	77
4	Bytesize Micro Tech	7, 60
5	Century Micro	34
6	CGRS MicroTech	18
7	Comm Data Software	1
8	Commodore 64 Users Group	35
9	Compu-sense	9, 32, 34, 37, 44
10	Computer Alliance	77
11	Computer Marketing	55
12	Computer Mat	49, 83
13	Data Equipment	27
14	Eastern House	17
15	Electronic Specialties, Inc.	36
16	Event Horizon	74
17	French Silk	48
18	Galactic	67
19	Gloucester	89
20	Intelligent Software	32
21	J. Systems Corporation	37
22	Leading Edge	Back Cover
23	Liberty Computer Distributers	38
24	Luna Software	92
25	Midwest Micro	83
26	Micro-Ed	73
27	Micrograms	35
28	Micro Spec	65
29	Micro Systems Development	3
30	Nibbles & Bits, Inc.	53
31	Optimized Data Systems	8
32	Performance Micro Products	36
33	Precision Technology	65
34	Protecto	91
35	Psycom Software	37
36	Quantum Data	59
37	Quick Brown Fox	31
38	Skylight	81
39	Southwest Micro Systems, Inc.	87
40	SW Computers	42
41	Synapse Software	Inside Front Cover
42	Tamarack Software	23
43	Taylormade	42
44	Texas Technical Services, Inc.	42
45	Toronto PET Users Group	45
46	TOTL Software	77
47	Tsasa, Inc.	63
48	Victory Software	Inside Back Cover

COM-STAR F/T

Tractor Friction Printer

only $349

• Lowest price quality tractor friction printer in the U.S.A. • Fast 80 characters per second
• 40, 46, 66. 80, 96, or 132 characters per line spacing • Prints labels, letters, graphs, and tables
• List your programs • Print out data from modem services

Deluxe COMSTAR F/T PRINTER — $349.00

The Comstar is an excellent addition to any micro-computer system. (Interfaces are available for Apple, VIC-20, Commodore-64, Pet, Atari 400 and 800, and Hewlett Packard) At only $349. the Comstar gives you print quality and features found only on printers costing twice as much. Compare these features.

• **BI-DIRECTIONAL PRINTING** with a LOGIC SEEKING CARRIAGE CONTROL for higher through-put in actual text printing. 80 characters per second.

• **PRINTING VERSATILITY:** standard 96 ASCII character set plus block graphics and international scripts. An EPROM character generator includes up to 224 characters.

• **INTERFACE FLEXIBILITY:** Centronics is standard. Options include EIA RS232C, 20mA Current Loop. (Add $20.00 for RS232)

• **LONG LIFE PRINT HEAD:** 100 million character life expectancy.

• **THREE SELECTABLE CHARACTER PITCHES:** • 10, 12 or 16.5 characters per inch. 132 columns maximum. Double-width font also is standard for each character pitch.

• **THREE SELECTABLE LINE SPACINGS:** 6, 8 or 12 lines per inch.

• **PROGRAMMABLE LINE FEED:** programmable length from 1/144 to 255/144 inches.

• **VERTICAL FORMAT CONTROL:** programmable form length up to 127 lines, useful for short or over-sized preprinted forms.

• **FRICTION AND TRACTOR FEED:** will accept single sheet paper.

• **224 TOTAL CHARACTERS**

• **USES STANDARD SIZE PAPER**

If you want more try —

Premium Quality COMSTAR F/T SUPER-10" PRINTER — $449

For $449.00 you get all of the features of the Comstar plus 10" carriage, 100 cps, 9 x 9 dot matrix with double strike capability for 18 x 18 dotmatrix. High resolution bit image (120 x 144 dot matrix), underlining, backspacing, 2.3K buffer, left and right margin settings, true lower descenders, with super and subscripts, and prints standard, Italic, Block Graphics, special characters, plus 2K of user definable characters. For the ultimate in price performance the Comstar F/T Super 10" leads the pack!

WE HAVE THE LOWEST PRICES

We sell to customers and you save the profit margin normally made by computer stores, department stores and distributors, we are willing to take a smaller margin to develop volume. WE LOVE OUR CUSTOMERS — OUR PRICES PROVE IT!

IMMEDIATE REPLACEMENT WARRANTY

If your printer fails because of warranty defect 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 via United Parcel Service prepaid. This warranty applies to all products we sell because WE LOVE OUR CUSTOMERS!

15 DAY FREE TRIAL

OTHER OPTIONS

Extra Ribbons	$ 5.95
Roll Paper Holder	32.95
Roll Paper	4.95
5000 Labels	19.95
1100 Sheets Fan Fold Paper	13.95

Add $20.00 shipping, handling and insurance. Illinois residents please add 6% tax. Add $40.00 for CANADA, PUERTO RICO, HAWAII, ALASKA 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 available!! Canada orders must be in U.S. dollars.

PROTECTO ENTERPRIZES (FACTORY-DIRECT)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

COMSTAR F/T

ABCDEFGHiJKLMNOPQRSTUVWXYZabcdefghijklmn
opqrstuvwxyz 1234567890
ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz1234567890

SUPER-10" ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890

Circle No. 34

LUNA SOFTWARE

LUNA SOFTWARE is quickly becoming one of the largest manufacturers of software for the Commodore 64™ and Vic 20™ . The reason behind our growth is that we offer the consumer only the best in quality, service and price. We have now available for immediate delivery a diverse line of software — ranging from business programs to arcade style games. Call us today and shoot for the stars with LUNA.

DISKETTES & CASSETTES FOR THE COMMODORE 64™ AND VIC 20™.

HYPER-HEN
ARCADE STYLE GAME

Hungry chicken hawks, sneaky coyotes, and fiendish zompys are all out to ruffle your feathers in this outrageous maze game. Non-stop action.
Cassettes for VIC 20 — $19.95

SPRITE EDITOR
UTILITY PROGRAM

Whether you're a hobbyist or a professional, our Sprite Editor will allow you to produce multi-colored sprites at the touch of a button. Extremely user friendly.
Cassettes for Commodore 64 — $32.95

MAILING LIST
HOME/BUSINESS PROGRAM

Alphabetizing, search on any field, over 650 records per diskette, and much more make this the most powerful mailing list program available.
Diskettes for Commodore 64 — $44.95
Diskettes for VIC 20 — $34.95
Cassettes for Commodore 64 — $39.95
Cassettes for VIC 20 — $29.95

PEDESTRIAN
ARCADE STYLE GAME

Crowded freeways and mugger filled parks make your trip home a harrowing experience. If you enjoyed Frogger, you'll flip for Pedestrian.
Cassettes for Commodore 64 — $21.95
Cassettes for VIC 20. — $19.95

PERSONAL FINANCE
PERSONAL PROGRAM

This versatile program can also be used by small businesses as an expense register and general ledger.
Diskettes for Commodore 64 — TBA
Diskettes for VIC 20. — $42.95

...AND SO MANY MORE.

The above are only a few of the many programs that we have available.
Write or call today for a free catalog.

LUNA SOFTWARE
P.O. Box 26922
San Jose, CA 95159-6922
(408) 378-7793

LUNA SOFTWARE

Design & Illustration: Paul Stephenson

ADVENTURE.
THE KEY IS YOUR COMPUTER

KONGO KONG

Climb ladders, avoid the barrels the crazy ape is rolling at you, and rescue the damsel. Fast machine code action.

Available for VIC-20 and COMMODORE 64
PLAYED WITH JOYSTICK OR KEYBOARD

$19.95

GRAVE ROBBERS

Introducing the first GRAPHIC ADVENTURE ever available on the VIC-20! With realistic audio-visual effects, you explore an old deserted graveyard and actually see the perils that lie beyond.

Available for VIC-20 and COMMODORE 64
PLAYED WITH KEYBOARD

$14.95

ANNIHILATOR

Defend your planet against the hostile aliens. All machine code makes this "Defender-like" program one of our best arcade games.

Available for VIC-20 and COMMODORE 64
PLAYED WITH JOYSTICK

$19.95

ADVENTURE PACK I

(3 programs)

Jack and the Beanstalk Defeat the Giant in your quest for his Golden Hen.

Computer Adventure Re-live the "excitement" of getting your computer. An adventure with a very different flavor.

Moon Base Alpha You must find a way to destroy the meteor that is racing towards your base, or else all moon colonies will be demolished!

Available for VIC-20 and COMMODORE 64
PLAYED WITH KEYBOARD

$19.95

ADVENTURE PACK II

(3 programs)

African Escape As the sole survivor of a plane crash, you must find your way out of the dark continent.

Hospital Adventure You are a spy whose mission is to complete the bungled assassination attempt on the evil dictator, who is recuperating in the hospital under heavy guard.

Bomb Threat Get back to town to warn the authorities of the bomb planted by the terrorists who left you prisoner at their hideout.

Available for VIC 20 and COMMODORE 64
PLAYED WITH KEYBOARD

$19.95

CHOMPER MAN

High speed machine action. Don't let the bullies catch you in a game packed full of machine code.

Available for COMMODORE 64
PLAYED WITH JOYSTICK OR KEYBOARD

$19.95

Programs for the
VIC-20 and the
COMMODORE 64

VICTORY SOFTWARE®

All programs fit in standard memory. All programs are on cassette tape.

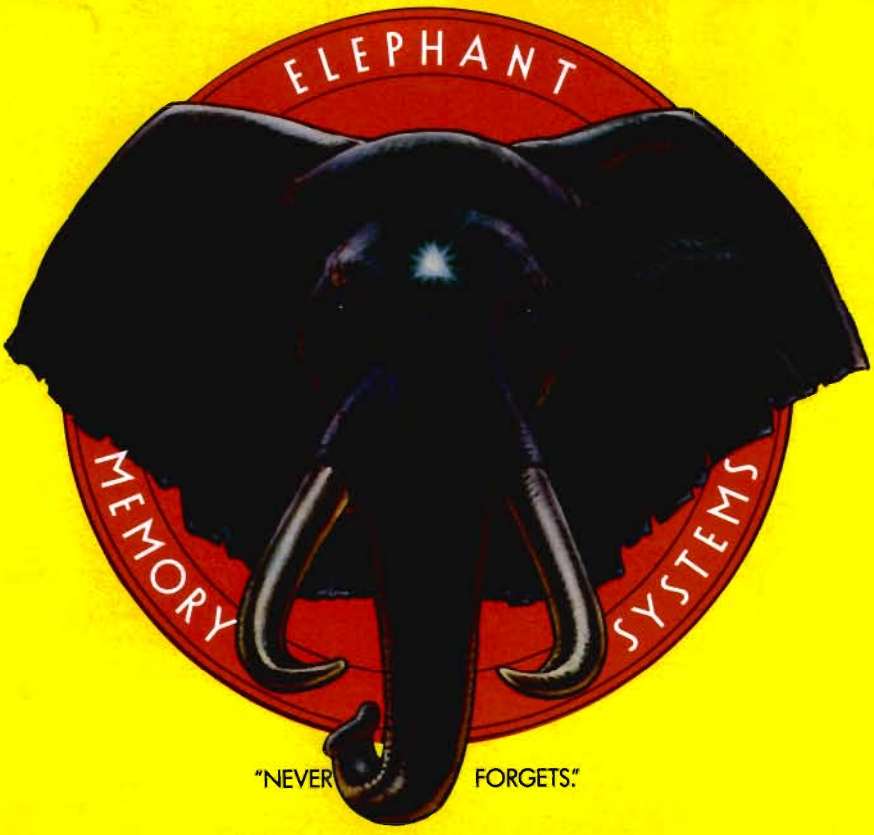
VICTORY SOFTWARE INC.
7 Valley Brook Road, Paoli, PA 19301
(215) 296-3787

Check your local dealer or order directly. **ORDERING** We accept personal checks, money orders, VISA, and MASTER-CHARGE. Charge orders please include number and expiration date. Overseas orders please use charge or have check payable through a U.S. bank. Add $1.50 postage and handling per order. PA residents please add 6% sales tax.

VISA

master charge

REMEMBER:



MORE THAN JUST ANOTHER PRETTY FACE.

Says who? Says ANSI.

Specifically, subcommittee X3B8 of the American National Standards Institute (ANSI) says so. The fact is all Elephant™ floppies meet or exceed the specs required to meet or exceed all their standards.

But just who is "subcommittee X3B8" to issue such pronouncements?

They're a group of people representing a large, well-balanced cross section of disciplines—from academia, government agencies, and the computer industry. People from places like IBM, Hewlett-Packard, 3M, Lawrence Livermore Labs, The U.S. Department of Defense, Honeywell and The Association of Computer Programmers and Analysts. In short, it's a bunch of high-caliber nitpickers whose mission, it seems, in order to make better disks for consumers, is also to make life miserable for everyone in the disk-making business.

How? By gathering together periodically (often, one suspects, under the full moon) to concoct more and more rules to increase the quality of flexible disks. Their most recent rule book runs over 20 single-spaced pages—listing, and insisting upon—hundreds upon hundreds of standards a disk must meet in order to be blessed by ANSI. (And thereby be taken seriously by people who take disks seriously.)

In fact, if you'd like a copy of this formidable document, for free, just let us know and we'll send you one. Because once you know what it takes to make an Elephant for ANSI . . .

We think you'll want us to make some Elephants for you.

ELEPHANT.™ HEAVY DUTY DISKS.

For a free poster-size portrait of our powerful pachyderm, please write us.
Distributed Exclusively by Leading Edge Products, Inc., 225 Turnpike Street, Canton, Massachusetts 02021
Call: toll-free 1-800-343-6833; or in Massachusetts call collect (617) 828-8150. Telex 951-624.