

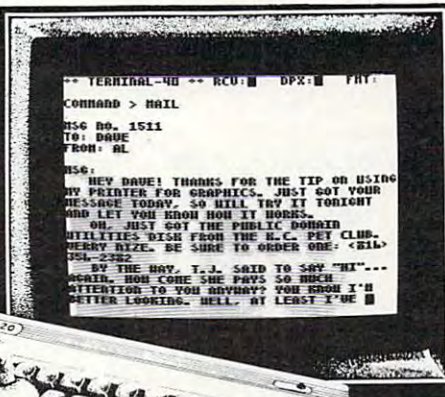
# 40-Column VIC — \$29.95!

But...there's a catch.

We found a way to transform your cramped VIC screen into a 40-column, smooth scrolling text display. So we created *Terminal-40*, a program for communicating by modem with networks such as CompuServe and Source. It's inexpensive, powerful, and a pleasure to use.

But we created a problem, too. Now everyone wants *all* their programs in 40 columns. That's the catch. *Terminal-40* is only for telecommunications. But don't despair...you'll have the *finest* VIC terminal available.

So, plug in your modem and...



## REACH OUT and BYTE SOMEONE!

### TERMINAL-40 ... \$29.95

Requires 8K or larger memory expansion and modem. VIC printer optional. On cassette.

This is just one of our good ideas. Send for a free brochure describing others.



**MIDWEST MICRO associates**

PO BOX 6148, KANSAS CITY, MO 64110

ORDER DESK: open 9 am - 4 pm.

**(816) 254-9600**

VISA/Mastercard add 3% (card # and exp. date)  
C.O.D. add \$3.50

MAIL ORDER: Add \$1.25 shipping and handling. Missouri residents include 4.6% sales tax. Foreign orders payable U.S.\$, U.S. Bank ONLY; add \$5 shipping/handling. Dealer inquiries invited.



## NEW VIC SOFTWARE VIC



COMPUTERMAT • BOX 1664, DEPT C  
LAKE HAVASU CITY, ARIZONA 86403

NEW COMMODORE 64 SOFTWARE — FREE CATALOG  
(602) 855-3357 WRITE FOR FREE CATALOG OF VIC SOFTWARE

WARNING — BUYERS OF THESE GAMES HAVE BEEN KNOWN TO BECOME ADDICTS

### ADVENTURE PAK

By Mark William



VIC-20  
In Text

ADVENTURE PAK  
2 Adventures Included

ADVENTURE — REQUIRES 8K OR 16K MEMORY CARTRIDGE  
CAVES OF SILVER — REQUIRES 8K OR 16K MEMORY CARTRIDGE

**\$12.95 Each**

ADD \$1.00 FOR SHIPPING AND HANDLING

RUNS IN STANDARD VIC-20



### TARGET COMMAND

Color By Cliff Dudzik  
Graphics JOYSTICK  
Sound OR KEYBOARD

SOFTWARE FROM  
**COMPUTERMAT**  
WILL TURN YOUR  
VIC-PET-CBM INTO A  
HOME ARCADE!

WE WELCOME YOUR PERSONAL CHECK



## Program 2.

```
10 GRAPHIC 2
20 REGION 5
50 DEFFNA(X)=INT(RND(1)*X)+1
100 FOR X=1 TO 1023 STEP FNA(10)+10
110 DRAW1,X,0TO1023-X,1023
120 NEXT
200 FOR X=1 TO 1023 STEP FNA(10)+10
210 DRAW1,1023,XTO0,1023-X
220 NEXT
300 FOR X=1 TO 1023 STEP FNA(10)+20
310 DRAW0,X,0TO1023-X,1023
320 NEXT
400 FOR X=1 TO 1023 STEP FNA(10)+20
410 DRAW0,1023,XTO0,1023-X
420 NEXT
500 GOTO 100
```

## Program 3.

```
10 GRAPHIC 2
20 REGION 5
50 DEFFNA(X)=INT(RND(1)*X)+1
100 FOR X=1 TO 1023 STEP FNA(70)+10
110 DRAW1,X,0TO1023,X
120 DRAW1,0,XTOX,1023
130 DRAW1,X,0TO0,1023-X
140 DRAW1,1023,XTO1023-X,1023
150 NEXT
```

## Program 4.

```
10 GRAPHIC 2
20 REGION 5
50 DEFFNA(X)=INT(RND(1)*X)+1
100 FOR A=1 TO 2
110 FOR X=1 TO 1023 STEP FNA(10)+10
120 DRAW1,1023-X,XTOX,0+X
130 DRAW1,X,1023-XTO0+X,X
150 NEXTX,A
```

## Program 5.

```
10 GRAPHIC 2
20 REGION 5
50 DEFFNA(X)=INT(RND(1)*X)+1
100 X=FNA(20):X1=X
120 DRAW1,511-X,511-XTO511+X,511
-XT0511+X,511+XT0511-X,511+XT05
11-X,511-X
130 X=X+X1
140 IFX<511THEN120
```

©

**TOLL FREE**  
Subscription  
Order Line  
**800-334-0868**  
In NC 919-275-9809

# NEW SOFTWARE

### PractiCalc® VIC-20 16K RAM

The extraordinary electronic spreadsheet program that does formula calculations, replicates formulas and data, has adjustable column width and numeric format, over 20 mathematical functions, alpha and numeric sorting, prints, and saves spreadsheets. Tape and disk versions available ..... \$35.00

### Sensational and International Software for Unexpanded VIC-20.

**FLYSNATCHER** - You travel the Australian bush. Your only source of nourishment is flies. Your mission is to avoid the weasel trying to devour you and survive..... \$9.95

**FLOWER POWER** - A flower is trying to exist in the Sahara Desert. You are its sole source of nourishment. Can it depend on you? ..... \$9.95

**MISSILE ATTACK and SUB COMMAND** - (2-game pack) - You have 3 probe ships to destroy bat-like mutants that have evolved from the effects of a nuclear war. Beware!!!..... \$9.95

**SPLATMAN** - A crew of 10 men are repairing the London Bridge. Can you prevent the horrors of an instant death which will be caused by them falling?..... \$9.95

### Sinclair Timex 1000 16K RAM Required

**MUGSY** - You are the boss of a Chicago gang operating a protection racket. Can you survive rival gangs, the cops, and Nick the Greek?..... \$6.95

**MURGATROYDS REVENGE** - The fiendish Murgatroyds are on the warpath again. You must fight off their attack with mines, superglue, decoys, and more!! ..... \$9.95

Other programs for the VIC-20 or SINCLAIR TIMEX 1000 in the areas of home use, business applications educational needs, and other games are available.

Order direct by calling 1-800-343-1078.

## We're looking for new software

CSA is searching for programmers who are creating software for Commodore, Timex, or Atari. We offer you an immediate, wide distribution network. Contact us at the address below.

## We're looking for new dealers

CSA is a distributor for U.S. and foreign software. Call or write us for a complete list of programs.



**COMPUTER  
SOFTWARE  
ASSOCIATES**

50 Teed Dr., Randolph,  
Massachusetts 02368  
617-961-5700



# VIC20™ PERSONAL COMPUTER

## TOP 10 SALE!! ARCADE GAMES (VIC-20 TAPE PROGRAMS)

Rank	Name	List	Sale
1.	Super Paratrooper (Fantastic)	\$24.95	\$19.95
2.	Exterminator-Plus (Better than Centipede)	\$24.95	\$19.95
3.	Cricket (Better than Frogger)	\$24.95	\$19.95
4.	3-D Hackman (3-Dimensional)	\$24.95	\$19.95
5.	Snackman (Better than Pacman)	\$19.95	\$15.95
6.	Bug Blast (Creepy)	\$19.95	\$16.95
7.	Anti Matter Splatter (Nuclear Disaster)	\$24.95	\$19.95
8.	Bombs Away (Great)	\$18.95	\$15.95
9.	3-D Maze-Escape	\$16.95	\$14.95
10.	Krazy Kong	\$16.95	\$14.95

**BUY ANY FOUR — DEDUCT 10% MORE**

## VIC-20 ACCESSORY SALE!!

**1. TRACTION-FRICTION LINE PRINTER** This new COM-STAR deluxe printer, prints 8 1/2" x 11" full size letter quality single, roll or fan fold paper, labels and etc. Impact dot matrix bi-directional 40, 66, 80, 132 columns. Includes interface cable that plugs direct into the VIC-20 computer, no other costly interface is needed. List \$599.00 — Sale \$399.00.

**2. UP TO 60K EXPANSION MODULE** Aero Space designed—6 slot—add up to 6 cartridges—switch select any program. Start and stop any program with reset button—not necessary to remove cartridges or turn off computer, saves time, television and computer (one year warranty) List \$149.00 — Sale \$89.00.

- 10 DAY FREE TRIAL
- WE HAVE THE LOWEST PRICES
- ONE DAY DELIVERY EXPRESS MAIL
- FREE CATALOGS
- WE LOVE OUR CUSTOMERS!

# PROTECTO ENTERPRISES (FACTORY-DIRECT)

BOX 550, BARRINGTON, ILLINOIS 60010  
Phone 312/382-5244 to order



**VIC-20**

## CASSETTE SOFTWARE

A new challenge every time.



### CRABS

Agility is the key to successfully guiding HERBIE (the halibut) through the maze, avoiding the deadly gaze of SONIC CRABS while feeding on delectable night crawlers.

The more you eat, the higher your score. Each time you clear the maze of tasty morsels, you will receive more time, additional lives, and a new group of night crawlers, as the game of SURVIVAL continues.

But beware! With the passing of time your presence becomes increasingly aggravating to the KILLER crabs who lurk within, improving the accuracy of their menacing sonic waves. Set at beginner or advanced levels, each game is played in a totally new maze, and may consist of any number of rounds that start identically for each player.

CRABS can be played using your VIC-20 keyboard or joystick, and will work on all standard VIC-20 memory configurations.

Exciting action for two players.



### TANK WAR

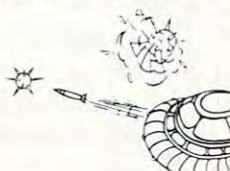
Your opponent watches closely as the BATTLEFIELD unfolds, and you both carefully plan strategies for the pending CONFLICT. Suddenly, both LASER TANKS fire to initiate movement. You begin to thread the way through your home territory, avoiding obstructions and buildings, as you proceed toward enemy ground.

Outscore the rival tank by destroying enemy buildings as well as placing direct hits on your opponent during one to one combat. Higher skill levels will add additional targets, mountain ranges and landmines to the battle zone for increasing EXCITEMENT.

One of three skill levels, with a new battlefield created for each game, provides a new challenge for both players every time.

TANK WAR may be played using your VIC-20 keyboard or paddles, and will work on all standard VIC-20 memory configurations.

The ultimate inter-stellar conflict.



### CYCLONS

Full Hi-Res Graphics, Arcade-Style Action

Continuing with their plan to conquer the universe, the CYTRON EMPIRE has chosen your sector as the first target in our galaxy. As COMMANDER of the protective forces, you must manoeuvre your craft, avoiding collision and enemy missiles, to attack and destroy enemy war ships.

The CYCLON fighters relentlessly enter the battle zone, attempting to lure you into making errors that will lead to your destruction. The menacing PULSAR DEATH SHIP also begins to attack, its only purpose to zero in on your location, chase you down, and put an end to your defense of civilization as we know it.

Our future lies with your skill.

CYCLON requires memory expansion to function. When loaded on a system with a 3K expander (or Super Expander) you will play an advanced level game. Loading the cassette onto a system with 8K or more expansion, you will be allowed to choose between a variety of difficulty/game-feature options. The game is controlled with the VIC-20 joystick.

Skill-testing defense against a new evil.



### CRITTERS

Full Hi-Res Graphics, Arcade-Style Action

While inspecting his prize pumpkin patch, Mr. GREENSLEEVES becomes aware of a flock of strange CRITTERS hovering in the sky above. Without warning small groups begin to leave the formation and dive in order to knock him down and STEAL the fruits of his labour. Armed only with a revolver, he must now DEFEND his crop against this new blight.

You will guide Greensleeves in his COURAGEOUS effort to save the patch. Run or crouch in order to avoid the swooping MENACE, and attempt to exterminate the critters before they can loot the entire crop. Most important, once a pumpkin is stolen, destroy the thief before he can reach the flock (taking care not to hit the pumpkin) or his prize will be your loss.

As the struggle progresses, larger flocks will arrive and the speed of their attack will increase. But don't despair. New pumpkins will grow with your point total providing additional opportunities to successfully fend off the raid. When they succeed in clearing the field, the conflict is over.

CRITTERS requires a minimum of 8K memory expansion and is controlled with your VIC-20 joystick.

Check for availability with your local dealer, or use the order form provided. Dealer enquiries are invited.

FORWARD TO: SYNTAX SOFTWARE INC., 33 ELMHURST AVE., SUITE 502  
WILLOWDALE, ONTARIO, CANADA M2N 6G8 PHONE (416) 221-8008

☐ CERTIFIED CHEQUE  
☐ MONEY ORDER  
Please Forward Charges To  
☐ VISA  
☐ MASTER-CARD  
☐ AMERICAN EXPRESS  
CARD NO. \_\_\_\_\_  
EXPIRY DATE \_\_\_\_\_

PLEASE SEND ME

— CRABS @ \$15.95 (U.S.)/\$18.95 (CDN.) = \_\_\_\_\_

— TANK WAR @ \$15.95 (U.S.)/\$18.95 (CDN.) = \_\_\_\_\_

— CYCLONS @ \$19.95 (U.S.)/\$23.95 (CDN.) = \_\_\_\_\_

— CRITTERS @ \$19.95 (U.S.)/\$23.95 (CDN.) = \_\_\_\_\_

Shipping and Handling @ \$1.00 per Cassette = \_\_\_\_\_

Ontario Residents Please Add 7% Sales Tax = \_\_\_\_\_

TOTAL = \_\_\_\_\_

SIGNATURE \_\_\_\_\_

Please Print

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

POSTAL  
CODE/ZIP

VIC-20 is a registered trademark of Commodore Business Machines Inc.

[www.commodore.ca](http://www.commodore.ca)



# Download/Upload For The Atari

Frank C. Jones, Silver Spring, MD

*Use this to transfer programs and text files to or from your Atari using a modem and the telephone lines.*

---

The program described in this article was developed over several months, with feedback from many people. I started writing it primarily because I was too cheap to go out and buy one. I wanted to try out my new communications hardware and look into some of the electronic bulletin boards that I had heard about. Furthermore, I used a mainframe computer in my work, and I thought that it would be convenient to be able to access it from the privacy of my home.

My first approach was to copy a short BASIC program by Henrique Veludo from **COMPUTE!** (February 1981, #9). This worked fine until I realized that a lot of the text went by too fast for me to read. I tried POKEing the incoming characters into a string, hoping to print it out later, but this was too slow; characters were being dropped, making things a bit hard to read. This led to an assembly language routine to speed things up a bit, and before I knew it I was on my way.

It wasn't long before I had added the upload capability so that I could transfer programs and text files to friends who had computers and modems. About this time I joined the downtown Atari club of Washington, D.C., and discovered their ARMUDIC bulletin board, developed and operated by Frank Huband.

After several weeks of enjoying the capabilities of this system and downloading lots of useful programs, I discovered that some of the members did not have terminal programs that would do some of the things that mine would do. I offered to give my program to the club and subsequently uploaded it to the ARMUDIC BBS.

I got calls about problems. I got calls with complaints. I got calls with suggestions. When I next talked to Frank Huband, I discovered that he had picked up a few suggestions and complaints too. We started working together to incorporate as many of the more reasonable ideas as we could, and over the next few months the program grew.

Since this article was intended to be utilitarian rather than tutorial, I have included no discussion of how the program does what it does. Instead, I have included complete instructions on its use

and the BASIC listing. There are, however, a few peculiarities about the program that should be pointed out before we get into its operation.

## Two Cautions

You may have already noticed that the statements on line 90 are preceded by a REM so that they are not executed. This line is to be used only by those people who find that the BREAK function does not work as described on their machines. The fault lies not in the computer, but in the 850 Interface Module.

Whenever concurrent I/O is turned on, the RS-232 port handler substitutes its own interrupt handlers for the ones in the OS ROM. This is necessary because concurrent I/O handles the serial bus interrupts differently from the way the operating system handles them. The machine language portion of JTERM detected pressing of the BREAK key by sensing what the 850 interrupt handlers did with it. Of course, this was too good to last: newer versions of the 850 Module handle the BREAK key by ignoring it (undocumented).

This leads us to line 90; it's a patch into the interrupt handler (new version) that enables the BREAK key. *Warning:* if the BREAK function works on your machine without line 90, *don't use it*; it will cause a crash if used with the older version handlers. So try it without line 90 first, and remove the REM if you find the BREAK key does nothing when you press it.

A further warning: this program should not be renumbered unless the subroutine at lines 2080-2110 is changed. This routine removes all of the data statements and initialization code after they are used to gain as much memory space as possible for the text buffer. If the program is renumbered and this routine is not changed accordingly, it will perform fatal surgery, and whatever is left won't be of much use. (To find out more about how this routine works, see my article in *COMPUTE!'s Second Book Of Atari*.)

For those of you who have some download capability already, the latest version of this program is available (free) from the ARMUDIC BBS (202) 276-8342. The program is available under the name of JTERM32 (or JTERM33 or... who knows what version will be available by now; this thing seems to have a life of its own). For the rest



# Experience the Magazine of the Future . . .



for the Atari 400/800

The Programmer's Institute's magnetic magazines will entertain, educate, and challenge you.

Each issue features ready-to-load programs ranging from games, adventures, home applications and utilities to personal finance, educational, and our unique teaching programs. Our magazines include fully listable programs, a newsletter containing descriptions and instructions for all programs, and notes on programming techniques used.

Vicvideo for the VIC-20 is here. Call for details.

## ORDERING INFORMATION

Subscriptions*	Cassette	Diskette
Year (10 issues)	\$50.00	\$75.00
½ Year (5 issues)	\$30.00	\$45.00
Trial Issue	\$10.00	\$15.00

\* Add \$2.00 postage and handling.  
ALL SOFTWARE REQUIRES 16K.

orders only, toll free number:

# 1-800-334-SOFT

See your local dealer or order direct:  
**THE PROGRAMMER'S INSTITUTE**

a division of FUTUREHOUSE  
P.O. BOX 3191, DEPT. C  
CHAPEL HILL, NC 27514



for information:

# 1-919-967-0861

Mon-Fri 10-6; Sat 11-3



800 (16K) .....	\$649.00
400 16K .....	\$279.00
400 YOURS to 32K or 48K .....	CALL
410 RECORDER .....	79.00
810 DISK DRIVE .....	449.00
850 INTERFACE .....	165.00
830 MODEM .....	149.00
825 PRINTER .....	575.00
481 ENTERTAINER KIT .....	79.00
484 COMMUNICATOR KIT .....	309.00
PRINTERS — Atari, Epson, Smith Corona .....	CALL

Prices subject to change without notice.

Shipping extra. No tax out of state.

Ca. residents add appropriate taxes.

WE ARE AN AUTHORIZED ATARI SALES AND SERVICE CENTER



## COMPUTERTIME, INC.

P.O. Box 216  
Kentfield, CA 94914

CALL TOLL-FREE 800-227-2520

In California 800-772-4064

For product and price list: send \$2.00 for shipping.



- ARCADE QUALITY CONSTRUCTION
- TWO FIRE BUTTONS (TOP & BASE)
- ADAPTERS TO OTHER COMPUTERS AVAILABLE
- FULL ONE YEAR WARRANTY

FOR ATARI .....	29.95*	
FOR APPLE .....	49.95*	INCL. ADAPTOR
FOR TRS-80 .....	39.95*	INCL. ADAPTOR

\*ADD \$3 PER ORDER FOR POSTAGE AND HANDLING • CHECK, MONEY ORDER, MASTERCARD OR VISA, C.O.D. (C.O.D. CHARGES ADDED) • FLA. RESIDENTS ADD 5% SALES TAX • FOREIGN ORDERS MUST BE PREPAID.



**GATOR MARKETING ENTERPRISES, INC.**

283 E. HWY. 434 • LONGWOOD, FL 32750

(305) 339-3848

DEALER INQUIRIES INVITED — PRICES SUBJECT TO CHANGE



of you, type it in, being very careful with the data statements; an error here will probably make the system crash. Then read the instructions and start communicating.

## Starting Up

JTERM is a download/upload terminal program for the Atari. It was written in BASIC and assembly language to combine ease in setting up and speed when in the actual terminal mode.

Note that an AUTORUN.SYS file with the RS-232 handler boot routine *must* be on disk and booted when you turn on your machine, if you are using a disk. The DOS command will cause the RS-232 handlers to be overwritten, so you must either have a MEM.SAV file on your disk or re-boot the handler after making a DOS call. Furthermore, it appears that the NEW command damages or wipes out the port handler as well. Therefore, you should always reboot the handler after using this command. An additional note: JTERM assumes that the modem is connected to RS-232 port #1. Also, the 850 Interface must be switched on *before* booting the disk.

JTERM is LOADED as a BASIC program, and when RUN it POKES the machine language routine into a string called PROG\$. While this is going on, the screen is black. After this set-up period is over, the first menu appears on the screen, along with information about the size and location in RAM of the available text buffer. All menu choices are made by simply typing the appropriate key that is highlighted in inverse video. (Type an ordinary character, not an inverse video one.)

The first choice to make is whether you wish to Download a file from the host computer or Upload a file to the host computer. If you wish to do simple communication without file transfer, Download is the proper mode to choose. After you choose between the Download and Upload modes, your next choice is between no translation (None), Light translation, and ATASCII. With Light translation, all high order bits are stripped from all outgoing and incoming characters, and the ATASCII EOL character (155) is changed to the ASCII CR character (13) on output and vice versa on input. No translation and ATASCII modes means that the 850 Interface Module does no changing of characters during either input or output. However, be warned that the program does some translation itself – more about that later.

The next choice is between the various modes of outgoing parity setting. (Note: incoming parity is not checked or changed by this program.) You should always select None if you have selected no translation because setting the parity on output will change the high order bit that was presumably

to be preserved. This option was included for the users who wish to access mainframe computers that require certain parity configurations.

At this point, if you choose Upload you will be asked for the filespec of the file to be uploaded. When this has been entered, the file will be loaded into RAM and then listed to the screen as a check. You will then enter the terminal mode. But if you choose Download, you will go directly from the parity choice to the terminal mode without going through the file loading routine.

## Terminal Operations

Whenever you enter the terminal mode, the flag (i.e., inverse video word) TERMINAL will appear at the top of the screen. This informs you that you are now in the machine language portion of JTERM. While you are in this mode, you may send data to and receive data from a host computer, provided all of the appropriate connections have been made. You may toggle the memory save function off and on by pressing the SELECT button; the flags MEMSTORE ON and MEMSTORE OFF will be printed on the screen as you toggle the memory.

While the memory save option is in effect, all incoming characters will be stored in sequence until the buffer is full. If the buffer should fill up, the flag MEMORY FULL will be printed on the screen. Note: If you have filled your buffer prior to an Upload, you should *not* turn on the memory save feature until you have completed the Upload. Otherwise, the incoming characters will overwrite your file.

When you enter the terminal mode, you will be in full duplex (i.e., only those characters that are received are printed on the screen and stored in memory). If the host computer echoes all characters that it receives, these characters will be incoming and will be printed and saved if desired. If the host computer operates in half duplex, it cannot send and receive at the same time, so it will not echo the characters that it receives from you. In this case you should turn on the half duplex mode. You can toggle between half and full duplex by pressing the OPTION button. Whenever you do, the flags HALF DUPLEX and FULL DUPLEX will be printed on the screen as appropriate.

## Leaving Terminal Mode

When you are ready to leave the terminal mode, you may do so by pressing the START button. When you do, one of three things will happen, depending on the circumstances. If you have chosen the Upload option and have not yet uploaded the file, you will go into the upload mode. The flag UPLOADING will appear on your screen, and the buffer will be printed, 25 characters at a



time, to the computer on the other end of the line. During this period you will still see all incoming characters displayed on your screen, so, if the host computer is echoing your transmission, you can watch the upload progress. When the upload is complete, you will reenter the terminal mode, this time in Download mode.

If you exit the terminal mode without saving anything to memory, you will automatically bail back out to the main menu, and you may start another session with different parameters if you wish.

If you were in Download mode and saved anything at all in memory, when you press START you will be asked for the filespec of the file to which you wish to save your memory, or you can type RETURN for further options (more about this in a moment). If you enter a filespec, this can be the cassette (C:), the printer (P:), the screen editor (E:), or a disk file (D:FILENAME). After you enter the filespec, the saved memory will be written to the file, and you will be told that you may reenter the terminal mode by pressing START.

If, however, you wish to save the memory to another file before returning to the terminal mode, press START and, *before releasing the start button*, press the OPTION button. This will bring you back to the request for a filespec. This may be repeated as many times as wished.

If you simply type RETURN instead of a filespec, you will be presented with a menu of three alternative choices. Pressing OPTION will erase your memory buffer and return you immediately to the terminal mode without changing any parameters. Pressing START will erase the buffer and return you to the main mode selection menu where you may reset any or all parameters. Finally, pressing SELECT will return you to the main mode menu while *preserving* everything saved in the memory buffer.

## Internal Translations And Other Features

When you choose between Light and No translation in the second menu, you are choosing the configuration of your 850 Interface Module RS-232 ports. You should read your 850 instruction manual for information about these configurations. This program does some additional translation of its own, however.

First of all, nothing that comes in from the port is changed at all before it is stored in memory. Therefore, if you choose ATASCII or No translation for your port, you will save in memory everything *exactly* as it was sent. There will be some translation, however, before it is displayed on the screen. For example, no control characters (ASCII values < 32) are displayed. This means, for in-

stance, that you will not see line feeds; they will, however, be stored and can mess up a program that you are downloading. You should *not* ask for line feeds; you do *not* need them even if the test messages are single spaced.

The carriage return character (ASCII 13) is translated to the ATASCII EOL character. The printer bell character (ASCII 7) is translated to the console bell (ATASCII 253). Finally, the ASCII backspace character (ASCII 8) is changed to the ATASCII DELETE/BACKSPACE (ATASCII 126). Again, none of this translation affects what is stored in memory; everything is stored exactly as it is received.

In ATASCII mode, no translation is done on any outgoing characters; everything is sent exactly as it comes from the keyboard. In the No translation mode, two characters are changed. The DELETE/BACKSPACE character is changed to the ASCII backspace character so that the key will have the same function with most host computers that it does in the Atari. Also, the RETURN key or EOL (ATASCII 155) is changed to the ASCII carriage return (ASCII 13) before it is sent. In light translation, the 850 module would do this translation automatically, but in the no translation mode it would not be done. There were enough situations in which inverse video characters (ASCII values >= 128) could be sent and received, but the host computer would still not recognize the EOL character to warrant this feature.

In half duplex operation, after a character has been sent to the port it is handed over to the input routine and handled just like any other incoming character.

An additional feature of JTERM is the ability to send a computer "BREAK" by simply pressing the BREAK key. This will cause the screen to flash, a beep to sound, the flag BREAK to be printed on the screen, and, last, a true break signal (approx. 0.5 sec. of SPACE tone) to be sent. (If all of this doesn't happen, see the discussion in the introduction.) Sending the BREAK signal will not be of much use when you are connected to a BBS since most of them do not recognize it, but it can be essential when you are connected to a mainframe computer whose attention cannot be gotten any other way.

You should note, however, that the BREAK routine passes briefly through BASIC. Should it be pressed more than once in rapid succession, you can cause a standard BASIC BREAK and terminate the program. If you should terminate the program, accidentally or on purpose, do not attempt to re-RUN it. Instead, *restart it with GOTO 100*. When the program is RUN for the first time, all of the DATA statements and most of the initialization statements are removed to make more room for the buffer; it cannot, therefore, be re-



initialized without crashing.

One added note: when the terminal mode is entered for the first time, the DTR line on RS-232 port #1 is set for those modems that monitor this line.

## Guidelines For Using JTERM

The JTERM menus were designed to provide maximum flexibility in communicating with many different types of computers, terminals, and bulletin board systems. This may cause some confusion, so here are some general guidelines:

- Most often, you will select Download, Light Translation, No Parity, and Full Duplex. This should work fine when communicating with information utilities such as CompuServe and The Source, as well as with most bulletin boards.

- For communicating between Ataris, choose the ATASCII mode instead of Light Translation. This allows full compatibility between characters sent and received. Also select half duplex instead of full duplex.

- For downloading TRS-80 graphics from TRS-80 bulletin board systems, choose No Translation.

- Usually you won't have to select a Parity option unless communicating with a mainframe computer.

- The half/full duplex option accomplishes with software what the half/full duplex switch on some modems does with hardware. This option was included for those users whose modems lack the duplex switch.

```
10 REM JTERM{3 SPACES}(VERSION 3.2)
   {12 SPACES}by Frank C. Jones July 1
   0, 1982
20 DIM PROG$(379), PROG2$(7), SPOOL$(15
   ), IN$(26)
30 CON=53279:POKE 559,0:IF PEEK(ADR(P
   ROG$))=104 AND PEEK(ADR(PROG$)+378
   )=216 THEN 50
40 FOR I=1 TO 379:READ A:PROG$(I,I)=C
   HR$(A):NEXT I
50 DIM MSG$(65):RESTORE 2000:FOR I=1
   TO 65:READ A:MSG$(I,I)=CHR$(A):NEX
   T I
60 DIM S$(5), T$(8), U$(9):FOR I=1 TO 5
   :READ A:S$(I,I)=CHR$(A):NEXT I:FOR
   I=1 TO 8:READ A:T$(I,I)=CHR$(A):N
   EXT I
70 FOR I=1 TO 9:READ A:U$(I,I)=CHR$(A
   ):NEXT I:DIM BR$(7):FOR I=1 TO 7:R
   EAD A:BR$(I,I)=CHR$(A):NEXT I
80 FOR I=1 TO 7:READ A:PROG2$(I,I)=CH
   R$(A):NEXT I:FLAG=0
90 REM FOR I=1 TO 3:READ A:POKE 8457+
   I,A:NEXT I:FOR I=1 TO 8:READ A:POK
   E 1663+I,A:NEXT I
95 GOSUB 2080:N=FRE(0)-256:DIM TXT$(N
   )
100 SETCOLOR 2,9,0:PROG$(200,200)=CHR
   $(13):PROG$(192,192)=CHR$(8)
110 POKE 82,0:PRINT "{CLEAR}";
120 PRINT N-1;" BYTES OF MEMORY AVAIL
   ABLE":PRINT "FROM-";ADR(TXT$);" T
```

```
0-";ADR(TXT$)+N-2
130 CLOSE #1:OPEN #1,4,0,"K"
140 POKE 752,1:PRINT "{2 DOWN}{TAB}Op
   eration Mode:";PRINT :PRINT "
   {TAB}";CHR$(196);"ownload":PRINT
   :PRINT "{TAB}";CHR$(213);"pload"
150 POKE 559,34:POKE 752,0:GET #1,ANS
   :IF ANS=68 THEN UPLD=0:GOTO 180
160 IF ANS=85 THEN UPLD=1:GOTO 180
170 GOTO 110
180 POKE 752,1:PRINT "{CLEAR}{2 DOWN}
   {TAB}Translation Mode:";PRINT :PR
   INT "{TAB}";CHR$(206);"one":PRINT
   :PRINT "{TAB}";CHR$(204);"ight"
190 PRINT :PRINT "{TAB}";CHR$(193);"T
   ASCII"
200 POKE 752,0:GET #1,ANS:IF ANS=76 T
   HEN MODE=0:GOTO 240
210 IF ANS=78 THEN MODE=32:GOTO 240
220 IF ANS=65 THEN MODE=32:PROG$(200,
   200)=CHR$(155):PROG$(192,192)=CHR
   $(126):GOTO 240
230 GOTO 180
240 POKE 752,1:PRINT "{CLEAR}{2 DOWN}
   {TAB}Parity:";PRINT :PRINT "{TAB}
   ";CHR$(206);"one":PRINT :PRINT "
   {TAB}";CHR$(207);"dd"
250 PRINT :PRINT "{TAB}";CHR$(197);"v
   en":PRINT :PRINT "{TAB}";CHR$(211
   );"et"
260 POKE 752,0:GET #1,ANS:IF ANS=78 T
   HEN PARITY=0:GOTO 310
270 IF ANS=79 THEN PARITY=1:GOTO 310
280 IF ANS=69 THEN PARITY=2:GOTO 310
290 IF ANS=83 THEN PARITY=3:GOTO 310
300 GOTO 240
310 IF UPLD THEN GOSUB 490
320 PRINT "{CLEAR}{2 TAB}";T$:POKE 65
   ,0:IF NOT FLAG THEN A=ADR(TXT$)
330 CLOSE #2:OPEN #2,13,0,"R":XIO 38,
   #2,MODE+PARITY,0,"R":XIO 34,#2,19
   2,0,"R":XIO 40,#2,0,0,"R"
340 A=USR(ADR(PROG$),A,ADR(TXT$)+N-1,
   ADR(MSG$)):IF PEEK(207)=128 THEN
   590
350 IF A=ADR(TXT$) AND NOT UPLD THEN
   CLOSE #2:GOTO 100
360 ON UPLD+1 GOSUB 430,650
370 IF UPLD THEN UPLD=0:TXT$="":GOTO
   320
380 PRINT "PRESS ";S$;" TO RE-ENTER T
   ERMINAL MODE"
390 IF PEEK(CON)<>6 THEN 390
400 IF PEEK(CON)=6 THEN 400
410 IF PEEK(CON)=2 THEN 360
420 GOTO 320
430 CLOSE #2:"{CLEAR}{4 DOWN}{TAB}E
   NTER OUTPUT FILENAME:"?"
   {4 SPACES}OR HIT <RETURN> FOR OPT
   IONS:"? :? "{TAB}";
435 POKE 702,64:POKE 65,3:TRAP 560:IN
   PUT SPOOL$:FLAG=0:IF SPOOL$<>"" T
   HEN 470
440 ? "{CLEAR}{2 DOWN}<START> erases
   buffer; to menus":? "<SELECT> ret
   ains buffer; to menus":? "<OPTION
   > erases buffer; to terminal"
445 I=PEEK(CON):IF I=5 THEN FLAG=1:GO
   TO 100
450 IF I=6 THEN 100
460 IF I=3 THEN 320
465 GOTO 445
```



```

470 CLOSE #3:OPEN #3,8,0,SP00L$:IF SP
    00L$(1,1)="E" THEN SETCOLOR 2,9,0
480 TXT$(A-ADR(TXT$)+1)=" ":PRINT #3;
    TXT$:CLOSE #3:RETURN
490 PRINT "{CLEAR}{4 DOWN}{TAB}ENTER
    UPLOAD FILENAME":PRINT :PRINT "
    {TAB}";:POKE 702,64:INPUT SP00L$:
    TXT$=""
500 TRAP 560:CLOSE #3:OPEN #3,4,0,SP0
    0L$:TRAP 4:POKE 65,3
510 AD=ADR(TXT$):XX=INT(AD/256):WW=AD
    -XX*256:ZZ=INT((N-1)/256):YY=(N-1
    )-ZZ*256
520 IOCB=3:GOSUB 620:TXT$(QQ+1)=" "
530 IF PEEK(883)=136 THEN 550
540 PRINT "ERROR ";PEEK(883);" DURING
    TEXT LOAD":STOP
550 CLOSE #3:PRINT TXT$:FOR I=1 TO 50
    0:NEXT I:RETURN
560 PRINT "{CLEAR}{4 DOWN}{TAB}UNABLE
    TO OPEN ";SP00L$:PRINT "{TAB}PRE
    SS ";S$;" WHEN READY"
570 IF PEEK(CON)<>6 THEN 570
580 GOTO PEEK(186)+256*PEEK(187)-10
590 CLOSE #2:SETCOLOR 2,13,10:SOUND 0
    ,30,10,15:XIO 34,#2,2,15,"R":FOR
    I=1 TO 20:NEXT I:XIO 34,#2,3,0,"R
    "
600 SOUND 0,0,0,0:SETCOLOR 2,9,0
610 PRINT BR$:GOTO 330
620 POKE 834+IOCB*16,7:POKE 836+IOCB*
    16,WW:POKE 837+IOCB*16,XX:POKE 84
    0+IOCB*16,YY:POKE 841+IOCB*16,ZZ
630 K=USR(ADR(PROG2$),IOCB*16)
640 QQ=PEEK(840+IOCB*16)+256*PEEK(841
    +IOCB*16):RETURN
650 PRINT "{CLEAR}{4 DOWN}{2 TAB}";U$
660 LL=LEN(TXT$):LN=INT(LL/25)+1
670 FOR I=1 TO LN
680 IF I=LN THEN PRINT #2;TXT$((I-1)*
    25+1);:GOTO 700
690 PRINT #2;TXT$((I-1)*25+1,I*25);
700 STATUS #2,B:BY=PEEK(747):IF BY TH
    EN GET #2,A:PRINT CHR$(A);:GOTO 7
    00
710 NEXT I
720 FOR I=1 TO 20
730 STATUS #2,B:BY=PEEK(747):IF BY TH
    EN GET #2,A:PRINT CHR$(A);:GOTO 7
    30
740 NEXT I
750 PRINT "{TAB}UPLOAD COMPLETE":FOR
    I=1 TO 500:NEXT I:RETURN
1000 DATA 104,104,133,213,104,133,212
    ,104,133,215,104,133,214,104,133
    ,225,104,133,224,169,128,133,216
    ,169,0
1010 DATA 133,226,133,207,172,31,208,
    192,7,240,112,192,6,208,1,96,192
    ,5,208,32,172,31,208,192,5
1020 DATA 240,249,164,216,192,255,240
    ,90,152,73,128,133,216,208,6,169
    ,12,133,217,208,36,169,25,133,21
    7
1030 DATA 208,30,192,3,208,67,172,31,
    208,192,3,240,249,164,226,152,73
    ,128,133,226,208,6,169,51,133
1040 DATA 217,208,4,169,38,133,217,24
    ,165,224,101,217,141,68,3,165,22
    5,105,0,141,69,3,169,14,141
1050 DATA 72,3,169,0,141,73,3,169,11,
    141,66,3,162,0,32,86,228,169,0,2
    40,2,240,137,173,252
DATA 2,201,255,240,54,162,32,169
    ,11,157,66,3,169,0,157,72,3,157,
    73,3,162,16,157,72,3
1070 DATA 157,73,3,169,7,157,66,3,32,
    86,228,201,126,208,4,169,8,208,6
    ,201,155,208,2,169,13
1080 DATA 162,32,32,86,228,164,226,20
    8,50,165,17,208,9,169,128,133,17
    ,133,207,96,240,243,162,32,169
1090 DATA 13,157,66,3,32,86,228,173,2
    35,2,201,0,240,163,169,7,157,66,
    3,169,0,157,72,3,157
1100 DATA 73,3,32,86,228,192,154,240,
    210,164,216,208,10,162,0,129,212
    ,230,212,208,2,230,213,201,13
1110 DATA 208,4,169,155,208,20,201,7,
    208,4,169,253,208,12,201,8,208,4
    ,169,126,208,4,201,32,144
1120 DATA 18,160,11,140,66,3,160,0,14
    0,72,3,140,73,3,162,0,32,86,228,
    165,215,197,213,144,16
1130 DATA 240,2,208,136,165,214,197,2
    12,144,6,240,4,169,0,240,135,169
    ,255,133,216,165,224,141,68,3
1140 DATA 165,225,141,69,3,169,13,141
    ,72,3,169,0,141,73,3,169,11,141,
    66,3,162,0,32,86,228
1150 DATA 169,0,240,216
2000 DATA 155,205,197,205,207,210,217
    ,160,198,213,204,204,155,205,197
    ,205,211,212,207,210
2010 DATA 197,160,207,206,160,155,205
    ,197,205,211
2020 DATA 212,207,210,197,160,207,198
    ,198,155,200,193,204,198,160,196
    ,213,208,204,197,216,160,155
2030 DATA 198,213,204,204,160,196,213
    ,208,204,197,216,160,155
2040 DATA 211,212,193,210,212
2050 DATA 212,197,210,205,201,206,193
    ,204
2060 DATA 213,208,204,207,193,196,201
    ,206,199,155,194,210,197,193,203
    ,155,104,104,104,170,76,86,228
2070 DATA 32,128,6,141,14,210,169,0,1
    33,17,96
2080 POKE 842,13:?"{CLEAR}":POSITION
    2,6:FOR I=1000 TO 1150 STEP 10:
    ? I:NEXT I:?"CONT":POSITION 0,0
    :STOP :LIST 100,200
2090 ? "{CLEAR}":POSITION 2,6:FOR I=1
    0 TO 90 STEP 10: ? I:NEXT I:?"CO
    NT":POSITION 0,0:STOP :LIST 100,
    200
2100 ? "{CLEAR}":POSITION 2,6:FOR I=2
    000 TO 2100 STEP 10: ? I:NEXT I:?"
    G.2110":POSITION 0,0:STOP
2110 POKE 842,12:RETURN

```

©

**COMPUTE!**  
The Resource.



# Commodore 64 Architecture

Jim Butterfield, Associate Editor

*This guided tour of the new Commodore 64 allows you a peek inside the computer's structure and demonstrates some of its extraordinary features.*

---

Let's build a Commodore 64 – at least in principle. We'll put the memory elements together and see how they all fit.

## RAM – 64K

We start with a full 64K of RAM. That's the maximum amount of memory that the 6510 chip can address.

If we stopped at this point, we'd have problems. First of all, the screen is fed from memory, but it would contain nonsense. We'll need to put in two extra things: a video chip, and a character generator for the video chip to use. Then again, we have no programs of any sort, and no way to get them into RAM.

## Building It Out

Here's what we will do: we'll add the extra features we need by piling them on top of RAM. That way, RAM will be "hidden" – if we look at that part of memory, we will see the new memory elements. But we'll include a set of switches which will allow us to "flip away" the overlaying material and expose the RAM beneath any time we choose. More about these later.

Keep in mind: the RAM is still there, but it's hidden behind the new memory chips.

## Input/Output

We'll take the block of memory at hexadecimal D000 to DFFF and reserve it for our interface chips. This includes: two CIA's for timing and input/output, a SID chip for sound, and a video chip to deliver a screen to the television set.

About the 6566 video chip: its "registers" are located at hex D000 to D02E; these locations control how the chip works. But when the video chip needs information to put on the screen, it gets it

directly from RAM memory. For example, the usual place for the screen characters is hex 0400 to 07E7. There's a distinction here: we control or check the chip by using its register addresses, but the chip gets information from almost anywhere it likes.

The video chip needs to look at RAM to get characters for the screen. It also needs to look somewhere else to get a "picture" of each character; this allows it to light up the individual dots, or "pixels," that make up a character. There needs to be a table which gives details of each character: what it looks like, and how to draw it. This table is called the "Character Base" table; hardware types may just call it the "character generator."

We could put this character base table in RAM and point the video chip to it. In fact, we are likely to do this if we want to define our own graphics. But on a standard 64, we'd just as soon have these characters built in – in other words, we'll put the character base table into ROM memory.

Now comes the tricky bit. We will put our ROM character base (it's 4K long when we allow for both graphics and text) into locations hex D000 to DFFF. Wait a minute! We just put our interface chips there!

No problem. We just pile the memory elements higher. The ROM character base sits above the RAM, and then we put the I/O on top. Any time we peek these locations, we'll see the I/O. The video chip, by the way, has a special circuit allowing it to go directly to the ROM character base, so there's no confusion there.

If you wanted to look at the character ROM, you'd have to flip it to the top somehow. It turns out you are allowed to do this: clearing bit two (mask four) of address one to zero will do the trick. But be sure you disable the interrupt first, or you're in serious trouble. After all, the interrupt routines expect the I/O to be in place. Bit 2 of address 0 is called the CHAREN control line.

Let's look at a small part of the character base – in BASIC! Be sure to do this on a single line, or as part of a program. First, to turn the interrupt off and back on again:

```
POKE 56333,127: ... : POKE 56333,129
```

Now, while the interrupt is in force, flip in the character base:

```
POKE 56333,127:POKE 1,51: ... POKE 1,55:POKE 56333,129
```

Finally, let's PEEK at part of a character:

```
POKE 56333,127:POKE 1,51:X = PEEK(53248): POKE 1,55:POKE 56333,129:PRINT X
```

You should see a value of 60; this is the top of the "@" character. To see its pixels, we would write it in binary as ..xxxx.. and to see the next



# COMPU \$ENSEI

## VIC-20®

VIC-20®	Personal Computer	\$179.95
VIC-1011A	RS232C Interface	39.95
VIC-1515	Printer	334.95
VIC-1530	Datasette	67.50
VIC-1540	Disk Drive	349.95
VIC-1111	16K RAM Exp.	99.95
VIC-1110	8K RAM Exp.	52.50
VIC-1210	3K RAM Exp.	34.95
VIC-1010	Expansion Module	139.95
VIC-1311	Joystick	9.95
VIC-1312	Game Paddles	19.95
VIC-1600	Telephone Modem	99.95

## BUSINESS & HOME APPLICATIONS

WB101	Total Text 2.5	\$24.95
WB102	Total Labels	19.95
WB103	Total Research	24.95
WB104	Predicator-Linear Regression	16.95
PB105	Billing Solver (20 & 64)	19.95
PB106	Utility Bill Saver (20 & 64)	12.95
WB107	The Gasoline UnGuzzler (20 & 64)	15.95
WB107	Accounting	29.95
WB108	Accounts Receivable	21.95
WB109	Calculator	12.95
WB110	Order Tracker	18.95
WB111	Business Inventory	19.95
WB112	Depreciation	10.95
WB113	Ratios	9.95
WB114	Cash Flow	14.95
WB115	Net Worth	14.95
WB116	Lease / Buy	14.95
WB117	Mortgage Calculator	10.95
WB118	Mortgage Comp.	10.95
WB119	Loan Amortiser	24.95
WB120	Loan Repayer	10.95
WB121	Phone Directory	9.95
WB122	Client Tickler	19.95
WB123	Estimates & Bids	14.95
WB124	Bar Charts	9.95
WB125	Stock Ticker Tape	16.95
WB126	Regress on VIC-20, 64	16.95
WB127	P.E.R.T. MY VIC	15.95
WB128	Business Appointments	13.95
WB129	The Predictor-Linear	16.95
PT130	Billing Solver VIC-20, 64	19.95
PT132	Utility Bill Solver VIC-20, 64	12.95
WB134	Nuismatic Panatic VIC-20, 64	15.95
WB135	The Pill Box VIC-20, 64	14.95
PT136	Club Lister VIC-20, 64	14.95
WB137	Mother's Recipes VIC-20, 64	12.95
WB139	Terminal 40	29.95
WB140	Minimon	11.79
WB141	Typewriter	27.95
WB142	Data Files	14.95
SB143SS	Mailing List (Tape) (Disk)	19.95 24.95

## CARDBOARD 6

\$79.95

(Special Christmas Price — after Dec. 15, back to \$99.95)  
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

\$29.95

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.

## CARDRITER

\$29.95

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

## GAMES FOR ALL

WG101	Adventure Land (Cart.)	\$37.95
WG102	Mission Impossible (Cart.)	37.95
WG103	Gorf (Cart.)	37.95
WG104	Omega (Cart.)	37.95
WG105	Money Wars	28.95
WG106	Breakout	9.95
WG107	Hangman	9.95
WG108	Monks	7.95
WG109	Tank	17.95
WG110	Simmon	15.95
WG111	Pac Bomber	15.95
WG112	Dam Bomber	15.95
WG113	Cube	14.95
WG114	Spider from Mars	37.95
WG115	Exterminator Plus	19.95
WG116	3-D Hackman	19.95
WG117	Snackman	19.95
WG118	Anti-Matter Splatter	19.95
WG119	Bombs Away	15.95
WG120	3-D Maze Escape	14.95
WG121	Krazy Kong	14.95
WG122	Alien Panic	14.95
WG123	Rescue from Nufon	14.95
WG124	Escapes	14.95
WG125	Journey	14.95
WG126	Invasion	14.95
WK101	Help Chicken Little	14.95
WK102	Mole Attack	19.98
WK103	Car Chase	19.98
WK104	Blue Meanies	11.95
WK105	Space Math	11.95
WK106	Super Slither	11.95
WK107	Spiders of Mars	11.95
WS101	Cribbage	14.95

## EDUCATION

WE101	Find the Words (20 & 64)	\$10.95
WE102	Temperature Converter (20 & 64)	9.95
PE103	The Mathamagican (20 & 64)	14.95
PE104	The Metric Brain (20 & 64)	10.95
WE105	Money Addition Grades 4th & 5th (20)	9.95
WE106	My Body - Elementary (20)	9.95
WE107	Graphics (20)	17.95
WE108	Diagramming Sentences (20)	12.95
WE109	Fraction Reduction (20)	9.95
WE110	Countries (20)	9.95
WE111	Spell (20)	9.95
WE112	State Capitols (20)	9.95
WE113	Tutor Math (20)	9.95
WE115	Math Whiz (20)	12.95

### TO ORDER:

P.O. Box 18765  
Wichita, KS 67218  
(316) 684-4660

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, Inc.

Prices subject to change.





line of pixels we would repeat the above code with `X = PEEK(53249)`.

Remember that this is ROM; we can PEEK but can't POKE. If we wanted a new character set, we would point the video chip to some new location.

## Kernal ROM

To allow the computer to work at all, we must have an operating system in place. The 64's system is called the Kernal: it's in ROM, and placed above RAM at addresses E000 to FFFF.

We can flip the Kernal away and expose the RAM beneath by clearing bit one (mask two) of address one. Be very careful! The computer can't exist for long without an operating system. Either put one into the RAM, or be prepared for a crash.

Even if you flip out the Kernal for a moment, you must be sure to disable the interrupt. The interrupt vectors themselves are in the Kernal; if the interrupt strikes while the Kernal is flipped away, we'll have utter confusion.

Flipping out the Kernal automatically flips out BASIC as well. So bit 1 of address 1, called the HIMEM control bit, switches out both ROMs. We can switch BASIC alone, however, by using bit 0 – the LOMEM control bit.

## BASIC ROM

To run BASIC, we have another ROM which is placed above RAM at addresses A000 to BFFF. We may flip it out by clearing bit zero (mask one) of address one.

This is a very useful thing to do. When a word processor, spread sheet calculator, or other program is in the computer, we may not need BASIC at all. Flip it away, and we have extra memory for our program.

## Do Your Own BASIC

We can do even more. If we copy BASIC – carefully! – from its ROM into the RAM behind it, we can get BASIC-in-RAM ... a BASIC we can change to meet our own needs.

Let's do this, just to show how. Write the following program into your Commodore 64:

```
100 FOR J = 40960 TO 49151
110 POKE J, PEEK(J)
120 NEXT J
```

Run the program. It will take a minute or so. While it's running, let's talk about that curious line 110. What's the point in POKEing a value into memory identical to what's already there? Here's the secret: when we PEEK, we see the BASIC ROM; but when we POKE, we store information into the RAM beneath.

The program should say READY; now we have made a copy of BASIC in the corresponding RAM. Flip the ROM away with `POKE 1,54`. If the cursor is still flashing, we're there. BASIC is now in RAM. How can we prove this?

Let's try to fix one of my pet peeves (PET peeves?). Whenever I try to take the ASC value of a null string, BASIC refuses. Try it:

```
PRINT ASC(" ")
```

.. will yield an ?ILLEGAL QUANTITY ERROR.

Now, it's my fixation that you should be able to take the ASCII value of a null string, and have BASIC give you a value of zero. (Don't ask why; that would take a couple more pages). By peering inside BASIC, I have established that the situation can be changed by modifying the contents of address 46991. There is usually a value of eight there. Normally, we couldn't change it: it's in ROM. But now BASIC is in RAM, and we'll change the ASC function slightly by:

```
POKE 46991,5
```

Now try `PRINT ASC(" ")`; it will print a value of zero. In every other way, BASIC is exactly the same.

Just for fun: you can change some of BASIC's keywords or error message to create your own style of machine. For example, `POKE 41122,69` changes the FOR keyword ... you must type the new keyword to get the FOR action. Say LIST and see how line 100 has changed. Alternatively, `POKE 41230,85`; now you must say LUST instead of LIST.

You may go back to ROM BASIC at any time with a `POKE 1,55`.

## Combination Switch

When we use the HIMEM control to flip out the Kernal, BASIC ROM is also removed. Is there any point in flipping both HIMEM and LOMEM? If you do, the I/O and character generator also disappear, giving you a solid 64K of RAM. You can't talk to anybody, since you have no I/O ... but you can do it.

We have named three control lines: CHAREN, which flips I/O with the character base; HIRAM, which flips out Kernal and BASIC ROMs; and LORAM, which controls BASIC. In my memory maps (**COMPUTE!** #29, October 1982), I've called them D-ROM switch, EF-RAM switch, and AB-RAM switch in an attempt to make them more descriptive.

But there are two other control lines, and your program cannot get to them. They are called EXROM and GAME and may be changed only by plugging a cartridge into the expansion slot. When these lines are switched by appropriate wiring



# COMPU SENSE!

## CARDBOARD 6

**\$79.95**

(SPECIAL CHRISTMAS PRICE — after December 15, back to \$99.95)  
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

**\$29.95**

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

## CARDRITER

**\$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) 684-4660

Personal Checks Accepted (Allow 3 Weeks)  
or C.O.D. (Add \$2) Handling Charges \$2.00

## COMPUTE! Subscriber Services

Please help us serve you better. If you need to contact us for any of the reasons listed below, write to us at:

**COMPUTE! Magazine**  
P.O. Box 5406  
Greensboro, NC 27403

or call the Toll Free number listed below.

**Change Of Address.** Please allow us 6-8 weeks to effect the change; send your current mailing label along with your new address.

**Renewal.** Should you wish to renew your **COMPUTE!** subscription before we remind you to, send your current mailing label with payment or charge number or call the Toll Free number listed below.

**New Subscription.** A one year (12 month) US subscription to **COMPUTE!** is \$20 (2 years, \$36; 3 years, \$54. For subscription rates outside the US, see staff page). Send us your name and address or call the Toll Free number listed below.

**Delivery Problems.** If you receive duplicate issues of **COMPUTE!**, if you experience late delivery or if you have problems with your subscription, please call the Toll Free number listed below.

**COMPUTE!**  
**800-334-0868**  
In NC 919-275-9809

## YOU DON'T HAVE TO BE A PIRATE TO AFFORD TOTL SOFTWARE for the VIC 20\* and COMMODORE 64\*



### WORD PROCESSING

Full capability word processing. Word-oriented—not a line editor. Menu-driven. Outstanding features including: footnotes, headings, footing, keyboard input, special printer control, and more. VIC: TOTL.TEXT 2.5 **\$35.00**  
64: TOTL.TEXT 2.6

### MAILING LIST and LABELS

Easy editing, automatically sorted, optional non-printing data line(s), browse and select functions. Menu-driven. **\$20.00**  
VIC or 64: TOTL.LABEL 2.0

### KEYWORD CROSS REFERENCE

Students and authors: keep track of reference notes and bibliographies. Quick reference by keyword. Requires printer. **\$25.00**  
VIC or 64: RESEARCH ASSISTANT 2.0

### TIME MANAGEMENT

Keep track of activities by date (and time). Screen inquiry by date, person, project. 56 different bar chart formats available. **\$25.00**  
VIC or 64: TOTL.TIME MANAGER 2.0

### BUSINESS ACCOUNTING

Accounts receivable and payable, inventory and expense tracking. Print invoices, statements, reports. Disk only. **(To be announced)**

### SPECIAL VERSIONS AVAILABLE for QUANTUM DATA INC. 40/80 COLUMN VIDEO BOARD.

All programs work with disk and/or tape; VIC or RS-232 printers. VIC requires minimum 8K expansion.

## LOOK for TOTL Software at your Dealer or order direct—shipping included.

**TOTL**  
software

P.O. Box 4742 • Walnut Creek, CA 94596

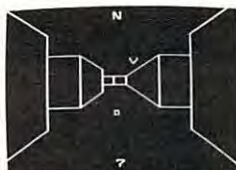
Send check or money order and be sure to specify machine. California residents add 6% sales tax.



Call (415)  
**943-7877**

\*VIC 20 and COMMODORE 64 are trademarks of Commodore Business Machines.

VIC-20®  
COMMODORE



### TREASURES OF THE BAT CAVE **\$14.95**

Explore the ancient caves filled with treasures and guarded by deadly vampire bats. The realistic 3-D display brings out your claustrophobia. Machine code for fast action: keyboard or joystick. Over 6x10<sup>23</sup> different caves to explore!

### ENCODER **\$14.95**

Use your VIC to keep prying eyes away from your personal matters. Encoder uses your password to scramble whatever you store in the computer: bank account numbers, household inventory, where you hid the jewelry. The scrambled data can be saved, or retrieved from tape. A 90 minute tape holds approximately 120 double spaced typed sheets. Keep a copy in your safety deposit box.



### ADVENTURES\*

The best adventures at the best prices! Controlled from the keyboard.

### GRAVE ROBBERS\* **\$14.95**

Introducing the first GRAPHIC ADVENTURE ever available on the VIC-20! Explore an old deserted graveyard. Actually see the perils that lie beyond.

### ADVENTURE PACK I\* **\$14.95**

(3 Programs)  
**MOON BASE ALPHA**—Destroy the meteor that is racing towards your base.  
**COMPUTER ADVENTURE**—Re-live the excitement of getting your first computer.  
**BIG BAD WOLF**—Don't let the wolf gobble you up.

### ADVENTURE PACK II\* **\$14.95**

(3 Programs)  
**AFRICAN ESCAPE**—Find your way off the continent after surviving a plane crash.  
**HOSPITAL ADVENTURE**—Written by a medical doctor. Don't check into this hospital!  
**BOMB THREAT**—Get back to town in time to warn the bomb squad of the bomb.

COMMODORE  
64®\*



### ANNIHILATOR **\$19.95**

Protect your planet against hostile aliens in this defender-like game. All machine code for fast arcade action. Joystick required.

### KONGO KONG **\$19.95**

Climb ladders; avoid barrels the crazy ape is rolling at you. Rescue the damsel. Partially machine code for smooth, fast action. Keyboard or joystick.

Send for free catalog  
All programs fit in the standard VIC memory, and come on cassette tape.

Ordering—Please add \$1.50 postage & handling per order. PA residents add 6% sales tax. Foreign orders must be drawn in U.S. funds or use credit card.

Credit card users—include number and expiration date.

**VICTORY SOFTWARE CORP.**  
2027-A S.J. RUSSELL CIRCLE  
ELKINS PARK, PA 19117  
(215) 576-5625

\*ONLY ADVENTURES ARE AVAILABLE FOR THE COMMODORE 64



inside the cartridge, the memory map changes once again.

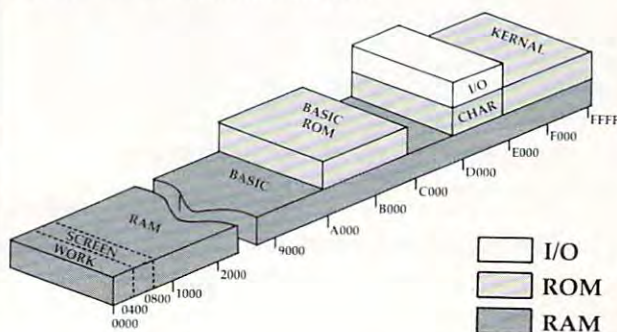
But that's another story.

For the first time, the machine's architecture is at your disposal. If you don't like BASIC, throw it out and replace it with your own. The same is true of the Kernal operating system; it's accessible or replaceable.

New horizons are opening. We'll need to do a lot of traveling to reach them.

### Commodore 64 Memory

Addresses shown in hexadecimal.



Your VIC-20 Will Smile...

# VIXEL™

Volume Three

## Warp

Pilot a spaceship on a hazardous journey. A fast-paced game that will keep you coming back for more.

(Needs joystick. Works on a 5K VIC-20.)

## Rail

You are the chief engineer in this tricky train yard. You control twelve switches, and up to eight trains.

(Needs 3K or 8K RAM memory board.)

## Fifteen

The classic puzzle: try to arrange 15 numbered tiles within a 4x4 grid.

(Needs joystick. Works on a 5K VIC-20.)

The VIXEL #3 cassette costs only \$12.95 in the US. Foreign orders add \$3.00 for shipping. California residents add 6% tax. Visa and MasterCard welcome.

**The Code Works**

Box 550, Goleta, CA 93116 805/683-1585

## VIC-20\* GAMES

### Cartridge:

Spiders of Mars	\$40.00
Outworld	40.00
Cloud Burst	32.00
Alien Blitz	32.00
Renaissance	40.00
Amok	32.00
Meteor Run	40.00
Sats & Mets	40.00
Skibbereen	32.00

### Cassette:

Simon	\$12.00
Amok	20.00
Subchase	20.00
Alien Blitz	20.00
The Alien	20.00
3-D Maze	12.00
Raceway	12.00
Kosmic Kamikaze	20.00
Super Driver	15.00



\*VIC-20 & Commodore-64 are registered trademarks of Commodore Business Machines

\*\*Prices and Availability Subject to Change Without Notice

### Business:

ViCalc	\$12.00
ViCat	20.00
ViCheck	20.00
ViTerm A	16.00

### Educational:

Skymath	\$20.00
Space Div.	12.00
Super Hangman	16.00

### Hardware:

Buti-3K ROM	\$72.00
Spokesman	150.00
Voice Synthesizer for (Commodore-64*)	VIC-20*
VIC-STUFF	\$5.00

A comprehensive overview of virtually all hardware and software items currently available for the VIC-20\* \*\*

ALL ORDERS ADD \$2.00 SHIPPING

California Residents Add 6% Sales Tax / Dealers Please Inquire

TO ORDER SEND CHECK OR MONEY ORDER TO:

**MOOSEWARE INCORPORATED**

Post Office Box 17868, Irvine, California 92713

WRITE FOR FREE BROCHURE & ASK ABOUT THE MOOSE CLUB.  
CLUB MEMBERS RECEIVE SPECIAL DISCOUNTS ON ALL PRODUCTS SOLD.



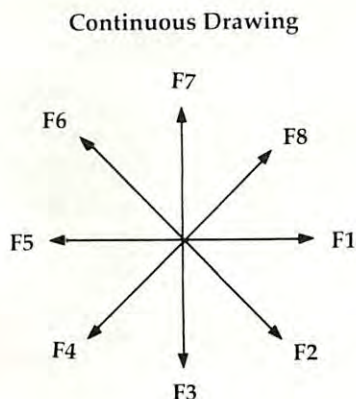
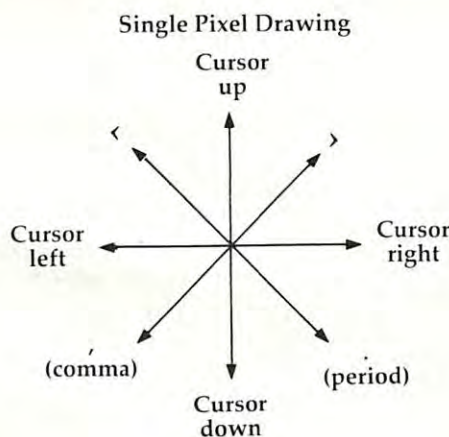
# VIC Pencil

Ken Bowd, Huntsville, Ontario

This High Resolution Drawing Program will run on a 5K VIC with 1K in reserve. When the RUN command is given, the screen will turn black (POKE 36879,8). You will have to allow a few seconds for the VIC to execute the loops. Hit the "D" key, and one pixel will light on the screen; hitting "E" will extinguish it.

The pencil can be moved either continuously or one pixel at a time. The continuous movement is controlled by the function keys, while single-pixel writing is done with the ",", "<", ">", and cursor control keys. The pencil will write left, right, up, or down, as well as in four directions diagonally. The "S" key stops all movement of the pencil. It is also possible to move the pencil without writing by hitting the "M" key.

## Pencil Control



You can clear home or clear the screen by using standard VIC operating procedures. Line 50 reserves some memory from BASIC; line 60 tells the VIC to go to RAM location 7168 for description of characters. Line 70 clears our reserved memory, and line 80 turns the screen black and clears the screen. Lines 100 through 120 set up a mini screen.

Line 130 is the beginning of the main program. It asks the operator for instructions, and from this point down to line 380 the values of X and Y are assigned according to what character was "gotten" from the keyboard. Lines 390 to 420 check to make sure the pencil is on the screen. On down to line 490 the proper bit is selected, and the proper POKE is made to either turn the bit on or turn it off.

Although this is really a novelty program, the kids will probably enjoy drawing on the computer. You will also find after a little practice that it is possible to draw arcs and curves. It should be noted that, although you can't draw on the entire screen, you can address 4096 different spots as compared to the usual 506.

```
50 POKE56,24:POKE52,24
60 POKE36869,255
70 FORI=7168TO7679:POKEI,0:NEXT
80 POKE36879,8:PRINTCHR$(147)
90 FORI=7680TO8191:POKEI,160:NEXTI
100 FORL=0TO7:FORM=0TO7
110 POKE7841+M*22+L,L*8+M
120 NEXT: NEXT
130 GETB$
140 IFB$="D"THENC$="D"
150 IFB$="E"THENC$="E"
160 IFB$="M"THENC$="M"
170 IFB$="{HOME}"THENX=0:Y=0
180 IFB$="S"THENA$=""
190 IFB$="{F1}"ORB$="{F2}"ORB$="{F
3}"ORB$="{F4}"ORB$="{F5}"
ORB$="{F6}"ORB$="{
F7}"ORB$="{F8}"THENA$=B$
200 IFB$="{CLEAR}"THEN220
210 GOTO230
220 FORI=7168TO7679:POKEI,0:NEXT
230 IFB$="{RIGHT}"THENX=X+1
240 IFB$="{LEFT}"THENX=X-1
250 IFB$="{UP}"THENY=Y-1
```



```

260 IFB$="{DOWN}"THENY=Y+1
270 IFB$=","THENX=X-1:Y=Y+1
280 IFB$="<"THENX=X-1:Y=Y-1
290 IFB$="."THENX=X+1:Y=Y+1
300 IFB$=">"THENX=X+1:Y=Y-1
310 IFA$="{F1}"THENX=X+1
320 IFA$="{F3}"THENY=Y+1
330 IFA$="{F5}"THENX=X-1
340 IFA$="{F7}"THENY=Y-1
350 IFA$="{F2}"THENX=X+1:Y=Y+1
360 IFA$="{F4}"THENX=X-1:Y=Y+1
370 IFA$="{F6}"THENX=X-1:Y=Y-1
380 IFA$="{F8}"THENX=X+1:Y=Y-1
390 IFX<0THENX=0
400 IFX>62THENX=62
410 IFY<0THENY=0
420 IFY>62THENY=62
430 CH=INT(X/8)*8+INT(Y/8)
440 RO=(Y/8-INT(Y/8))*8
450 BY=7169+8*CH+RO
460 BI=7-(X-(INT(X/8)*8))
470 IFC$="D"THENPOKEBY,PEEK(BY)OR
(2↑BI)
480 IFC$="M"THENPOKEBY,0ORPEEK(BY)
490 IFC$="E"THENPOKEBY,0
500 GOTO130

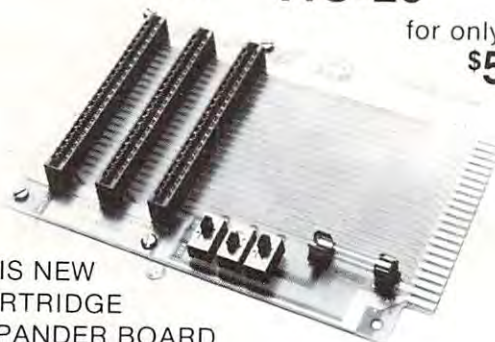
```

©

# EXPAND

YOUR VIC-20

for only  
**\$59<sup>95</sup>**



THIS NEW  
CARTRIDGE  
EXPANDER BOARD  
PLUGS INTO THE **SINGLE** EXPANSION PORT  
OF THE VIC-20, AND PROVIDES **THREE**  
SWITCHED EXPANSION PORTS FOR SELEC-  
TIVE OR SIMULTANEOUS USE OF ANY VIC-20  
CARTRIDGES. ADD MEMORY, PROGRAMMERS  
AID, SUPER EXPANDER, GAMES, WORD  
PROCESSOR, OR WHATEVER YOU CHOOSE.  
SEE YOUR DEALER OR ORDER FROM:



**PRECISION TECHNOLOGY, INC.**  
COMPUTER PRODUCTS DIV.  
2970 RICHARDS ST.  
SALT LAKE CITY, UTAH 84115

COD  
VISA  
M/C

(801)487-6266

# RINGS OF SATURN ©

PILOT THE SCOOP SHIP VOYGER  
INTO THE RINGS OF SATURN TO  
BECOME A MULTIMILLIONAIRE

CALL  
(408) 738-1751.

MAIL

D. SMITH & CO.  
1164 ANDOVER DR.  
SUNNYVALE, CAL.  
94087

VISA & MASTERCARD WELCOME  
ONLY \$ 19.95  
FOR THE UNEXPANDED VIC-20

## SIMULATIVE STRATEGY GAMES VIC-20

NO JOYSTICKS REQUIRED

**AT THE TRACK:** Horserace gambling game for 1 to 4 players. VIC gives odds. You bet to win, place and show. **\$11.95**  
**SKY PILOTS** (avail. Jan. 1983): Pilot a WWI Biplane. Over 10 Allied and German aircraft to choose from. **\$11.95**  
**DUNGEONS OF KAL:** A fantasy adventure in the realm of the Evil Two-Headed Ruler Kal. Not for the timid at heart! **\$11.95**  
**STAR DEFENDER:** Protect your Star Systems from the Alien Invasion. Over 15 separate Starship commands! **\$11.95**  
**CONVOY RAIDER:** Seek out and destroy the enemy merchant fleet. Commands include SONAR, PERISCOPE, TORPEDO and more! **\$11.95**  
**BOXER'S CORNER:** Unique simulation allows you to match great fighters on your VIC. Pick ring strategy. Ratings included. **\$11.95**  
**CONVOY ESCORT:** Escort your fleet to safety. Commands include SONAR, FORMATION, SUB TRACK and more! **\$11.95**  
**COMPUTER BASEBALL:** Use real life stats as you field a team against your VIC. Gives unique options for batters and pitchers. **\$11.95**  
**FOOTBALL CHALLENGE** (8K expander req.) Manage an NFL team against Vic or an opponent. All 1981 NFL teams included! **\$14.95**  
**GALACTIC CONQUEST** (8K expander req.) by Scott Jensen. Interactive strategy game for 1 to 6 players. A classic struggle for existence! **\$15.95**

All Programs On Cassette. No Memory Expansion Required Unless Specified.

Send check or money order plus \$1.50 postage and handling to:

P.R. Software, P.O. Box 169, South San Francisco, CA 94080

Calif. Res. add 6% sales tax

Dealer Inq. Invited • Programmers sought VIC is a reg. T.M. of CBM

## EXPANDED VIC-20 SOFTWARE

\*\*\*SPACE CHALLENGE: A space adventure with  
a difference, for 16k expanded vic  
\*\*\*DUNGEON OF ARITHMA: an educational adventure  
for kids of all ages, 8k expanded vic  
\*\*\*SCI CAL: Science calculator with all  
functions, trig, metric conv., 8 memorys,  
3k expander needed  
\*\*\*COLOR T.V. TEST & SETUP: all color  
test patterns needed to setup color &  
convergence, no expander needed  
\*\*\*All are \$9.95 each or any two for \$12.95 one  
tape, please add 75cents Postage & handling

MORRIS SOFTWARE  
P.O. BOX 85261  
LAS VEGAS NV.,  
89185-0261



**(Fantastic!!)**  
**VIC-20 COMPUTER WILL PLAY**  
**ATARI GAMES CARTRIDGES**  
 when you plug in our  
**GAME LOADER!**


Wow!! Now you can play all Atari game cartridges on your "VIC-20 Computer." Atari VCS cartridge video games, Activision, Imagic, M-Network cartridges will all play on your "VIC-20 Computer," when you use our new "GAME LOADER" *plus* you get fantastic VIC-20 sound and graphics.

LIST PRICE \$99.00 **SALE \$79.00**

**"15 DAY FREE TRIAL"**

- We have the lowest VIC-20 prices
- We have over 500 programs
- Visa - Mastercharge - C.O.D.
- We love our customers!

**PROTECTO**  
**ENTERPRIZES** (FACTORY-DIRECT)  
 BOX 550, BARRINGTON, ILLINOIS 60010  
 Phone 312/382-5244 to order

<b>VIC-20*</b>		<b>SOFTWARE SPECIALS</b>				<b>VIC-20*</b>			
<p>FROM TRONIX</p>  <p><b>GALACTIC BLITZ</b>          Destroy the aliens that descend in 15 different attack patterns. Super fast action arcade game. Machine Language - Joystick          Cassette ..... \$24.95</p>		<p><b>QUACKERS</b></p>  <p>From Interesting Software          Bring the fun of the shooting gallery into your own home with Quackers!          Cassette ..... \$12.95</p>		<p><b>FREE GAME</b>          See Below</p>		<p>FROM TRONIX</p>  <p><b>SWARMS!</b>          Another fast action game written entirely in machine language from Tronix. Insects invade your Vic!          Cassette ..... \$29.95</p>		<p><b>DUST COVERS - \$7.95</b>          For Vic-20 or Vic-64          * Waterproof          * Brown Color          * Commodore Logo          Protect your investment!</p>	
		<p>FROM TRONIX</p>  <p><b>SIDEWINDER</b>          Maneuver your chopper to destroy and avoid various attacking space beings. 8K Ram Exp. Req. Machine Language - Joystick          Cassette ..... \$29.95</p>				<p>FROM MARTIAN SOFTWARE</p>  <p><b>STAR COMMAND</b>          * Intergalactic Combat! * Space Conflict          * All Machine Language          Cassette ..... \$16.95</p>			
<p> <b>WICO JOYSTICKS</b>          Regular or Famous Red Ball          Backed by a 1 year Warranty, these are the best joysticks we have seen for the Vic-20 or Atari. Now priced at \$27.50.</p>		<p> Here's Where To Order!</p>		<p> <b>INTERESTING SOFTWARE</b>          21101 S. Harvard Blvd., Torrance, CA 90501          (213) 328-9422          Visa/MC/Check/Money Order Add \$2.00 Postage &amp; Handling          CA residents add appropriate sales tax Dealer Inquirers Invited          Write for free Catalog  <b>HOLIDAY SPECIAL</b> -Orders received before Jan. 1, 1983 receive free "Rader Tank Game"  <small>*Vic-20 is a trademark of Commodore Business Machines</small></p>					



# Atari's Exponents

Matt Giwer, Annandale, VA

The exponential operator,  $\wedge$ , performs a very standard mathematical function, although if you are not familiar with mathematics you may not be aware of its potential. Also, there is another byte-saving use that I will save for the end.

The key to making full use of  $\wedge$  is to realize that in mathematical notation the square root of four is the same as four to the one-half power. In BASIC you can write either `SQR(4)` or `4^(1/2)`. So what good is that? Well, you might want to do a cube root, which would be `8^(1/3)`. Get the idea? Not believing that this works, you might have tried this by now and have noticed that the machine insists that `4^(1/2)` is not 2 but rather 1.998... something. It seems strange to accept a wrong answer from a very slow function.

To correct for this inaccuracy, we simply write the instruction `INT (4^(1/2) + 0.01)`, and this will return the number 2. In return for this inaccuracy we get the ability to calculate very unusual powers and roots. The above could have been written `4^0.5` and the same answer returned. Also we could just as easily have written `4^0.4321` or `2^2.223` and have gotten an answer correct enough for many calculations. Also, those complex problems such as two to the five-thirds power `2^(5/3)` can be calculated with ease. So not only can we do the more common cube roots by using  $\wedge(1/3)$ , but we can now also do an entire range of mathematical functions.

It is not only faster but more accurate to write `2*2` rather than `2^2`. If we are not doing mathematics, how do we make use of this? How about instead of writing a byte-consuming timing loop for a beep, we simply write `A = 1^1`? If the beep should last longer, then there is always `A = 1^1^1^1^1`, etc. It takes quite a while before this simple statement equals the number of bytes consumed by a timing loop. Thus the major drawback to more frequent use of  $\wedge$  can be turned to our advantage. ©

**COMPUTE!**  
The Resource.

Use the handy  
reader service cards  
in the back of the  
magazine for  
information on products  
advertised in **COMPUTE!**

## an **ATARI®** Cartridge Storage Case

is ideal for anyone.

So don't wait  
for the attractive  
8 Cartridge  
Storage System

**\$15.95**

by Data Faire

Here is what you have  
been looking for  
**ASTRO**

Can you choose any of the planetoids in our solar system and land on it? Choose any of the planets or the large moons and try to land safely. Each one has its own description and gravitational pull and is a simulation of an actual landing. Atari 32K, Disk \$15.95.

**DATA FAIRE**  
1614 SPEYER  
REDONDO BEACH, CA 90278  
(213)374-8743  
(213)379-5798

DEALER INQUIRIES INVITED  
Atari® is a registered trademark of Atari, Inc.

PLEASE ADD \$2.00 SHIPPING FOR MAIL ORDERS. C.O.D. ORDERS ACCEPTED.

## RAM

For ATARI  
**48K RAM BOARD FOR THE 400**  
with Lifetime Warranty

- Highest quality available
- Reduces power consumption
- Reduces heat

**48K Board** (400) **\$175**

**32K Board** (400/800) **\$ 90**

**16K Board** (800) **\$ 60**

FREE SHIPPING ANYWHERE IN U.S.A.

**INTEC**  
**PERIPHERALS**  
**CORP**

906 E. Highland Ave.  
San Bernardino, CA 92404  
(714) 881-1533



ATARI, 400, 800 are Trademarks of ATARI, Inc.



**(Fantastic!!)**  
**VIC-20 COMPUTER WILL PLAY**  
**ATARI GAMES CARTRIDGES**  
 when you plug in our  
**GAME LOADER!**

Wow!! Now you can play all Atari game cartridges on your "VIC-20 Computer." Atari VCS cartridge video games, Activision, Imagic, M-Network cartridges will all play on your "VIC-20 Computer," when you use our new "GAME LOADER" *plus* you get fantastic VIC-20 sound and graphics.

LIST PRICE \$99.00 **SALE \$79.00**

**"15 DAY FREE TRIAL"**

- We have the lowest VIC-20 prices
- We have over 500 programs
- Visa - Mastercharge - C.O.D.
- We love our customers!

**PROTECTO**  
**ENTERPRIZES** (FACTORY-DIRECT)  
 BOX 550, BARRINGTON, ILLINOIS 60010  
 Phone 312/382-5244 to order

<b>VIC-20*</b>		<b>SOFTWARE SPECIALS</b>				<b>VIC-20*</b>		
<b>FROM TRONIX</b>  <b>GALACTIC BLITZ</b> Destroy the aliens that descend in 15 different attack patterns. Super fast action arcade game. Machine Language - Joystick Cassette ..... \$24.95		 <b>QUACKERS</b> From Interesting Software Bring the fun of the shooting gallery into your own home with Quackers! Cassette ..... \$12.95		<b>FREE GAME</b> See Below		<b>FROM TRONIX</b>  <b>S W A R M !</b> Another fast action game written entirely in machine language from Tronix. Insects invade your Vic! Cassette ..... \$29.95		<b>DUST COVERS - \$7.95</b> For Vic-20 or Vic-64 * Waterproof * Brown Color * Commodore Logo Protect your investment!
		<b>FROM TRONIX</b> <b>SIDEWINDER</b>  Maneuver your chopper to destroy and avoid various attacking space beings. 8K Ram Exp. Req. Machine Language - Joystick Cassette ..... \$29.95				<b>FROM MARTIAN SOFTWARE</b>  <b>STAR COMMAND</b> * Intergalactic Combat! * Space Conflict * All Machine Language Cassette ..... \$16.95		
 <b>WICO JOYSTICKS</b> Regular or Famous Red Ball Backed by a 1 year Warranty, these are the best joysticks we have seen for the Vic-20 or Atari. Now priced at \$27.50.		 Here's Where To Order!		 <b>INTERESTING SOFTWARE</b> 21101 S. Harvard Blvd., Torrance, CA 90501 (213) 328-9422 Visa/MC/Check/Money Order Add \$2.00 Postage & Handling CA residents add appropriate sales tax Dealer Inquirers Invited Write for free Catalog <b>HOLIDAY SPECIAL</b> -Orders received before Jan. 1, 1983 receive free "Rader Tank Game". <small>*Vic-20 is a trademark of Commodore Business Machines</small>				



# Atari's Exponents

Matt Giwer, Annandale, VA

The exponential operator,  $\wedge$ , performs a very standard mathematical function, although if you are not familiar with mathematics you may not be aware of its potential. Also, there is another byte-saving use that I will save for the end.

The key to making full use of  $\wedge$  is to realize that in mathematical notation the square root of four is the same as four to the one-half power. In BASIC you can write either  $\text{SQR}(4)$  or  $4^{(1/2)}$ . So what good is that? Well, you might want to do a cube root, which would be  $8^{(1/3)}$ . Get the idea? Not believing that this works, you might have tried this by now and have noticed that the machine insists that  $4^{(1/2)}$  is not 2 but rather 1.998... something. It seems strange to accept a wrong answer from a very slow function.

To correct for this inaccuracy, we simply write the instruction  $\text{INT}(4^{(1/2)} + 0.01)$ , and this will return the number 2. In return for this inaccuracy we get the ability to calculate very unusual powers and roots. The above could have been written  $4^{0.5}$  and the same answer returned. Also we could just as easily have written  $4^{0.4321}$  or  $2^{2.223}$  and have gotten an answer correct enough for many calculations. Also, those complex problems such as two to the five-thirds power  $2^{(5/3)}$  can be calculated with ease. So not only can we do the more common cube roots by using  $\wedge(1/3)$ , but we can now also do an entire range of mathematical functions.

It is not only faster but more accurate to write  $2*2$  rather than  $2^2$ . If we are not doing mathematics, how do we make use of this? How about instead of writing a byte-consuming timing loop for a beep, we simply write  $A = 1 \wedge 1$ ? If the beep should last longer, then there is always  $A = 1 \wedge 1 \wedge 1 \wedge 1$ , etc. It takes quite a while before this simple statement equals the number of bytes consumed by a timing loop. Thus the major drawback to more frequent use of  $\wedge$  can be turned to our advantage. ©

**COMPUTE!**  
The Resource.

Use the handy reader service cards in the back of the magazine for information on products advertised in **COMPUTE!**

## an **ATARI®** Cartridge Storage Case

is ideal for anyone.

So don't wait  
for the attractive  
8 Cartridge  
Storage System

**\$15.95**

by Data Faire

Here is what you have  
been looking for  
**ASTRO**

Can you choose any of the planetoids in our solar system and land on it? Choose any of the planets or the large moons and try to land safely. Each one has it's own description and gravitational pull and is a simulation of an actual landing. Atari 32K, Disk \$15.95.

**DATA FAIRE**  
1614 SPEYER  
REDONDO BEACH, CA 90278  
(213)374-8743  
(213)379-5798

DEALER INQUIRIES INVITED  
Atari® is a registered trademark of Atari, Inc.

PLEASE ADD \$2.00 SHIPPING FOR MAIL ORDERS. C.O.D. ORDERS ACCEPTED.

## RAM

For ATARI  
**48K RAM BOARD FOR THE 400**  
with Lifetime Warranty

- Highest quality available
- Reduces power consumption
- Reduces heat

**48K Board** (400) **\$175**

**32K Board** (400/800) **\$ 90**

**16K Board** (800) **\$ 60**

FREE SHIPPING ANYWHERE IN U.S.A.

**INTEC**  
**PERIPHERALS**  
**CORP**

906 E. Highland Ave.  
San Bernardino, CA 92404  
(714) 881-1533



ATARI, 400, 800 are Trademarks of ATARI, Inc.



# VIC Personal Accountant

Peter Mendall, Monmouth, ME

*Much ado is made about IRA accounts these days. Can you really be a millionaire, or is this a fantasy even less real than an eight-color printer for your home computer? For unexpanded or expanded VICs.*

Here is a program with a four-option menu which demonstrates the growth power of an exponential function. This is especially true if it is non-taxed money!

Remember that IRA money will be taxed sometime and carries a penalty for early withdrawal. However, a 10% one-time "linear" deduction can be offset by an investment compounded exponentially.

This program will provide you with instantaneous delight at the thought of investing ten dollars out of your weekly pay check for 40 years (if you are 25 or younger).

Option one gives you the future value of your choice of payment, interest rate, and payment per year. Option two gives you the payment needed for your choice of future value. The third option prints a table showing how quickly you can multiply your money by factors of two through ten given your interest rate and the frequency it is compounded. The fourth option shows what happens to a one-time investment under compounded interest.

```
1 REM PETER MENDALL
2 REM NO. MAIN ST
3 REM MONMOUTH, ME
5 PRINT "{CLEAR}"
10 REM:COMPOUND INTEREST
15 PRINT "{CLEAR}"
20 P=PM=I=N=0
30 PRINT"COMP INTEREST MENU"
35 PRINT
40 PRINT"<1>FUT VAL:REG DEP"
45 PRINT
50 PRINT"<2>REG PMT FOR FUT VAL"
55 PRINT
60 PRINT"<3>COMPOUNDING TIME"
65 PRINT
70 PRINT"<4>FUT VAL:SINGLE DEP"
80 PRINT
85 PRINT"<5>END"
92 PRINT
95 PRINT"MENU CHOICE";
97 INPUT X
100 REM PROGRAM
```

```
110 ON X GOTO 1000,2000,3000,4000,10000
230 FOR W=2TO10
1000 REM FUTURE VAL
1005 PRINT"{CLEAR}"
1010 P=PM=I=N=0
1100 PRINT"P=# OF PER/YR:P=";
1102 INPUT P
1105 PRINT
1110 PRINT"PM=PMT/PER:PM=";
1112 INPUT PM
1115 PRINT
1120 PRINT"I=RATE/YR:(.XX)";
1122 INPUT"I=";I
1125 PRINT
1130 PRINT"N=# OF YR:N=";
1132 INPUT N
1135 PRINT
1140 PRINT"IS INPUT OK? Y OR N"
1145 PRINT
1150 GET A$
1160 IF A$="" GOTO 1150
1170 IF A$="N" THEN 1000
1200 REM CALC I/PER=IR
1210 IR=((1+I)^(1/P)-1)
1220 N=N*P
1300 REM CALC FUT VAL=FV
1310 FV=(PM*((1+IR)^N-1)/IR)
1320 FV=(INT((FV+.005)*100))/100
1400 REM PRINT FUT VAL
1410 PRINT"# PER",N
1415 PRINT"PMT",PM
1420 PRINT"I/YR",I
1425 PRINT"FV",FV
1430 PRINT
1440 PRINT"<1>FV <2>MAIN MENU"
1450 GET X
1460 IF X=0 GOTO 1450
1470 ON X GOTO 1000,5
```

## FOX 20:™ The magazine for \*VIC-20 users

FOX 20 will provide you, each month, with 5 or more ready-to-run programs on cassette - exciting, imaginative game, educational, and utility programs for all VIC memory configurations. In addition, you will receive Foxtales, an informative Video Newsletter, on Side 2. Novice and pro alike, FOX 20 is the magazine for you. Be a sly little fox for only \$43 a year - Subscribe to:

### FOX 20:™

P.O. Box 507, Deer Park, Texas 77536  
 FOX 20 is a division of: Foxfire Systems, Inc.  
 3811 Newton, Pasadena, Texas 77503  
 Dealer Inquiries Invited (713) 473-6723  
 Texas residents add 5% Sales Tax  
 Canada and overseas \$53  
 Orders pre-paid  
 U.S. Dollars only



\*VIC-20 is a trademark of Commodore Business Machines, Inc.



# commodore VIC-20™ Computer

VIC's MOM—MOTHER BOARD EXPANDER

Expand your vic to full limit:  
provisions for switches in board  
VIC-20 to IEEE-488 Interface  
allows VIC to use PET/CBM Peripherals.

3 slot \$39.95  
with switches \$45.95  
\$79.95

## CHARACTER BUILDER— UTILITY AID

will save and load from disk or tape  
design your own CUSTOM

CHARACTERS  
use with any memory  
configuration \$25.00

RS-232 bi-directional  
INCLUDES SECOND  
JOY STICK PORT \$40.00

\*NEW\*SECOND JOY  
STICK PORT \$20.00

## ROM EXPANSION BOARD

put your own programs on 2K  
or 4K EPROMS  
we can put your program in ROM—  
call for info \$19.50

8K RAM BOARD  
can be daisy chained  
to four \$49.95

4K RAM BOARD \$39.95

VIC DUST COVER  
protect your VIC \$12.95

NEW CARTRIDGE VIDEO GAMES FROM MACHINE  
LANGUAGE, INC.—SUPER FAST\*\*COLORFUL  
AVAILABLE THRU OEM, INC. \$25.00



TWO PLAYER GAMES

CLOSE ENCOUNTERS OF THE WORST KIND • BLACK JACK  
ACID RAIN • BLOCK BUSTER • DOT GOBBLER • FROGMAN  
SPIN TOIDS • CHESS

we need good new machine language games - royalty paid  
CALL FOR DETAILS

Completely Tested, 100% Guaranteed



Dealer inquiries invited

TO ORDER CALL 305-464-7549

Personal checks accepted, allow time to clear—add \$2 for shipping—add \$5 for COD  
Florida residents add 5% state sales tax—Master Card & Visa add 5%

order from OEM Inc.  
2729 South U.S. #1  
Ft. Pierce, Florida 33450

# \*commodore

\*VIC 20 \$176  
16K RAM \$ 69



## MEMORY EXPANSION

VIC 1540 DISC DRIVE ..... \$299.95  
VIC 1530 DATASSETTE ..... \$ 64.95  
VIC 1515 GRAPHIC PRINTER ..... \$299.00  
VIC 1213 MACHINE LANGUAGE MONITOR ..... \$ 43.00  
4 SLOT FULLY BUFFERED EXTENDER..... \$ 59.95  
VIC MODEM..... \$ 89.95  
8K RAM MEMORY EXPANSION ..... \$ 39.95  
2Kx8 STATIC RAM CHIPS (200 NSEC) QTY. \_\_\_\_\_ ea. \$ 7.95

## ORDER FORM

(Circle Above Items)

CHECK ONE:



NAME \_\_\_\_\_  
STREET \_\_\_\_\_  
CITY \_\_\_\_\_  
STATE \_\_\_\_\_ ZIP \_\_\_\_\_  
PHONE \_\_\_\_\_

☐ VISA ☐ MASTERCARD  
☐ Check Enclosed ☐ C.O.D.  
Credit Card # \_\_\_\_\_  
Expiration Date \_\_\_\_\_  
Add 3% Shipping Charge;  
COD's add \$1.50 plus 20% Deposit  
Required. CA Res. 6% Tax  
Credit Cards add 3%  
Personal checks accepted  
(Allow 3 weeks extra)

**U.S. TECHNOLOGIES**

P.O. Box 7735  
San Diego, CA 92107  
(619) 224-8016

WE WILL NOT BE UNDERSOLD!

DEALERS: REDUCED  
PRICES OFFERED ON  
LARGER ORDERS  
CALL FOR DETAILS

\*Trademark of Commodore

```

2000 REM PMT FOR FUT VAL
2010 PM=FV*IR=N=P=I=0
2020 PRINT "{CLEAR}"
2100 PRINT "FV=TOT AMT
      DESIRED"
2110 INPUT "FV="; FV
2115 PRINT
2120 PRINT "I=INT/YR: (.XX)";
2130 INPUT "I="; I
2135 PRINT
2140 PRINT "N=# OF YR:N=";
2150 INPUT N
2155 PRINT
2160 PRINT "P=#PMTS/YR:P=";
2170 INPUT P
2175 PRINT
2180 PRINT "INPUT OK? Y OR N"
2185 GET A$
2190 IF A$="" THEN 2185
2195 IF A$="N" THEN 2000
2200 REM CALC I/PER=IR
2210 IR=((1+I)^(1/P)-1)
2220 N=P*N
2300 REM CALC PMT FOR FV
2310 PM=((FV*IR)/((1+IR)
      ^N-1))
2320 PM=((INT((PM+.005)
      *100))/100)
2400 REM PRINT PM
2410 PRINT "FV", FV
2415 PRINT "#/Y", P
2420 PRINT "I", I
2425 PRINT "PMT", PM
2430 PRINT "<1>PMT<2>MAIN
      MENU"
2440 GET X
2450 IF X=0 THEN 2440
2460 ON X GOTO 2000,5
3000 REM COMPOUNDING TIME
3003 DIM A(12)
3010 P=I=IR=N=0
3030 PRINT "{CLEAR}"
3100 PRINT "COMPOUNDING TIME"
3105 PRINT
3110 PRINT "I=INT/Y: (.XX):I=";
3120 INPUT I
3125 PRINT
3130 PRINT "P=COMPOUND FREQ
      /Y:P=";
3140 INPUT P
3145 PRINT
3150 PRINT "INPUT OK? Y OR N"
3155 GET A$
3160 IF A$="" THEN 3155
3170 IF A$="N" THEN 3010
3200 REM CALC I/PER=IR
3204 PRINT "CALC TIME=20-50
      SEC"
3210 IR=((1+I)^(1/P)-1)
3220 N=1
3230 FOR W=2 TO 10
3240 N=N+1
3250 X=((1+IR)^(N))
3260 IF X>=W THEN 3280
3270 GOTO 3240
3280 A(W)=N
3290 NEXT W
3300 REM PRINTING
3400 PRINT "FACT#PER#OF YRS"

```

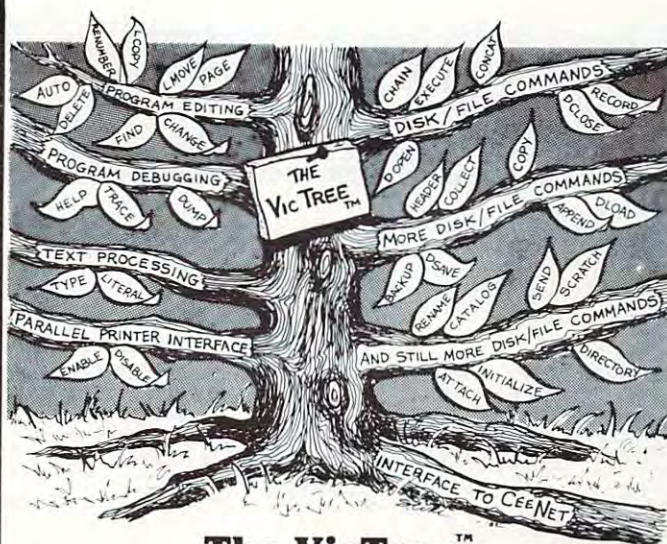


```

3405 PRINT
3410 FOR W=2 TO 10
3412 NY=A(W)/P
3414 NY=(INT((NY+.05)*10))/10
3420 PRINTW;TAB(5)A(W);TAB(11)NY
3430 NEXT W
3435 PRINT
3440 PRINT"<1>COMP TIME"
3450 PRINT"<2>MAIN MENU"
3460 GET X
3470 IF X=0 THEN 3560
3480 IF X=1 THEN 3010
3490 GO TO 5
3560 GET X
3570 IF X=0 THEN 3560
3580 IF X=1 THEN 3010
3590 GO TO 5
4000 REM SINGLEDEPOSIT
4010 FV=PV=IR=N=0
4020 PRINT" {CLEAR}"
4100 PRINT"PV=SINGLEDEP:PV="
4110 INPUT PV
4115 PRINT
4120 PRINT"I=INT/YR:(.XX):I="
4125 INPUT I
4127 PRINT
4130 PRINT"#PER/YR:P="
4135 INPUT P
4137 PRINT
4140 PRINT"# OF YR:N="
4145 INPUT N
4147 PRINT:PRINT
4150 PRINT"INPUT OK? Y/N"
4160 GET A$
4170 IF A$=" " THEN 4160
4180 IF A$="N" THEN 4000
4190 PRINT"3"
4210 IR=((1+I)^(1/P)-1)
4220 N=P*N
4300 FV=PV*((1+IR)^N)
4310 FV=(INT((FV+.005)*100))/100
4400 REM PRINT FV
4405 PRINT"FUT VAL SINGLE DEP"
4407 PRINT
4410 PRINT"#PER/YR",P
4412 PRINT
4414 PRINT
4415 N=N/P
4416 PRINT"# OF YR",N
4418 PRINT
4420 PRINT"DEP",PV
4425 PRINT
4430 PRINT"I/YR",I
4435 PRINT
4440 PRINT"FV",FV
4450 PRINT
4455 PRINT
4460 PRINT"<1>SINGLE DEP"
4462 PRINT
4465 PRINT"<2>MAIN MENU"
4470 GET X
4480 IF X=0 THEN 4470
4490 ON X GOTO 4000,5
10000 PRINT"END PROGRAM"
10010 END

```

...PET/CBM/VIC? SEE SKYLES...



### The VicTree™

...Leaves your new Vic (or CBM 64) with 42 additional commands.  
 ...Branches out to most BASIC 4.0 programs.  
 ...Roots into most printers.

New from Skyles: the VicTree, a coordinated hardware and software package that allows your Vic to branch out in unbelievable directions and makes it easier than ever to do BASIC programming, debugging and to access your disk. Unbelievably simple to use and to install, the VicTree gives you all the additional BASIC 4.0 commands to allow most BASIC 4.0 programs to work on your new Vic or CBM 64.

From Skyles, the best friend you and Commodore ever had... Skyles, the largest specialist in designing and marketing peripherals, software, expansion, memory for all Commodore computers.

Now only \$89.95... or \$109.95 complete with Centronics standard printer cable. (Cable alone \$29.95.) Available now from your local dealer or order through your Visa or MasterCard toll free: (800) 227-9998 (California, Canada, Alaska, Hawaii: (415) 965-1735) or send check or money order directly to:



Skyles Electric Works

231E South Whisman Road  
 Mountain View, CA 94041  
 (415) 965-1735

...PET/CBM/VIC? SEE SKYLES...

## TOUCH-N-LIGHT PEN for the VIC

A REAL light pen for the VIC, easy to install, easy and comfortable to handle.

- lightweight barrel
- three foot flexible cable
- touch switch to activate
- ability to independently read touch switch
- small p.c. board plugs into user port

### Programs Now Available

1. <b>PLAY IT AGAIN!</b>	TOUCH-N-LIGHT PEN	\$75.00
2. <b>ALPHA ONE</b>	Programs - each	\$ 9.95
3. <b>NUMBER ONE</b>	Shipping	\$ 1.50

Send Check or Money Order

New York residents add tax



Sunshine Peripherals Incorporated

1229 East 28th Street Brooklyn NY 11210



# CAPUTE!

Modifications Or Corrections To Previous Articles

## UXB On VIC

To produce the correct alternate character set for the VIC version of UXB (November 1982, p. 56) the following lines must be added to Program 1:

```
596 POKE51,0:POKE58,28:POKE55,0:POKE56,28:CLR:
    CB=7168
597 READ A:IF A=-1 THEN 600
598 FOR N=0TO7:READ B:POKE(CB+A*8+N),B:NEXT
599 GOTO 597
900 DATA 1,153,219,189,153,129,66,36,36
910 DATA 17,126,255,199,203,211,227,255,126
920 DATA 24,36,36,36,36,60,36,66,129
930 DATA 26,4,24,24,60,126,126,126,60
940 DATA 32,0,0,0,0,0,0,0,0
950 DATA -1
```

## Pack Up Your DATA

There is an error in line 130 of the example program which condenses PET or VIC data for files (October 1982, p. 162). The line should read:

```
130 V%=V/256:L=V-(V%*256)
```

## VIC Superchase

The VIC version of this game (October 1982, p. 66) requires several changes. Lines 10 and 22 should be removed from the program. In line 12100, a semicolon should be added after the CHR\$(142). Also in that line, the characters shown as underlined ampersands (&) are typed in by holding down the Commodore logo key and hitting the "+" key. The characters shown as underlined dollar signs (\$) in line 14010 are typed in by holding down the logo key and hitting the "@" key.

## VIC Pixelator

The author sent in some additions and clarifications on his custom character editor (October 1982, p. 141):

Under certain circumstances, the "Pixdata" program will not adjust the end-of-program pointers causing the program to reappear and interfere with the newly written DATA statements. This can be taken into account by changing two lines in the program and adding two new lines. Notice that you must type the abbreviations pO and pE for POKE and PEEK to fit line 170 into the computer:

```
10 C=PEEK(56):POKE51,0:POKE52,20:POKE55,0:POK
    E56,20
170 A2=INT(AA/256):A1=AA-A2*256:B=PEEK(43)+256
    *PEEK(44):POKEB,A1:POKEB+1,A2:POKE56,C
180 ZZ=ZZ+257-AA+B:Z2=INT(ZZ/256):Z1=ZZ-Z2*256
```

```
190 POKE251,Z1:POKE174,0:POKE175,0:POKE46,Z2:P
    OKE45,PEEK(251)
```

Also, memory expansion of 8K or more on the VIC usually moves the screen memory so that there is not enough room between the end of the screen and the beginning of the last available character map area in RAM for the "Pixelator" to operate. Before loading the Pixelator, 8K users should enter the following as a single line and then hit RETURN:

```
POKE43,0:POKE44,2244::POKE45,00:POKE46,24:POKE
    47,0:POKE48,24
```

This moves the start-of-BASIC memory to 6144. Now type:

```
POKE6143,0:POKE6144,0:POKE6145,0
```

and hit RETURN. This simply cleans up the area. Now LOAD the Pixelator, delete line 30, and make this change:

```
20 XX=5120:SC=4096:CL=37888
4010 SYSXX-16:PRINT" {HOME} ":PRINT"LOOKING AT "
    ;S5$:POKESC+33,C0
```

SAVE the program before using it. Make the following change in both Pixaver and Pixeloader:

```
10 XX=5120
```

Make these changes in Pixdata:

```
10 C=PEEK(56):POKE51,0:POKE52,32:POKE55,0:POK
    E56,32
20 XX=5120
40 ZZ=8192:AA=ZZ
```

8K users can access the RAM character set by typing:

```
POKE36869,PEEK(36869)ANDNOT15OR13
```

Finally, the symbols appearing in lines 70, 80, and 90 of the printed listing of Pixelator might be confusing. A more attractive display can be achieved by changing the underlined slashes to Commodore-P (hold down the Commodore logo key while typing "P"); the underlined apostrophe (-) should be Commodore-M; the underlined percent sign (%) should be Commodore-G; and the underlined 7 should be Commodore-Y.

## Atari Mathman Improvements

Our thanks to John Bergen for the following enhancements to this program (October 1982, p. 72). With these changes, Mathman can recover the incorrect answer after it is sent off the screen, print the correct response, turn the screen a new color after each trial, and also show a student the current question number:

```
11 Y=INT(RND(0)*15):SETCOLOR 4,Y,6:SE
    TCOLOR 2,Y,4
375 POSITION 0,22:"SCORE-";SCO;"
    {3 SPACES}TURNS-";0
1070 POSITION 8,10:"{4 SPACES}":POS
    ITION 10,10:"B*C;"-Correct Answer
    G"
1071 POSITION 8,12:"{4 SPACES}":POS
    ITION 10,12:"AS;"-Your Answer WA
    E"
1072 FOR Z=1 TO 200:NEXT Z
```



# COMPUTE! Publications

**COMPUTE!'s First Book of Atari.** 192 pages of useful informative applications and programs from **COMPUTE!** Magazine issues now out of print. Includes previously unpublished information including Memory Map. Contents include such articles and programs as "Adding a Voice Track to Atari Programs," "Designing Your Own Atari Graphics Modes," and "Inside Atari BASIC." Spiral bound for ease of access to listings. For beginner level to advanced Atari users. ISBN 0-942386-00-0. Paperback. \$12.95.

**COMPUTE!'s First Book of PET/CBM.** 256 pages of Commodore PET and CBM articles from **COMPUTE!** Magazine issues now out of print. Includes such classic articles and programs as "Feed Your PET Some Applesoft," "Disk Lister: A Disk Cataloging Program," and "Cross Reference For The PET." Spiral bound for ease of access. ISBN 0-942386-01-9. Paperback. \$12.95.

## The Beginner's Guide To Buying A Personal Computer.

A novice's handbook of useful, helpful information designed to teach you the basics of evaluating and selecting a personal computer. Written in plain English for the interested beginner. Complete with personal computer specification charts and buyer's guide. Applicable to home, educational, and small business buyers. ISBN 0-942386-03-5. Paperback. \$3.95.

**Inside Atari DOS.** From the author of the Atari Disk Operating System, an exciting step-by-step guide to the DOS software. Complete with listings of commented source code and detailed explanations of each module of code. Author: Bill Wilkinson, Optimized Systems Software, Inc. Spiral bound for ease of access to listings. For intermediate to advanced Atari Users. ISBN 0-942386-02-7. Paperback. \$19.95.

**Programming The PET/CBM,** by Raeto Collin West. Described by one reviewer as "... unquestionably the most comprehensive and accurate reference I have seen to date..." this reference encyclopedia for Commodore computer users is packed with useful information, programs, diagrams, and charts. ISBN 0-942386-04-3. Paperback, 504 pages. \$24.95.

**COMPUTE!'s Second Book of Atari.** With over 200 pages of unpublished Atari information specially selected by the editors of **COMPUTE!** Magazine, this new release from **COMPUTE! Books** is an excellent resource for Atari owners and users. Spiral bound for ease of access to listings. ISBN 0-942386-06-X. Paperback. \$12.95.

**Every Kid's First Book of Robots and Computers.** This exciting book, complete with exercises for teachers, parents, and children, uses turtle graphics to introduce kids to robots and computers. Exercises are presented for use with graphics languages, such as Atari PILOT. Additional exercises are presented throughout the fully-illustrated book, allowing users to learn turtle graphics through the Milton Bradley "Big Trak,"™ or the built-in "Turtle Tiles"™ that are provided with each book, for children who don't yet have access to a computer. ISBN 0-942386-05-1. Paperback. \$4.95.

**COMPUTE!'s First Book of VIC.** In the style of our First Books of Atari and PET/CBM, this book contains many of the articles and applications featured in past issues of **COMPUTE!** Magazine. Approximately 20-30% of the book is material that has not been previously published. An excellent resource book for Commodore VIC-20 owners. Spiral bound for ease of access to listings. ISBN 0-942386-07-8. Paperback. \$12.95.

**COMPUTE! Magazine** A monthly encyclopedia of informative applications articles and programs. **COMPUTE!** features articles, programs, and columns covering the spectrum of home and educational computing. Monthly reviews, complete BASIC and machine language listings of games, utilities, applications such as "Programming Your Home Insurance Inventory," "Real Estate Investment Analysis," "Telecommunications: How To Use A Modem," and much more. Written for children and parents, educators, novices to advanced programmers. Principal editorial coverage is Atari, Apple, Commodore PET/CBM, and VIC-20. Editorial coverage is expanding to include TI-99/4A, Sinclair ZX-81, and Radio Shack Color Computer.

Atari is a registered trademark of Atari, Inc. PET and CBM are trademarks of Commodore Business Machines, Inc. Turtle Tiles is a trademark of David D. Thornburg and Innovision, Inc. Big Trak is a trademark of the Milton Bradley Company.

Mail coupon to: **COMPUTE!** Publications, P.O. Box 5406, Greensboro, NC 27403

## COMPUTE! MAGAZINE

My Computer is:

- ☐ PET ☐ OSI  
☐ Sinclair ZX-81 ☐ Radio Shack  
☐ VIC-20 ☐ Color Computer  
☐ Apple ☐ TI 99/4A  
☐ Atari ☐ Other  
☐ Don't yet have one

For Fastest Service  
 Call Our Toll-Free  
 US Order Line  
**800-334-0868**  
 In NC Call  
**919-275-9809**

- ☐ \$20 One Year US Subscription ☐ \$38 Europe, Australia Air Delivery  
☐ \$36 Two Year US Subscription ☐ \$48 Middle East  
☐ \$54 Three Year US Subscription ☐ \$68 Elsewhere, Air Delivery  
☐ \$25 One Year Canada ☐ \$25 International Surface Mail

☐ Payment Enclosed ☐ VISA ☐ MasterCard ☐ American Express

ACCT. NO. \_\_\_\_\_ EXPIRES \_\_\_\_\_ / \_\_\_\_\_

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

COUNTRY \_\_\_\_\_

## COMPUTE! BOOKS

For fastest service, in the US call **Toll Free 800-334-0868**.  
 In NC call **919-275-9809**.

Quan.	Title	Price	\$/H	Total
_____	The Beginner's Guide to Buying A Personal Computer	\$ 3.95 +	\$1.00*	_____
_____	COMPUTE!'s First Book of Atari	12.95 +	2.00*	_____
_____	Inside Atari DOS	19.95 +	2.00*	_____
_____	COMPUTE!'s First Book of PET/CBM	12.95 +	2.00*	_____
_____	Programming the PET/CBM	24.95 +	3.00**	_____
_____	Every Kid's First Book of Robots and Computers	4.95 +	1.00*	_____
_____	COMPUTE!'s First Book of VIC	12.95 +	2.00*	_____
_____	COMPUTE!'s Second Book of Atari	12.95 +	2.00*	_____

For air mail outside US: \*\$4.00 / \*\*\$9.00

All orders must be prepaid (money order, check, or charge). All payments must be in US funds. NC residents add 4% sales tax.

☐ Payment Enclosed ☐ VISA ☐ MasterCard ☐ American Express

ACCT. NO. \_\_\_\_\_ EXPIRES \_\_\_\_\_ / \_\_\_\_\_

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

COUNTRY \_\_\_\_\_

Allow 4-6 weeks for delivery. Foreign surface delivery 2-3 months.



# How To Type COMPUTE!'s Programs

Many of the programs which are listed in **COMPUTE!** contain special control characters (cursor control, color keys, inverse video, etc.). To make it easy to tell exactly what to type when entering one of these programs into your computer, we have established the following listing conventions. There is a separate key for each computer. Refer to the appropriate tables when you come across an unusual symbol in a program listing. If you are unsure how to actually enter a control character, consult your computer's manuals.

## Atari 400/800

Characters in inverse video will appear like: **ERASE VIDEO**. Enter these characters with the Atari logo key, {A}.

When you see	Type	See
{CLEAR}	ESC SHIFT <	↵ Clear Screen
{UP}	ESC CTRL -	↑ Cursor Up
{DOWN}	ESC CTRL =	↓ Cursor Down
{LEFT}	ESC CTRL +	← Cursor Left
{RIGHT}	ESC CTRL *	→ Cursor Right
{BACK S}	ESC DELETE	␣ Backspace
{DELETE}	ESC CTRL DELETE	⌫ Delete character
{INSERT}	ESC CTRL INSERT	⌵ Insert character
{DEL LINE}	ESC SHIFT DELETE	⌫ Delete line
{INS LINE}	ESC SHIFT INSERT	⌵ Insert line
{TAB}	ESC TAB	↵ TAB key
{CLR TAB}	ESC CTRL TAB	⌫ Clear tab
{SET TAB}	ESC SHIFT TAB	⌵ Set tab stop
{BELL}	ESC CTRL 2	🔔 Ring buzzer
{ESC}	ESC ESC	⌨ ESCape key

Graphics characters, such as CTRL-T, the ball character ● will appear as the "normal" letter enclosed in braces, e.g. {T}.

A series of identical control characters, such as 10 spaces, three cursor-lefts, or 20 CTRL-R's, will appear as {10 SPACES}, {3 LEFT}, {20 R}, etc. If the character in braces is in inverse video, that character or characters should be entered with the Atari logo key. For example, {A} means to enter a reverse-field heart with CTRL-comma, {5A} means to enter five inverse-video CTRL-U's.

## Commodore PET/CBM/VIC

Generally, any PET/CBM/VIC program listings will contain bracketed words which spell out any special characters: {DOWN} would mean to press the cursor-down key; {3DOWN} would mean to press the cursor-down key three times.

To indicate that a key should be *shifted* (hold down the SHIFT key while pressing the other key), the key would be underlined in our listing. For example, S would mean to type the S key while holding the shift key. This would result in the "heart" graphics symbol appearing on your screen. Some graphics characters are inaccessible from the keyboard on CBM Business models (32N, 8032).

Sometimes in a program listing, especially within quoted text when a line runs over into the next line, it is difficult to tell where the first line ends. How many times should you type the SPACE bar? In our convention, when a line breaks in this way, the ~ symbol shows exactly where it broke. For example:

```
100 PRINT "TO START THE GAME ~
      YOU MAY HIT ANY OF THE KEYS
      ON YOUR KEYBOARD."
```

shows that the program's author intended for you to type two spaces after the word *GAME*.

## All Commodore Machines

Clear Screen {CLEAR}	Cursor Left {LEFT}
Home Cursor {HOME}	Insert Character {INST}
Cursor Up {UP}	Delete Character {DEL}
Cursor Down {DOWN}	Reverse Field On {RVS}
Cursor Right {RIGHT}	Reverse Field Off {OFF}

## VIC/CBM 64 Conventions

Set Color To Black {BLK}	Function Two {F2}
Set Color To White {WHT}	Function Three {F3}
Set Color To Red {RED}	Function Four {F4}
Set Color To Cyan {CYN}	Function Five {F5}
Set Color To Purple {PUR}	Function Six {F6}
Set Color To Green {GRN}	Function Seven {F7}
Set Color To Blue {BLU}	Function Eight {F8}
Set Color To Yellow {YEL}	Any Non-implemented Function {NIM}
Function One {F1}	

To enter any color code, hold down CTRL and press the appropriate color key. Use CTRL-9 for RVS on and CTRL-0 for RVS off.

## 8032/Fat 40 Conventions

Set Window Top {SET TOP}	Erase To Beginning {ERASE BEG}
Set Window Bottom {SET BOT}	Erase To End {ERASE END}
Scroll Up {SCR UP}	Toggle Tab {TGL TAB}
Scroll Down {SCR DOWN}	Tab {TAB}
Insert Line {INST LINE}	Escape Key {ESC}
Delete Line {DEL LINE}	

When you see an underlined character in a PET/CBM/VIC program listing, you need to hold down SHIFT as you enter it. Since the VIC-20 and Commodore 64 have fewer keys than the PET/CBM, some graphics are grouped with other keys and have to be entered by holding down the Commodore key. If you see any of the symbols in the left column underlined in a listing, hold down the Commodore key and enter the symbol in the right column. Just use SHIFT to enter all other underlined characters.

! K	← *	1 E
" I	↑ PI	2 R
# T	. S	3 W
\$ @	- Z	4 H
% G	= X	5 J
' M	< C	6 L
& #	> V	7 Y
\ -	, D	8 U
; F	/ P	9 I
? B	* N	@ SHIFT*
( £	+ Q	[ SHIFT+
) SHIFT-£	0 A	] SHIFT-

## Apple II / Apple II Plus

All programs are in Applesoft BASIC, unless otherwise stated. Control characters are printed as the "normal" character enclosed in brackets, such as {D} for CTRL-D. Hold down CTRL while pressing the control key. You will not see the special character on the screen.

## TRS-80 Color Computer

No special characters are used, other than lowercase. When you see letters printed in inverse video (white on black), press SHIFT-0 to enter the characters, and then press SHIFT-0 again to return to normal uppercase typing.

## Texas Instruments 99/4

No special control characters are used. Enter all programs with the ALPHA lock on (in the down position). Release the ALPHA lock to enter lowercase text.

## Timex TS-1000, Sinclair ZX-81

Study your computer manual carefully to see how to enter programs. Do not type in the letters for each command, since your machine features single-keystroke entry of BASIC commands. You may want to switch to the FAST mode (where the screen blanks) while entering programs, since there will be less delay between lines. (If the blanking screen bothers you, switch to the SLOW mode.)



# A Beginner's Guide To Typing In Programs

The first few times you type in a computer program, things can be quite confusing. We have prepared this guide to help new readers adjust to the novelties of program entry.

## What Is A Program?

A computer cannot perform any task by itself. Like a car without gas, a computer has *potential*, but without a program, it isn't going anywhere. Most of the programs published in **COMPUTE!** are written in a computer language called BASIC. BASIC is easy to learn and is built into most computers (on some computers, you have to purchase an optional BASIC cartridge).

## BASIC Programs

Each month, **COMPUTE!** publishes programs for many machines. To start out, type in only programs written for your machine, e.g., "TI Version" if you have a TI-99/4. Later, when you gain experience with your computer's BASIC, you can try typing in and converting certain programs from one computer to yours.

Computers can be picky. Unlike the English language, which is full of ambiguities, BASIC usually has only one "right way" of stating something. Every letter, character, or number is significant. A common mistake is substituting a letter such as "O" for the numeral "0", a lowercase "l" for the numeral "1", or an uppercase "B" for the numeral "8". Also, you must enter all punctuation such as colons and commas just as they appear in the magazine. Spacing can be important. To be safe, type in the listings *exactly* as they appear.

## Brackets And Special Characters

The exception to this typing rule is when you see the curved bracket, such as "{DOWN}". Anything within a set of brackets is a special character or characters that cannot easily be listed on a printer. When you come across such a special statement, refer to the appropriate key for your computer. For example, if you have an Atari, refer to the "Atari" section in "How to Type **COMPUTE!**'s Programs."

## About DATA Statements

Some programs contain a section or sections of DATA statements. These lines provide information needed by the program. Some DATA statements contain actual programs (called machine language); others contain graphics codes. These lines are especially sensitive to errors.

If a single number in any one DATA statement is mistyped, your machine could "lock up," or "crash." The keyboard, break key, and RESET (or STOP) keys may all seem "dead," and the screen may go blank. Don't panic – no damage is done. To regain control, you have to turn off your computer, then turn it back on. This will erase whatever program was in memory, so always SAVE a copy of your program before you RUN it. If your computer crashes, you can LOAD the program and look for your mistake.

Sometimes a mistyped DATA statement will cause an error message when the program is RUN. The error message may refer to the program line that READs the data. *The error is still in the DATA statements, though.*

## Get To Know Your Machine

You should familiarize yourself with your computer before attempting to type in a program. Learn the statements you use to store and retrieve programs from tape or disk. You'll want to save a copy of your program, so that you won't have to type it in every time you want to use it. Learn to use your machine's editing functions. How do you change a line if you made a mistake? You can always retype the line, but you at least need to know how to backspace. Do you know how to enter inverse video, lowercase, and control characters? It's all explained in your computer's manuals.

## A Quick Review

- 1) Type in the program a line at a time, in order. Press RETURN or ENTER at the end of each line. Use backspace or the back arrow to correct mistakes.
- 2) Check the line you've typed against the line in the magazine. You can check the entire program again if you get an error when you RUN the program.
- 3) Make sure you've entered statements in brackets as the appropriate control key (see "How To Type **COMPUTE!**'s Programs" elsewhere in the magazine.)
- 4) Save the program to tape or disk before you RUN it. Consult your computer manuals if you aren't sure how to do this.
- 5) If you get an error when you RUN the program, check your listing against the published program.





**tele soft, inc.**

P.O. BOX 3456, TROY, MICH 48099

Complete line of Computers ... Software  
Video Games and Accessories  
CALL TODAY!



## HOME COMPUTERS

	400	800
16K	\$279.95	\$659.00
48K	499.00	799.00

## ACCESSORIES

410	Cassette Recorder	\$ 89.95
810	Disk Drive	499.99
850	Interface Module	169.95
825	80 Column Printer	699.95
MOSAIC	32K Ram	113.00

## Bell & Howell (Black Apple)

Apple II plus 48K	\$1287.00
Disk Drive w/Controller	550.00
Disk Drive without Controller	475.00
ACE 16K Expansion	165.00
Parallel Interface	125.00

## Commodore

Commodore "64"	\$525.00
Commodore Vic 20	215.00
Disk Drive	499.00
Datassette	69.00
8K Memory Expander	49.95
RS232 Interface	45.00
Vic 20 Cartridge Games	27.95

## BUSINESS MACHINES

CBM 8032	\$1100.00
CBM 8050 Dual Disk	1299.00
TRS 80 Model III	1650.00

**TIMEX** Home Computer ..... 89.95

**SANYO** Small Business Computer ..... 1700.00

**NEC** Computer 32K Ram ..... 834.00

**XEROX** 820 System I ..... 2600.00

**TeleVideo** 64K Computer ..... 1500.00

**Texas Instruments** TI99 ..... 200.00  
(with \$100.00 rebate)

**HAYES MODEM 1200** ..... 575.00

## ACCESSORIES

Stick Stand	\$ 6.99
2 For	12.00
Atari Joy Stick	6.20
Wico Joy Stick	22.50
Wico Red Ball Joy Stick	24.80
Wico Track Ball Atari/Commandor	52.00
Many More Accessories	CALL

## SOFTWARE FOR



Centipede	\$34.75
Pac Man	34.75
Super Breakout	28.50
Missile Command	28.50
Star Raiders	34.75

**FREE!**  
STICK STAND  
with FASTBALL  
(With purchase of \$60.00  
or more, A \$6.99 value!)



REDUCES  
HAND  
& WRIST  
FATIGUE



**NEW!**

## CBS Software

Krazy Shootout	\$36.00
Krazy Krtfers	36.00
K-Star Patrol	36.00
Krazy Antiks	36.00



Crush, Crumble, Chomp	\$23.00
Ricochet	15.50
Star Warrior	30.50
Rescue at Rigel	23.00

## Broderbund

Choplifter	\$29.95
Apple Panic	23.00
Star Blazer	24.50
David's Midnight Magic	27.00
Stellar Shuttle	29.95

## synapse

Nautilus	23.00
Slime	23.00
Dodge Racer	23.00
Protector	23.00
Chicken	23.00

## IDS!

Pool 1.5	27.00
----------	-------

**VISA & MASTERCARD ACCEPTED**



## ORDERING INFORMATION

Check, Money Order, MasterCard, Visa and C.O.D. Orders accepted. Add \$2.00 for C.O.D. All other orders shipped U.P.S. collect. Michigan residents add 4% sales tax. Hours 9 a.m. to 8 p.m. daily.

**CALL FREE 1-800-255-2000**  
**IN MICHIGAN 1-800-742-4242**

## Adventure

Preppie	23.00
Rear Guard	15.50
Treasure Quest	23.00
3D Tic Tac Toe	12.00
Adventure Series	15.50
War	19.50
Diskey	37.00

## N-LINE systems

Ultima I	30.50
Ultima II	47.50
Frogger	27.00
Jaw Breaker	23.00
Crossfire	23.00

## DataSoft

Shooting Arcade	23.00
Pacific Coast Highway	23.00
Clowns and Balloons	23.00
Atari Character Generator	15.50

## BRUNN

Andromeda	27.00
Doctor Goode's Cavern	24.00
Pathfinder	27.00
Match Racers	24.00

## VISICALC

(For Apple, Atari, Commodore, and IBM) 200.00

## Introducing the BAYLIS BIG STICK



- Arcade tough
- Left or right hand models available
- 7"x8"x3"
- \$39.95 suggested retail



The BAYLIS BIG STICK for Atari® and Vic-20® computers by R. Allen Baylis.

Available at Computer Store Int'l. Glendale, CA and other fine dealers.

Released through Torrey Engberg Smith Co.  
P.O. Box 1075, Glendale, CA 91209 (213) 247-6484.  
Dealer and distributor inquiries welcome.



**ATARI \***  
**400**  
**MEMORY**  
**48K + 4**

- 52 KBYTES TOTAL MEMORY CAPACITY
- 4K BYTES MORE THAN OTHERS
- USES 64K RAMS FOR REDUCED POWER CONSUMP.
- GOLD PLATED CONTACTS FOR RELIABILITY
- SOLDER MASK AND PARTS LEGEND
- 90 DAY WARRANTY
- COMES WITH ILLUSTRATED "HOW TO" MANUAL AND SPECIAL JUMPERS

➔ **BARE BOARD \$ 50.** ➔  
**KIT 179.**  
**ASSM/TESTED 199.**

ECRL, INC.  
PO BOX 387  
CANBY, OR 97013  
(503) 266-4982

ADD \$3 SHIPPING PER BOARD. DELIVERY FROM STOCK  
WITH MONEY ORDER, 3 WEEKS FOR PERSONAL CHECKS.  
\* ATARI 400 IS A TRADEMARK OF ATARI, INC.



# NEWS & PRODUCTS

## Peripherals For The VIC

DATA 20 corporation has introduced its new line of four peripherals for the VIC-20: Video Pak, Printer Interface, Expansion Chassis, and Memory Cartridge. All are designed to give the VIC-20 added capability at an affordable price.

The Video Pak cartridge plugs right into the VIC-20 expansion port, instantly giving a standard 24-line display with a choice of 40 or 80 upper-and-lowercase characters. It also increases memory from 5K to 20K or even 70K, enabling the VIC-20 to run Commodore business software. Video Pak also includes a terminal emulator and screen print feature.

Printer Interface matches the VIC-20 to most popular printers and gives a continuous visual monitoring of the data transfer functions. Status lights indicate if the printer is hooked up, if the buffer is full, and if data is being transmitted. The Printer Interface comes complete with cable and connector and needs no assembly.

Expansion Chassis lets the VIC-20 run a series of four compatible memory, software, or game cartridges with the standard 22 pin edge connector at the same time, while protecting the VIC-20 power supply with a built-in 500ma fuse.

Memory Cartridge boosts the brainpower of the VIC-20 to 20K and features 200ns RAMs for added reliability. Housed in a rugged plastic case, the Memory Cartridge is an ideal first add-on to any VIC-20.

For further information on these four VIC-20 peripherals, contact:

DATA 20 Corporation  
20311 Moulton Parkway  
Suite B10  
Laguna Hills, CA 92653  
(714)770-2366

## New Products From Krell Software

Krell Software has announced several new products. *Connections* is a game system designed to extend and develop the mental capacities of children of all ages. Users select from a variety of game formats as they search for logical connections and learn the



Screen display options with Data 20's Video Pak Cartridge.

**micro magic**  
EXCITING SOFTWARE  
FOR YOUR ATARI.

**TALKING\* ELIZA:**™ Why spend \$100.00 an hour when you can talk to this electronic shrink right in your living room. But watch what you say. \$16.95 Cass. 24K. \$19.95 Disk 32K.

**TALKING\* BANDIT:** All the high powered gambling in software graphics \$16.95 Cass. 24K. \$19.95 Disk 32K.

**TALKING\* NAME THAT TONE:** Simon Says, Simon Does, but did you ever hear Simon talk (Game of Concentration) \$16.95 Cass. 16K. \$19.95 Disk 24K.



**TALKING\* MICRO DUNGEONS:** Limited graphics. Fun to play. Can you survive the perils of the Dungeon and bring back the Golden Orb in this unique talking adventure. Disk only. \$21.95 40K.

**ALIEN COMMANDO:** Protect your Galactic Base from an invasion of Alien Space Saucers of unknown origin. \$22.95 Cass. 24K. \$25.95 Cass. 32K.


Talking Programs can be used with or without voice.

**TALKING\* PROGRAMS** available with speech programmed for voice box by Allen Group. Order at least two programs and buy the voice box at a special price.

Send for low discount prices on Atari and Vic-20, Vic-64 Computer Software.  
A Jan Company  
Enterprise

We accept  

Call or write to order: 614-866-2685  
Send check or money order to:

**MICRO MAGIC  
SOFTWARE**  
P.O. BOX 13428  
Columbus, Ohio 43213



principles of scientific reasoning. *Connections* draws subject matter from all fields of science and the humanities. *Connections* may be played competitively or cooperatively. Players may set difficulty levels and may add additional data as desired.

Available on disks for Apple, Atari, Commodore, Franklin, Radio Shack, and IBM personal computer systems, *Connections* costs \$99.95 (includes one data base).

*The Amazing Ben* is designed to introduce programmers of all ages to the art of artificial intelligence. Extensive documentation is provided to help users create programs which learn from their environment. Ben's language enables him to sense his surroundings, to write and read messages, to ask questions and interpret answers, to move at will across the screen, and to create his own memory structures.

*The Amazing Ben* set of pro-

grams starts by teaching you Ben's language. It guides the user in writing a series of increasingly difficult programs to help Ben traverse mazes that he has never seen before. The user can control Ben and see what he sees as he follows the different mazes while both the user and Ben are learning.

*The Amazing Ben* sells for \$79.95. It is available for Apple, Atari, Commodore, Franklin, Radio Shack, and IBM personal computer.

The Ciarcia High-Resolution Sprite Graphics board enables you to maintain as many as 32 sprites (single-color figures of 8x8 or 16x16 pixels) at one time or hires alphanumerics, all with a solid-color backdrop.

The Sprite Graphics Board is Apple (C) slot-compatible. Since it comes with Krell's Multi-Video Board, only one monitor is needed to display both normal Apple (C) video or sprites.

The Sprite Graphics Board comes with two disks (demonstration software and the sprite editor), with full documentation. The price is \$325.

The *College Board 1983 SAT Exam Preparation Series* includes 42 programs covering vocabulary, reading comprehension, word relationships, mathematics, and the test of standard written English. It is available for Apple, Atari, Commodore, Franklin, IBM and Radio Shack microcomputers for \$299.95.

Krell is also the marketing agent for the Socrates Chess Corporation's *Shelby Lyman Chess Tutorial Series* for Apple, Atari, Commodore, Franklin, and IBM personal computers.

The series uses the latest and most effective methods of chess instruction programming techniques to provide truly individualized instruction. All aspects of the game are covered, from basic chess weaponry to the

## FIVE NEW GAMES FOR CASSETTE OR DISK FROM MERLIN ENTERPRISES

# MERLIN

ATARI® apple® VIC-20®

### LASER ARENA (16K).....\$14<sup>95</sup>

Be a Laser Gladiator; Race a Laser Chariot; Battle your opponent or the computer in a fight to the death.

### MIND LEXICA (16K).....\$9<sup>95</sup>

A compendium of familiar and futuristic challenges for everyone to enjoy. Watch out . . . may be addictive.

### CODENAME: COBALT (48K).....\$24<sup>95</sup>

This is the one you've been waiting for! Not a text game! Experience the ultimate adventure in this 3-D, full-color, high-resolution future-world. Can you outwit the guardians of this behemoth labyrinthion: a hurtling, living COBALT BOMB! Find and arm the self-destruct before the Earth is vaporized . . . but can you escape with your life?!



### ARTHUR DAVIS DETECTIVE ENCOUNTER SERIES — TWO FOR ONE SPECIAL .....\$19<sup>95</sup>

Scotland Yard is baffled! Can you as Arthur Davis — famous Welsh detective — unravel these tangled webs of intrigue?



**#3 Murder in the Manor (48K)**  
Does everyone have a motive?!

**#4 Death for Dessert (48K)**  
Why would anyone want to murder Mr. Pym?

California residents add 6% Sales Tax.  
UPS, C.O.D. Prepaid orders shipped FREE!  
Send check or money order to:

**MERLIN ENTERPRISES**  
P.O. BOX 2876, TORRANCE, CA 90509 213/316-0945



**COMMODORE**

**ATARI**

400 16K	\$265
410 RECORDER	76
800 48K	635
810 DISK DRIVE	429
PERCOM D/D DISK DRIVE	589
825 PRINTER	575
830 MODEM	149
850 INTERFACE	159
LE STICK	30
NEWPORT PROSTICK 150	30
VERBATIM SS/DD DISKS	29
MAXELL SS/DD DISKS	35
Joysticks or Paddles	18
The Entertainer	69
The Programmer	54
The Educator	119
The Communicator	299
Caverns of Mars	29
Centipede	33
Pac Man	33
Star Raiders	33
Apple Panic	21
Canyon Climber	21
Choplifter	26
Clowns and Balloons	21
Rosen's Brigade	26
Frogger	25
Gorf	30
Picnic Paranoia	26
K-Razy Shootout	36
Escape from Vulcan's Isle	21
Pacific Coast Highway	21
Nautilus	26
Preppie	23
O'Reilly's Mine	26
Threshold	30
Shamus	25
Curse of Ra	16
Firebird	30
Zork I/II	30
Visicalc	179
APX SOFTWARE	CALL
APPLE SORTWARE	CALL
TRS-80 SOFTWARE	CALL

**Commodore**

VIC 20	\$179
VIC 1515 PRINTER	335
VIC 1530 DATASSETTE	67
VIC 1540 DISK DRIVE	489
VIC 1600 VICMODEM	97
VIC 1211 SUP. EXPANDER	53
VIC 16K MEM. EXPANDER	99
VIC 8K MEM. EXPANDER	52
Scott Adams Adventures	35
Vic Avenger	23
Super Alien	23
Choplifter	32
Apple Panic	32
Omega Race	35
Shamus	29
Gorf	35

**PRINTERS**

NEC 8023A-C	\$479
Okidata Microline 80	329
Okidata Microline 82A	469
Epson MX 100/Graftax	679

**MONITORS**

NEC JC-1203 Color	\$779
Sanyo 13" Color	399
Amdek Video 300 Amber	169
Amdek Color I	339

## Optomam Consumer Products

Dept. A  
P.O. Box 1038, Placerville, CA 95667

**916/621-1090**

TO ORDER CALL OR WRITE

Terms: Certified check, M.O., personal check (2 wks. to clear), Bank Wire (U.S. Funds). No C.O.D. Visa, M/C add 3% surcharge, inc. card # & exp. date. CA res. add 6% tax. Ship. & Handling add 3% (Min. \$3) in Cont'l. U.S. (call for ship. other areas). Send \$2 for catalog, \$2 off coupon on next order. Inc. phone # all orders. Prices subject to change w/o notice.

## ★ COMMODORE ★ ★ PET OWNERS ★ NEW AUTHENTIC PROGRAMS CASINO CRAPS

- Any bet made in Vegas, now can be made at home.
- The Field Hardways-Place Bets-Come-Pass Line
- Find a winning system, without losing a dime.

8K version (1 player) \$10.95  
16K version (5 players) \$12.95

### KONNECT FOUR

- Now play this popular game against your pet.
  - Excellent sound & graphics
  - Real time clock
  - Three levels of play
  - Can fit into 8K
  - Fun & Educational for all ages
- ONLY \$10.95

GPMicrosystems  
72-31 67th Place  
Glendale, N.Y. 11385

Please include \$1.50 shipping & handling for each program. Indicate version.

## Memory Expansion Boards for the ATARI\* Computer

- Completely compatible with ATARI hardware and software
- No modifications necessary (16K & 32K)
- Fully assembled and tested
- User installable
- Gold connector tabs and sockets
- One year warranty

16K Memory Board (800)-\$49.95  
32K Memory Board (400/800)-\$89.95  
48K Memory Board (400)-\$169.96

We Will Meet Advertised Prices

### Build Your Own Memory

16K board - no components - \$10.00  
32K board - no components - \$30.00  
48K board - no components - \$50.00

### — NEW ATARI SOFTWARE —

Add \$2 Shipping and handling  
Visa & MasterCard Accepted  
ATARI is a trademark of Atari Inc.

Dealer Inquiries Welcome

**Tiny Tek, Inc.**

P.O. Box 820249  
Dallas, TX 75382-0249  
214-373-8926

## Eric Marfin's

Where prices are born, not raised!



**Atari 800 48K \$639.**

810 Disc Drive \$439.  
410 Recorder \$74.  
825 Printer \$578.  
850 Interface \$168.  
481 Entertainer \$76.  
482 Educator \$118.  
483 Programmer \$54.  
484 Communicator \$295.

### ATARI Software

CX4104 Mailing List ..... \$17  
CXL4007 Music Composer ..... 43  
Programming 2 & 3 ..... 20  
Conversational Languages ..... 43  
CX4018 Pilot ..... 57  
CX405 Pilot ..... 97  
CS8126 Microsoft Basic ..... 65  
CXL4022 Pac-Man ..... 31  
CXL4020 Centipede ..... 31  
CXL4009 Computer Chess ..... 26  
CSL4011 Star Raiders ..... 33  
CXL4012 Missile Command ..... 26  
CSL4013 Asteroids ..... 26

*Call for price of 3rd party software*



*Orders shipped in 24 hours*

For fast delivery, send certified or cashier checks, money orders, or direct bank wire transfers. Personal checks allow 2 to 3 weeks to clear. Prices reflect cash discount and are subject to change. Add 2% for credit card purchases. Shipping—Software \$2 Minimum. Hardware—call. Foreign inquiries invited—add 15% for shipping. Ohio residents add 6.5% sales tax.

## Eric Marfin's

5485 Warrensville Center Road  
Maple Heights, Ohio 44137  
**216/663-2032**

Call Toll Free  
**1-800-482-7254**  
outside Ohio

Mon.-Sat. 10-6 EST



game's most subtle points. The series also offers a chance to match wits against international grandmasters.

Each instruction module interfaces with the Socrates Chess Player. The price of each module is \$39.95.

*Krell Software*  
1320 Stony Brook Road  
Stony Brook, NY 11790  
(516)751-5139

## ZX-81 Software

RAK Electronics has announced a new line of software for the Sinclair ZX-81. Three recent releases are *Math Drill*, *Golf*, and *Towers of Hanoi*.

An educational program, *Math Drill* allows the user to select addition, subtraction, multiplication, or division. Written for elementary school aged children, *Math Drill* displays

flashcard-style math and keeps score.

*Golf* allows up to four players to play 18 holes.

In *Towers of Hanoi*, the player tries to move all the discs to the last tower in the least number of moves possible.

Each program is available for \$4.95. There is also a \$2 (per order) shipping and handling charge. Each program requires a 16K memory expander. A free catalog of ZX-81 software is available on request.

*RAK Electronics*  
P.O. Box 1585  
Orange Park, FL 32073

## Airstrike Game For Atari 400/800

English Software announces the release of *Airstrike*. Available on 16K cassette and disk, *Airstrike*

provides arcade realism and demands a high level of skill from the game-player within a fast shoot-out scenario.

Game features include: superb fine-scrolling graphics; top-notch color; multiple skill levels (each denoted by a different color playfield); 100% machine program; one- or two-player mode. The suggested retail price is \$39.95.

*English Software Company*  
934 Hermosa Avenue  
Suite 13, Sandcastle Plaza  
Hermosa Beach, CA 90254  
(213)372-3440

## A 40/80 Character Expansion For The VIC

Computer World has designed an expansion to make the VIC suitable for professional applications, e.g., accounting and word processing, especially when using the Brother 8300 daisy wheel printer/typewriter, adapted to operate with the VIC-20.

When using the video cartridge, you may choose between a 25 x 40 and a 25 x 80 character mode (25 lines of 80 characters each). This enables you to use the programs written for the 2000, 3000, 4000 and 8000 CBM computers without major alterations.

The Computer World video cartridge for the VIC-20 has the following features:

- 40 or 80 column display (switchable with BASIC, without losing any program in memory).
- VIC and PET/CBM graphics.
- 32K RAM expansion (instead of 27.5K). Note: All you need is the expansion box with the 3, 8 and 16K RAM cartridges.
- Upper- and lowercase with true descenders.
- Full cursor control.
- Program editing in 40 or 80 column mode.
- No alterations needed in VIC.

## Apropos introduces RAMAX

The only RAM your VIC-20® will need

### FEATURES

- A FULL 27K bytes. (Added to VICs 5K)
- Fully switchable in sections. (may be used with Super Expander and games, and other plug-ins)
- Built in reset button.
- Fuse protected.
- Totally self contained
- 2 extension connectors for any device normally plugged into the expansion port
- Very low power useage
- High reliability, gold plated connectors

THIS SUPERB PLUG-IN GIVES YOUR VIC-20  
REAL POWER AND EXPANDABILITY

FOR ONLY \$165.00

6 month parts and labor warranty  
WE SERVICE WHAT WE SELL

### TO ORDER:

Send Check or Money Order For the Total, plus Shipping: \$2.00 (Software) or \$4.00 (Hardware), max \$5.00. Calif. residents add 6% tax.

Phone orders: CALL (805) 484-3604

For credit card orders, include all information on card.



Foreign orders, add \$8.00.  
All items shipped from stock.



VIC-20 is a registered trademark of Commodore Business Machines, Inc.

**APROPOS TECHNOLOGY**

### SOFTWARE DR. FLOYD

Psychoanalysis by computer? - well, not quite, but Dr. Floyd will carry on

a conversation with you using psychoanalytic techniques giving the appearance of artificial intelligence. Requires 16K or more. \$12.95

### WORD PLAY

Includes: "Jargon" - a jargon word generator. "Animal" - a fun game where the player teaches the computer about animals. "Story" - the computer writes stories using the players input names, places, etc. "Haiku" - the computer writes HAIKU like poetry. Requires 16K or more. \$12.95

All software is on high quality cassettes and is replacement guaranteed.

Camarillo, CA 93010

350 N. Lantana Ave., Suite 821



# OLYMPIC SALES CO

Telex: 67 34 77 Toll-Free Phone Orders:  
Toll-free (in CA) 800-252-2153 800-421-8045 (out of CA)  
Order Desks open 6 days a week! 7:00 AM to 6:00 PM Mon-Sat  
P.O. Box 74545 216 So. Oxford Ave. Los Angeles, CA 90004  
Phone: (213) 739-1130 Cable: "OLYRAV" LSA

**HEWLETT PACKARD LCD**  
HP-16C Computer Scientist—  
for Programmers & Digital  
Designers 127.50 **WE ARE AUTHORIZED  
FULL LINE HP Dealers.**

**VICTOR** YOUR COST:  
\$395.00  
VICTOR 5080 80 Column Printer  
A real work horse! 100 cps, graphics  
buffer, 4 interfaces including HP-IB  
Retail: \$995.00 Wholesale: \$670.00  
Fully guaranteed by Victor, in business  
since 1918

**Commodore VIC-20**  
5K Personal Computer  
(Expands to 32K)  
Works with any TV!  
**\$169.95**

**COMMODORE VIC-20**  
1530 Datasette rec. 59.95  
1541 Disk drive 339.95  
1525E Printer, great unit 339.95  
1600 Phone modem 99.95  
We carry an enormous amount of  
software & games for the VIC-20.  
**WE ARE A FULL-LINE  
COMMODORE DEALER &  
CARRY IN STOCK ALL  
COMMODORE MODELS MOST OF THE TIME.**

**FRANKLIN ACE 1000**  
64K Computer, Apple Compatible  
uses all Apple software, peripherals  
& accessories.  
ACE 1000 including disk drive w/  
controller plus "ACE Writer" word  
processor software. RE: \$1776.00  
Your Cost: \$1299.95

**ATARI 800™ - 48K**  
It is 100% Atari  
**\$499.95**  
IN STOCK

**olivetti** Your Cost  
"PRAXIS 35" \$429.95  
**ELECTRONIC TYPEWRITER**  
Interchangeable 'Daisy  
Wheel' type element,  
3 sizes-Pica, Elite & Micro  
plus cartridge ribbon & more!

**WE CARRY THE  
FOLLOWING  
MONITORS**  
BMC as low as \$89.95  
SANYO all models  
COMREX all models  
AMDEK all models  
NEC all models  
Texas Instruments  
& more!

**APPLE COMPUTER**  
48K Plus 1069.95  
Disk dr w/controller 494.95  
Disk dr - no controller 419.95

**TIMEX/SINCLAIR**  
TS1000 2K Computer 99.95  
TS1600 Memory expansion 49.95  
**MEMOTECH** Memopak Peripherals  
MT64K 64K \$179.95  
MT32K 32K 109.95  
MT16K 16K 59.95  
More peripherals available

**ATARI 400™**  
16K  
**\$199.95**

**MULTITECH**  
Computer \$349.95  
64K Apple compatible with tape  
software, available with Apple  
compatibility with diskette in  
January 1983, great unit. Plenty  
of educational & other software.  
Full size keyboard \$49.95  
With Chinese lang. \$479.95  
5 1/4" Disk drive w/cont. 269.95  
150 line p/m ptr 179.95  
Cassette recorder 69.95  
Sound generation board 129.95  
& speech synthesizer

**COLECO VISION**  
YOUR COST  
**\$199.95**  
including FREE  
Donkey Kong  
Cartridge.  
from COLECO  
ARCADE QUALITY  
TELEVISION GAME

**Texas Instruments  
Home Computer**

**TI-99/4A**  
Now  
Only  
**\$199.95**  
AFTER MFG'S  
REBATE—you pay  
OSC \$299.95, TI rebates you \$100.  
(offer good thru 1/31/83)  
Plus FREE \$50 RF Modulator  
with purchase of TI-99/4A  
Call & ask about FREE Speech  
Synthesizer OFFER!

**TI EXPANSION BOX SYSTEM**  
Peripheral expansion box 199.95  
RS 232 card 139.95  
Disk control card 199.95  
Mem. exp. 32K card 239.95  
P-code card (1270 req) 199.95  
Disk memory drive 379.95  
An enormous amount of peripherals,  
accessories & software, at great prices  
**Programmable TI-59**  
Your Cost: \$169.95 plus—\$20.00  
rebate from TI plus Free Library  
TI LCD Programmer 59.95  
**DISKETTES** Box of 10  
Verbatim SS SD 40 track 29.95  
3M SS DD 7440 29.95  
Maxell SS DD Soft sect 34.95  
Dysan 104 Soft sect 44.95  
BASF Soft sectored 28.95  
OMNI SS SD 19.95  
Head cleaning kit 11.95  
Refill 19.95

## SPECIFIC SOFTWARE

<b>SKETCH PAD</b> Draw your own pictures	For VIC 20	10.95
<b>MONEY MINEFIELD</b> Try to collect all the money bags before running into the walls. A fast action multiple skill level game	For VIC 20	12.95
<b>TARGET DESTROY</b> Try to destroy the enemy base before you run out of bombs	For VIC 20	10.95
<b>FIREFIGHTER II</b> Protect your homes and forest from the raging fire	For VIC 20	12.95
<b>MOONLANDER</b> Try to land without crashing into the moon. A fast action, fun filled adventure	For VIC 64	14.95
<b>FIREFIGHTER 64</b> Like FIREFIGHTER II protect your homes and forest, but now its more exciting than ever	For VIC 64	14.95
<b>SPRITE EDITOR</b> For people who want to take advantage of the Commodore 64. Multi-colored sprites at your fingertips. Easy to make, and fun to use. A must for all serious programmers	For VIC 64	17.95
<b>MAILING LIST V1.9</b> The best mailing list around for your Vic-20 and 1540 disk drive system. 650 entries per floppy with an 8k expansion Single or multiple label printing capability Printing of all information Adding - Changing - Deleting any record Single Record searching Menu Driven. Very user friendly	For VIC 20	17.95
<b>PERSONAL FINANCE PACKAGE I</b> A very versatile program product. An expense register and general ledger all in one. Menu driven and very user friendly. A must for all with recordkeeping in mind	SPECIFY VIC 20 or 64	19.95
<b>MAILING LIST V2.0</b> Even better than V1.9. Now faster searches multiple width mailing labels, alphabetizing and much much more	For VIC 64	19.95

Dealer Enquiries Always Invited  
California residents add 6 1/2% sales tax  
To order send check or money order to:

**SPECIFIC SOFTWARE**

P.O. Box 10516 San Jose, CA 95157  
For COD orders call (408) 241-0181



## ATARI NECESSITIES

We now have in stock the fabulous  
ATR8000. Look for Software Publishers ad  
(Nov. pg. 193) for details. Look to us for  
price!! Save 15% and more.

DISKEY	<del>40.00</del>	(d)	39.95
VALFORTH	<del>46.00</del>	(d)	39.95
GENERAL UTILITY PACKAGE	<del>40.00</del>	(d)	35.95
PLAYER MISSILE, CHAR. & SOUND	<del>40.00</del>	(d)	35.95
DISPLAY FORMATTER	<del>36.00</del>	(d)	29.95
TURTLE GRAPHICS & FP ROUTINES	<del>46.00</del>	(d)	39.95
TEXT COMPRESSION & FORMATTING	<del>18.00</del>	(d)	14.95
HEAVY DUTY BINDER	<del>10.00</del>		11.95
ALL SEVEN ITEMS ABOVE	<del>250.00</del>	(d)	179.95
TRICKY TUTORIALS 1, 2, 3, 4, 6, 8	<del>40.00</del>	(c,d)	16.95
TRICKY TUTORIALS 5, 7	<del>20.00</del>	(c,d)	24.95
TRICKY TUTORIALS 9, 10, 11,	<del>40.00</del>	(c,d)	16.95
DE RE ATARI	<del>10.00</del>	(b)	17.95
TECHNICAL REFERENCE NOTES	<del>20.00</del>	(b)	24.95
DOS UTILITIES SOURCE LISTING	<del>7.00</del>	(b)	5.95
INSIDE ATARI DOS	<del>10.00</del>	(b)	16.95
YOUR ATARI COMPUTER	<del>16.00</del>	(b)	14.95
ATARI GAMES & RECREATIONS	<del>14.00</del>	(b)	12.95

**CHRISTMAS SPECIAL — THE ENTIRE MONTH OF DECEMBER 15% OFF  
ON ANY BOOK IN STOCK — HUNDREDS OF TITLES — GIVE US A CALL**



**COMPUTER PLACE**  
P.O. Box 6007-169 1698 Market St.  
Redding, CA 96001 Ph. 916-221-1312



COMPUTER PLACE has the largest selection of items for Atari, Apple, Com-  
modore and Radio Shack computers that you are ever likely to see. Try us for  
obscure and hard to get items that your local dealer might not stock. **Mail Order  
Terms:** Cashier's check or M.O. Charge cards add 3%. Add 3% shipping and  
handling (minimum \$2.50) UPS ground. No. C.O.D.'s. CA residents add 6% sales  
tax. Prices subject to change without notice.



- No external power supply needed.
- Fits in the Arfon or Commodore expansion box.
- Operates with all ROM cartridges, except those located in the area from A000 hex to C000 hex.

The price is \$249 US.

The company was incorrectly identified in the November 1982 new product release in **COMPUTE!**. The correct information is:

Computer World  
Hilvertsweg 99.  
1214 JB Hilversum  
Holland  
Tel: 035-12633

## Color Video For PET/CBM, AIM, SYM

Color Chart is a color video RAM board designed for Commodore CBM, Rockwell AIM and Syner-tek SYM type systems. The small

2 1/2 x 5 inch board plugs into a 2532 ROM socket. Two control wires clip to read/write signals in the system and convert the ROM socket into a 4K video RAM.

Color Chart operates in eight different modes, ranging from an alphanumeric 32 x 16 display with built-in character generator to a high resolution graphics mode with 128 x 192 pixels. Up to eight different colors are available, depending on mode. Based on the 6847 video controller, Color Chart reads information that the computer writes to video RAM and translates it into a standard RS170 type composite video output. This can directly drive most color video monitors or can be used with a RF modulator and color TV set.

Color Chart can be used to present independent color graphics displays on a PET/CBM while the main screen displays corresponding text. Business graphs and game graphics can be displayed. Color Chart provides an inexpensive full screen video

display for AIM or SYM and has been used to convert these machines into remote computer terminals.

Color Chart sells for \$139.95.

CGRS Microtech  
P.O. Box 102  
Langhorne, PA 19047  
(215)757-0284

## Disk Utility For The Apple

Central Point Software, Inc., has introduced The Filer, an Apple disk utility system for 35, 40, and 70 track drives. The Filer package contains a disk drive speed check, disk drive test, fast copy program (35 seconds), and a sophisticated file manager. Options include: Catalog with space on disk, Copy Files, Copy Disk, and Copy DOS, Delete, Lock and Unlock Files, and Change Booting Program (name and file type).

## YOU'RE GONNA LOVE THESE ROCK BOTTOM PRICES—HONEST!

### SOFTWARE

RETAIL	SALE
Action Quest	29.95 21.95
Ali Baba and the 40 Thieves	32.95 22.95
Alien Numbers	34.95 24.49
Anti-sub Patrol	29.95 21.95
Apple Panic	29.95 21.95
Astro Quizes	23.95 16.95
Atari Assem Ed — cart	58.95 42.95
Atari Bookkeeper	149.95 106.95
Atari Macro Asm Text Editor	89.95 64.49
Atari Microsoft Basic	89.95 64.49
Atari Home File Manager	49.95 36.95
Avianche	22.95 16.95
Bandits	34.95 24.95
Battle of Shiloh	39.95 27.95
Beane Bopper — cart	34.95 24.49
Bomber Attack	16.00 10.95
Bug attack	29.95 21.95
Claim Jumper	34.95 24.49
Came to Fame	19.95 14.95
Conversational Spanish	59.95 42.95
Cosmic Balance	39.95 27.95
Crossfire	29.95 21.95
Crossword Magic	49.95 34.49
Crush, Crumble, & Champ	29.95 21.95
Crypt of the Undead	29.95 21.95
Curse of the Ra	19.95 13.95
Cyborg	34.95 24.49
Cyroid	29.95 21.95
David's Midnight Magic	34.95 24.49
Deadline	49.95 34.49
Deadly Secrets #1	34.95 24.49
Deadly Duck — cart	29.95 21.95

Deluxe Invaders	34.95 24.49
Dig Daze	22.95 16.95
Downhill	22.95 16.95
Dr. Goodcode's Cavern	29.95 21.95
Eastern Front (1941)	29.95 21.95
Embargo — cart	49.95 34.49
Escape from Vulcan's Isle	29.95 21.95
Family Cash Flow	22.95 16.95
Fast Eddy — cart	29.95 21.95
Fathoms Forty	34.95 24.49
File Manager 800+	99.95 69.95
Firebird — cart	49.95 34.49
Gemy White's Music Lesson	29.95 21.95
Ghost Encounters	29.95 21.95
Ghost Hunter	34.95 24.49
Gold Rush	34.95 24.49
Golf	39.95 27.95
In-Is-Balloon	34.95 24.49
Jawbreaker	29.95 21.95
K-razy Shootout — cart	49.95 34.49
King Arthur's Heir	29.95 21.95
Knockout	20.00 13.95
Letterman	22.95 16.95
Letter Perfect	149.95 106.95
Letter Perfect w/ Mail Merge	199.95 136.49
Lost Colony	29.95 21.95
Maid-N-Ten	34.95 24.49
Master Type	39.95 27.95
Match Racers	29.95 21.95
Math Pak	34.95 24.49
Miner 2049'er — cart	49.95 34.49
Mission: Asteroid	24.95 17.49
Moon Game Is	29.95 21.95
Mouskattack	34.95 24.49
My First Alphabet	34.95 24.49



### TOP SELLERS

CANYON CLIMBER	29.95 21.95
CENTPEDE — CART	44.95 31.95
CHOPLIFTER	34.95 24.95
COMBAT	24.95 17.95
DATA PERFECT	99.95 74.95
FROGGER	34.95 24.49
GRAPHIC GENERATOR	24.95 17.49
PAC MAN — CART	44.95 31.95
PREPPY	29.95 21.95
RASTER BLASTER	29.95 21.95
SHAMUS	34.95 24.49
SLIME	34.95 24.49
TEXT WIZARD II	99.95 68.95
WIZARD OF WOR	39.95 27.95
ZORK I, II, OR III	39.95 27.95
AXLON 128K RAMDISK	699.00 464.95
MPC 32K MEM MODULE	199.50 109.95
PROWRITER I PRINTER	795.00 449.95
WICO JOYSTICK	29.95 21.95
WICO REDBALL STICK	34.95 24.49

Nautilus	34.95 24.49
Number Blast	15.95 11.95
O'Reilly's Mine	34.95 24.49
Outlaw Howitzer	22.95 16.95
Pacific Coast Highway	29.95 21.95
Page 6	29.95 21.95
Picknick Paranoia	34.95 24.49
Pogoman	39.95 27.95
Pool 15	34.95 24.49
Pool 400 — cart	39.95 27.95
Protector	34.95 24.49
Raphian	34.95 24.49
Rear Guard	24.95 17.95
Rescue at Rigol	29.95 21.95
Robbie the Robot Chaser	24.95 17.49
Rosen's Brigade	34.95 24.49
Saga Hi-res Adventures	39.95 27.95
Salmon Run	22.95 16.95
Sammy the Sea Serpent	22.95 16.95
Sands of Egypt	39.95 27.95
S.C.R.A.M.	24.95 17.95
Seven Card Stud	15.95 11.95
747 Landing Simulator	22.95 16.95
Shattered Alliance	29.95 21.95
Shootout at the G.K. Galaxy	20.00 13.95
Snake Byte	29.95 21.95
Sneakers	29.95 21.95
S.A.M. (Software Auto-Mouth)	59.95 41.49
Space Eggs	29.95 21.95
Speedway Blast — cart	39.95 27.95
Spell Wizard	29.95 21.95
Star Blazer	31.95 21.95
Star Raiders — cart	44.95 31.95
Stellar Shuttle	29.95 21.95
Syn Assembler	49.95 34.49

Tank Arcade	15.00 10.49
Temple of Aposha	39.95 27.95
The Next Step	39.95 27.95
The Nightmare	29.95 21.95
Threshold	39.95 27.95
Tigers in the Snow	39.95 27.95
Track Attack	29.95 21.95
Ultima I	39.95 27.95
Ulysses and the Golden Fleece	34.95 24.49
Upper Reaches of Aposha	19.95 13.95
Video Math Flash Cards	15.95 11.95
Vocalic	250.00 183.95
War	24.95 17.49
Warlock's Revenge	34.95 24.49
Way Out	39.95 27.95
Wizard & the Princess Hi-res Adv.	32.95 22.95
Worm War I — cart	34.95 24.49

### HARDWARE

Atari 800 Home Computer 48K	899.00 624.95
Atari 810 Disk Drive	599.95 424.95
Atari 825 80 Column Printer	799.95 579.95
Atari 830 Acoustic Modem	199.95 149.95
Atari 850 Interface Module	219.95 169.95
Atari Numerical Keypad	124.95 94.95
Epson MX80FT w/ Graphics	945.00 699.95
Hayes Smartmodem 300 Baud	289.00 194.95
NEC 12" Hi-res Green Screen	285.00 149.95
NEC 8023 Printer	695.00 459.95
Printmaster II (Daisy Wheel)	2595.00 1599.95
Powrwriter II Printer	995.00 649.95
Starwriter II (Daisy Wheel)	1895.00 1325.95
Percom Disk Sgl Density Drive	799.00 599.95
Elephant Brand Diskettes	10 Box 18.95
Verbatim Diskettes	10 Box 25.00

CALL US... WE CAN HELP!

TERMS: WE ACCEPT VISA/MASTERCARD! please include name, address, phone number, card number, & expiration date, cashier's check, personal check (allow 10 working days to clear), or C.O.D. (add \$2 C.O.D. charge). Unless otherwise requested, we ship U.P.S. surface (street address required). Please include \$5 or 5% (whichever is greater) for shipping & handling. U.P.S. blue label slightly higher, please call. Please add \$10 or 5% (whichever is greater) for shipping & handling of monitors due to their excessive weight. Foreign orders please include \$10 or 10% (whichever is greater) for shipping.



(619) 765-0239

Shipping: Please INCLUDE PHONE NUMBER WITH ALL ORDERS. All items are new and carry manufacturer's warranty. Apple Country, Ltd. cannot guarantee the merchantability of any product. Prices are subject to availability and change without notice. Call before returning goods for repair or replacement. RMA number required. California residents add 6% tax. Please send S.A.S.E. for free catalog. WE CARRY A FULL LINE OF SOFTWARE FOR APPLE, ATARI, TRS-80, VIC, AND IBM.

P.O. Box 1099, 2225 Main Street, Julian, Calif. 92036

Apple Country, Ltd. is A DISCOUNT MAIL ORDER HOUSE for the micro computer industry and is a California corporation not affiliated with Apple Computer Inc. Apple is a trademark of Apple Computer Inc. Atari is a trademark of Atari Inc.



## THE MONKEY WRENCH™ FOR ATARI



\$49.95  
(See the many reviews.)

A BASIC and machine language programmers aid for 800 users. Plugs into right slot and works with ATARI BASIC. Adds 9 new direct mode commands including auto line numbering, delete lines, change margins, memory test, renumber BASIC, hex/dec conversion, cursor exchange, and machine language monitor.

The monitor contains 15 commands used to interact with the 6502. Some are display memory/registers, disassemble, hunt, compare, hex/dec convert, transfer memory. Uses screen editing.

## 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 PET VIC PET VIC PET VIC PET VIC PET

Are you tired of long waits to load and save on Cassette? Like to have the standard LOAD/SAVE plus an extremely fast and reliable capability? Then you need...

## The Rom Rabbit

**NEW!**  
Rabbit on ROM Cartridge for VIC. Can be used with other cartridges since it has a piggy-back connector which saves wear and tear on your VIC's connector.

Easy to install. It just plugs in.

1. Much faster cassette load/save
2. Memory test
3. 12 commands in all

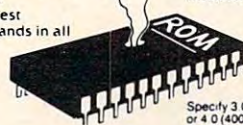
VIC or PET

\$39.95



Loads and saves an 8K program in about 30 seconds. Try it - your Pet or VIC normally takes 3 minutes!

Quantity Discounts for educational institutions.



Visa and M.C.

Specify 3.0 (2001 PET) or 4.0 (4001 or 8032) or VIC

## PET TERMINAL SOFTWARE

A buy you RS-232 users can't pass-up. Includes RS-232 hardware with a sophisticated software package. May be controlled via keyboard or from BASIC. A super buy. \$129.95

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

Rana Disk Drive - 375  
4 Drive Controller - 114

## More than just an Assembler/Editor!

It's a Professionally Designed Software Development System



**MAE**  
for PET  
APPLE  
ATARI  
\$169.95

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!

## 5 1/4 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!



## ATC TECHNICAL SALES



ATARI Special of the Month  
**800 48k**  
**Now \$659.**



ATARI 810™  
Disk Drive  
**\$429.**



NEW PERCOM  
Disk Drive  
for ATARI  
IN STOCK



Compatible with ALL  
APPLE II\* Software & Hardware

## STANDARD FEATURES

- 64K RAM
- UPPER & LOWER CASE
- 50 WATT PWR. SUPPLY
- NUMERIC KEYPAD
- ALPHA SHIFT LOCK
- BUILT IN FAN

\*Apple II is a trademark of Apple Computer Co.

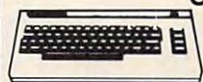
## PRINTERS & PERIPHERALS

C. ITOH 8510 PROWRITER	\$495
STARWRITER F-10	1449
SMITH CORONA TP-1	649
OKIDATA 82A	485
PERCOM 1st DRIVE	649
PERCOM 2nd DRIVE	375
SIGNALMAN MODEM	84
BOX 10 DISKETTES	20

CALL TOLL FREE  
1-800-343-0854  
FOR ORDERS ONLY

LOW, LOW  
SOFTWARE  
PRICES  
FOR ALL  
COMPUTERS

## commodore VIC-20



OUR LOW  
PRICE  
**\$184**

1525 PRINTER \$339  
1540 DISK DRIVE 365

OTHER VIC-20 PRICES  
ON REQUEST

WICO  
JOYSTICKS &  
TRACKBALLS  
ON SALE  
\*\*CALL\*\*



Technical Sales  
281 Needham St., Newton, MA 02164  
Out of State 800-343-0854—  
In MA 617-969-1799

Do not send cash. Personal checks take two weeks to clear. Add 3% for MasterCard or VISA. Add shipping charges to all orders. We cannot ship to P.O. Box. Delivery subject to availability. Prices may change without notice. In-store prices may vary. Not responsible for typographical errors. Minimum charge for shipping and handling is \$3.95.

**IN STOCK ITEMS SHIPPED WITHIN 24 HOURS**

**WE MEET OR BEAT ANY CURRENTLY ADVERTISED PRICE. CALL FOR PRICES**



The suggested retail price is \$19.95. Available at computer and software stores or direct from:

Central Point Software, Inc.  
P.O. Box 19730-#203  
Portland, OR 97219  
(503)244-5782

## Word Processing On Commodore VIC And 64

A full-featured, letter quality word processing package is available for the Commodore VIC and 64 computers from Quick Brown Fox.

With this package, a user can edit even with the VIC's standard 22-column width. Features include full line and global edit capabilities, text moving, boilerplating, tab and margin settings, right justification, and pro-

portional spacing. Quick Brown Fox also automatically reformats edited text, without using the paragraph-by-paragraph method.

The cost of the package is \$65.

With Quick Brown Fox software, a user can put together a workstation that includes letter-quality printing, 80-column display, and ample internal and disk storage.

Quick Brown Fox  
548 Broadway, Suite 4F  
New York, NY 10012  
(212)925-8290

## Space Game For Atari

*K-Star Patrol* is a game which has space ships confronting alien attack ships and an intergalactic leech. The package, with graphics, contains one ROM Car-



*K-Star Patrol, space game from K-Byte.*

tridge and a 12-page, full-color instruction booklet with complete rules of the game. The cartridge fits Atari 400 and 800 personal computer systems.

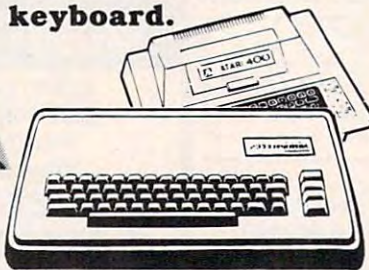
For more information on *K-Star Patrol* (Model No. ATR1002) and other computer games and products, contact:

K-Byte  
Division of Kay Enterprises Co.  
1705 Austin Street  
Troy, MI 48064  
(313)524-9878

## Sit Back With SIDEWRITER



**The Auxiliary  
Keyboard for the  
"Atari 400 or 800",  
which gives you the  
advantage of a  
Portable full stroke  
keyboard.**



**Whether you use  
the Sidewriter as a  
second point of  
entry or you just wish to sit back with your feet  
up, the Sidewriter goes where you go to give you  
the most from your Atari computer.**

FOR  
INFORMATION  
CONTACT:

**SCREEN SONICS INC.**

14416 S. OUTER 40 RD. / CHESTERFIELD, MO. 63017  
(314) 434-0433 DEALER INQUIRIES INVITED

## Color Computer Expansion Unit

Maple Leaf Systems announces the Multiport, the first multiple-slot expansion unit for the Color Computer. This device allows simultaneous connection of up to four separate Color Computer compatible peripherals. For example, a disk, modem, program cartridge, printer, and clock cartridge can now be on-line at once. The computer can switch between peripherals under software control, allowing one program to access any or all of the peripherals at any time.

The Multiport is a powerful hardware circuit which allows selection of any of the four sockets with a simple POKE command. It connects directly to the expansion port of all models of the Color Computer.

The Multiport comes completely assembled and tested,





# ATARI®

## 800 COMP. (48K) .. \$619.00

### ★ PERCOM D/D DISK DRIVE .. \$559.00 ★

810 DISK DRIVE .....	\$428.00	32K RAM (Mosaic) .....	\$99.00
410 RECORDER .....	\$74.00	32K RAM (Intec) .....	\$69.00
850 INTERFACE .....	\$164.00	48K RAM (Intec/400) .....	\$139.95
400 COMP (16K) .....	\$265.00	RAMDISK .....	\$425.00
ENTERTAINER .....	\$66.95	SIGNALMAN MK II .....	\$78.95
COMMUNICATOR .....	\$298.00	WICO JOYSTICK .....	\$22.95
BOOKKEEPER KIT .....	\$169.00	WICO TRACKBALL .....	\$48.95

### SUPER DISCOUNT SOFTWARE

<b>ADVENTURE INTERNATIONAL</b>		<b>INFOCOM</b>	
Rear Guard (D) .....	\$16.95	Zork I (D) .....	\$26.95
Adventures (per set) (D) .....	\$28.95	Zork II (D) .....	\$26.95
Adventures 1-12 Each (C) .....	\$17.95	Deadline (D) .....	\$33.95
Preppie (C/D) .....	\$19.95	<b>JV SOFTWARE</b>	
War (D) .....	\$16.95	Action Quest (C/D) .....	\$19.95
<b>APX</b>		Ghost Encounters (C/D) .....	\$19.95
Eastern Front 1941 (C/D) .....	\$22.95	<b>K-BYTE</b>	
Fam. Cash Flow (D) .....	\$16.95	K-Razy Shootout (R) .....	\$33.95
747 Landing Sim. (C/D) .....	\$16.95	K-Star Patrol (R) .....	\$33.95
<b>ATARI INCORPORATED</b>		K-Razy Krippers (R) .....	\$33.95
Microsoft Basic (D) .....	\$65.95	K-Razy Antics (R) .....	\$33.95
Macro Assem. & Editor (D) .....	\$64.95	K-Dos (D) .....	\$58.95
Assembler Editor (R) .....	\$44.95	<b>ON-LINE</b>	
Basic Cartridge (R) .....	\$44.95	HI RES Wiz & Princess (D) .....	\$21.95
Pac Man (R) .....	\$32.95	Crossfire (C/D) .....	\$19.95
Centipede (R) .....	\$32.95	Frogger (C/D) .....	\$22.95
Caverns of Mars (D) .....	\$27.95	Threshold (D) .....	\$26.95
Missile Command (R) .....	\$25.95	Ultima I (D) .....	\$26.95
Star Raiders (R) .....	\$32.95	Ultima II (D) .....	\$38.95
Asteroids (R) .....	\$25.95	The Next Step (D) .....	\$26.95
Conversational Lang. Ea. (C) .....	\$43.95	<b>OPTIMIZED SYSTEMS</b>	
Music Composer (R) .....	\$29.95	Basic A + (D) .....	\$58.95
Super Breakout (R) .....	\$26.95	OS/A + (D) .....	\$58.95
Computer Chess (R) .....	\$26.95	Speed Read Plus (D) .....	\$42.95
My First Alphabet (D) .....	\$25.50	<b>ROKLAN</b>	
Programming 2 & 3 (ea.) (C) .....	\$21.00	Deluxe Invaders (D) .....	\$22.95
Word Processor (D) .....	\$107.00	Deluxe Invaders (R) .....	\$26.95
Pilot (Educ) .....	\$98.00	Gorf (D) .....	\$26.95
Home File Manager (D) .....	\$36.95	Gorf (R) .....	\$29.95
Bookkeeper Program (D) .....	\$98.95	Wizard of Wor (D) .....	\$26.95
<b>AUTOMATED SIMULATIONS</b>		Wizard of Wor (R) .....	\$29.95
Invasion Orion (C/D) .....	\$16.95	<b>SIRIUS</b>	
Rescue at Rigel (C/D) .....	\$19.95	Space Eggs (D) .....	\$19.95
Temple of Apshai (C/D) .....	\$26.95	Sneakers (D) .....	\$19.95
Star Warrior (C/D) .....	\$26.95	Way Out (D) .....	\$26.95
Datelines of Ryn (C/D) .....	\$14.95	<b>STRATEGIC SIMULATIONS</b>	
Dragon's Eye (D) .....	\$19.95	The Shattered Alliance (D) .....	\$26.95
Crush Crumber Ch. (C/D) .....	\$19.95	Tigers In The Snow (C/D) .....	\$26.95
<b>AVALON HILL</b>		Battle of Shiloh (C/D) .....	\$26.95
Empire of Overmind (D) .....	\$22.95	<b>SYNAPSE SOFTWARE</b>	
Voyager (D) .....	\$17.95	File Manager 800 + (D) .....	\$64.95
B-1 Nuclear Bomber (C) .....	\$11.95	Protector (C/D) .....	\$22.95
Lords of Karma (C) .....	\$14.95	Shamus (C/D) .....	\$22.95
Tanktics (D) .....	\$19.95	Nautilus (C/D) .....	\$22.95
<b>BRODERBUND SOFTWARE</b>		<b>MISCELLANEOUS SOFTWARE</b>	
Apple Panic (C/D) .....	\$19.95	Ali Baba & 40 Thieves (D) .....	\$21.95
Star Blazer .....	\$21.95	Crypts of Terror (D) .....	\$22.95
Choplifter (D) .....	\$22.95	Dr. Goodcodes Cavern (D) .....	\$19.95
David's Midnight Magic (D) .....	\$22.95	Master Type (D) .....	\$26.95
HI RES Deadly Secrets (D) .....	\$22.95	Pool 1.5 (D) .....	\$22.95
Stellar Shuttle (C/D) .....	\$19.95	Raster Blaster (D) .....	\$19.95
<b>DATA SOFT</b>		Sam (D) .....	\$40.95
Text Wizard II (D) .....	\$64.95	Sammy the Sea Serpent (C) .....	\$12.95
Spell Wizard (D) .....	\$52.95	Warlocks Revenge (D) .....	\$23.95
Canyon Climber (D) .....	\$19.95	Visicalc (D) .....	\$168.95
Pacific Coast Hwy (D) .....	\$19.95	3-D Supergraphics (C/D) .....	\$28.95
<b>EDU-WARE</b>			
Compu-Read (D) .....	\$20.95		
Compu-Math Frac. (D) .....	\$27.95		
Compu-Math Dec. (D) .....	\$27.95		
Compu-Read (C) .....	\$13.95		

D = DISK C = CASSETTE R = ROM (CARTRIDGE)

### VIC-64 - CALL

VIC-20 .....	\$178.95
1530 RECORDER .....	\$58.95
1525 PRINTER .....	\$296.00
1540 DISK DRIVE .....	\$298.00
VIC 16K RAM .....	\$87.95

### PRINTERS

NEC 8023A-C .....	\$469.00
SMITH CORONA TPI .....	\$589.00
AXIOM GP-100 .....	\$269.00

### MONITORS

BMC 12" GRN .....	\$83.95
BMC 13" COLOR .....	\$269.95

FREE PRICE LIST THE ABOVE PRICES ARE FOR PREPAID ORDERS

Add \$2.00 Shipping per software order anywhere in U.S. Non-U.S. software orders, add \$5.00. Hardware Shipping, call for cost. Calif. residents add 6% sales tax. Cashiers Checks or Money Orders filled same day. Personal checks require 4 weeks to clear. Master Card and Visa OK for software only, add 3% surcharge. Include card no., expiration date and signature. Prices subject to change.

**COSMIC COMPUTERS**  
UNLIMITED  
ORDER LINES OPEN  
MON-SAT 8 am - 9 pm  
228 N. PROSPECTORS RD.  
DIAMOND BAR, CA. 91765

**(714) 861-1265**

ATARI IS A TRADEMARK OF ATARI, INC.

# YORK 10™ BASF-DPS WORLD STANDARD TAPE



**MONEY BACK  
GUARANTEE**

## COMPUTER GRADE BLANK CASSETTES

PREMIUM 5-SCREW  
SHELL FITS ALL  
STANDARD RECORDERS

DATA TRAC / C-05, C-10, C-20

### CASSETTE STORAGE CADDY

NEW!  
ORGANIZE  
YOUR TAPES!  
**\$2.95 EACH**



FINEST QUALITY  
PHILIPS (NORELCO)  
TYPE HARD BOXES



TRACTOR FEED  
DIE-CUT BLANK  
CASSETTE LABELS

### INTRODUCTORY OFFER!

ORDER 2 DOZ. CASSETTES AND 1 CADDY  
GET 1 CADDY FREE! ORDER 4 DOZ. CASSETTES AND  
2 CADDIES — GET 2 FREE

HERE'S WHAT  
USERS SAY ABOUT YORK 10 CASSETTES:

"We monitored the output to the computer with a specially built meter and found absolutely no dropouts throughout the tape..."  
Stace Papadopoulos  
Beaverton, OR

"It's nice to have a tape you can rely on 100% of the time to perform with such quality. And the fast, courteous service was a pleasant surprise."  
Tom Parkinson  
Madison, OH

"YOU'VE TRIED THE REST,  
NOW BUY THE BEST"



Call: 213/710-1430

for IMMEDIATE SHIPMENT  
on Credit Card Orders.



ORDER NOW... **YORK 10™ Computerware**  
MAIL TO: 24573 Kittridge St., #C0, Canoga Park, CA 91307

### ORDER FORM

ITEM	1 DOZEN	2 DOZEN	TOTAL
C-05	<input type="checkbox"/> 7.50	<input type="checkbox"/> 13.50	
C-10	<input type="checkbox"/> 8.00	<input type="checkbox"/> 14.40	
C-20	<input type="checkbox"/> 10.00	<input type="checkbox"/> 18.00	
Hard Box	<input type="checkbox"/> 2.50	<input type="checkbox"/> 4.00	
Storage Caddy @ \$2.95 ea.	Quantity _____		
FREE: Quantity _____			
Blank labels	<input type="checkbox"/> 4.00/100	<input type="checkbox"/> 30.00/1000	
<b>SUB TOTAL</b>			
Calif. residents add 6% sales tax			
Shipping/handling 1 doz. \$2; 2 doz. \$3.50;			
3 doz. \$4.50; each additional doz. \$5.00			
For Parcel Post instead of UPS ADD \$1			
Outside Continental USA, ADD \$2			
<b>TOTAL</b>			

Each cassette includes two YORK 10 labels only. Boxes are sold separately. Shipments are by U.P.S. unless Parcel Post requested. Boxes, caddies, and blank labels are free of shipping charges when ordered with cassettes. When ordered without cassettes, shipping charges Boxes — \$1.00/doz., Caddies \$1.00 each, MINIMUM SHIPPING/HANDLING ON ANY ORDER — \$2.00

Check or M.O. enclosed ☐ Charge to Credit Card: ☐ VISA ☐ MASTERCARD  
☐ PLEASE SEND QUANTITY DISCOUNTS

Card No. \_\_\_\_\_ Exp. \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State/Zip \_\_\_\_\_

Signature \_\_\_\_\_

Computer make & model \_\_\_\_\_ Disk?(y/n) \_\_\_\_\_



with full instructions, for \$99.50.

Maple Leaf Systems

P.O. Box 2190, Station 'C'

Downsview, Ontario Canada M2N 2S9

## Music And Sound For The Apple II/II +

Passport Designs has added *Turbo-Traks* to the expanding library of software available for the Soundchaser Computer Music System.

The Soundchaser package, for the 48K Apple II+ with one disk drive, includes a polyphonic synthesizer, multi-track recorder, computer-aided instruction device, and realtime music transcriber. It may be purchased as a complete analog/digital system (suggested retail price, \$1450) or as individual modules. Manuals are available separately for \$8 each.

*Turbo-Traks* includes a 16-



The Soundchaser Computer Music System.

track digital recorder that simulates an analog tape deck. It also has a variable number (up to 16) of oscillators per voice, sync to tape or drum machine, and extended recording time. *Turbo-Traks* is a live performance synthesizer and 16-track recording studio all in one package.

Another recent release of Passport Designs is *Kaleido-Sound*,

a realtime graphics program that synchronizes to any audio input. The four full-color kaleidoscopes change color, pattern, and location on a CRT monitor, television, or video screen as the music changes frequency and loudness. *Kaleido-Sound* (including connecting cable) has a suggested retail price of \$39.95.

Passport Designs  
116 North Cabrillo Hwy.  
Half Moon Bay, CA 94019  
(415)726-0280

**CALL FOR THE  
BEST. P.R.I.C.E.  
800-343-1078**  
[ in Mass. (617) 961-2400 ]

Call P.R.I.C.E.  
for big savings on  
home computers,  
video cassette record-  
ers, car stereo, home  
stereo, portable radios  
and tape recorders,  
telephone answering  
machines, video  
games, tapes, and  
movies.



Technics SL-5 illustrated.

Pioneer CT9R cassette deck ..... \$417  
Pioneer SX6 receiver ..... \$199  
Sony hifi, car, video equipment ..... \$CALL  
Technics SLQ30 turntable ..... \$145  
Technics SL5 turntable ..... \$125  
Akai GXF66R cassette deck ..... \$375  
JVC, Aiwa equipment ..... \$CALL

Remember,  
P.R.I.C.E. will beat any  
legitimate offer on in-  
stock items.

Just pick up the  
phone, dial our toll-  
free number, and ask  
for P.R.I.C.E. quotes.

Shure V15 Type 5 cartridge ..... \$124  
Atari 800 home computer w/48K ..... \$CALL  
Commodore VIC-20 home computer ..... \$249  
Jensen RE518 car stereo ..... \$232  
Pioneer KE6100 car stereo ..... \$159  
Aiwa HSJ02 AM/FM cassette portable ..... \$CALL  
Prices subject to change after 1/30/83.

**AND JUST SOME OF THE BRANDS WE SELL:**

Sony  
JVC  
Technics  
Pioneer

Nikko  
Akai  
Aiwa

Hitachi  
Panasonic  
Jensen

Mitsubishi  
Concord  
Dual

Teac  
Atari  
Commodore

Mattel  
Magnavox  
Stanton

**P.R.I.C.E.**

Hours: 9 to 9 Mon.-Fri.  
10 to 5 Sat.



67 Teed Drive, SRE183, Randolph, MA 02368.

## EPYX Expands Line Of VIC-20 Software

EPYX has released two new action games, *Crush, Crumble and Chomp!* and *Rescue at Rigel*, for the VIC-20.

*Crush, Crumble and Chomp!*, a movie monster game, lets the player assume the role of any one of six hungry man-eating beasts in more than 100 possible scenarios. To satisfy his enormous appetite, the player snacks on his opponents, while doing battle with National Guard tanks, infantry, helicopters, and even a team of mad scientists. The player can wreak havoc on any one of four major cities - New York City, San Francisco, Tokyo and Washington, D.C.

*Rescue at Rigel*, a space adventure, takes the player into a maze-like, six-floor, 60-room complex inhabited by an alien in-





# Heartland Software

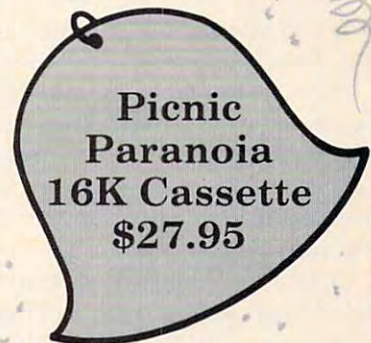
## 1983 Specials



**Tank  
Arcade**  
**16K Cassette**  
**\$13.95**



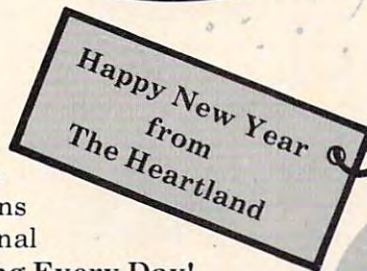
**Sea Fox**  
**48K Disk**  
**\$23.95**



**Picnic  
Paranoia**  
**16K Cassette**  
**\$27.95**

### We Stock

Broderbund    APX  
Synapse        PDI  
Avalon Hill    JV Software  
On-Line        Strategic Simulations  
Datasoft       Automated Simulations  
Big-Five        Adventure International  
Sirius          New Games Arriving Every Day!  
Call For Information



Title	List	Our Price	Title	List	Our Price	Title	List	Our Price
Action Quest	29.95	23.95	Frogger	34.95	25.95	Ricochet	19.95	15.95
Adventure 12-Pack	129.95	100.00	Galaxy Invasion	15.95	12.95	S.A.G.A. 1-12	39.95	29.95 ea.
Andromeda Conquest	23.00	18.95	Genetic Drift	29.95	23.95	Sammy The Sea Serpent	16.95	13.95
Apple Panic	29.95	23.95	Graphics Composer	39.95	29.95	Scarfman	19.95	15.95
B-1 Nuclear Bomber	16.00	12.95	Ghost Encounter	29.95	23.95	Serpentine	34.95	27.95
Battle of Shiloh	39.95	29.95	Invasion Orion	24.95	18.95	Sea Fox	29.95	23.95
Claim Jumper	34.95	27.95	K-Razy Shootout	49.95	37.95	Shamus	34.95	27.95
Combat	24.95	19.95	Labyrinth	29.95	23.95	Shooting Arcade	29.95	23.95
Convoy Raider	16.00	12.95	Legionnaire	35.00	27.95	Slime	34.95	27.95
Cosmic Balance	39.95	29.95	Micropainter	34.95	27.95	Softporn Adventure	29.95	23.95
Crossfire	29.95	23.95	Mission: Asteroid	24.95	18.95	Space Eggs	29.95	23.95
Curse of Ra	19.95	15.95	Moon Base 10	29.95	23.95	Star Blazer	31.95	24.95
Cyclod	29.95	23.95	Morloc's Tower	19.95	15.95	Star Warrior	39.95	29.95
Datestones of Ryn	19.95	15.95	Mousekattack	34.95	27.95	Stellar Escort	15.95	12.95
Deadly Secrets	34.95	27.95	Midway Campaign	16.00	12.95	Stellar Shuttle	29.95	23.95
Deadline	49.95	37.95	Nautilus	34.95	27.95	Super Nova	15.95	12.95
Defense Command	15.95	12.95	OK Galaxy	20.00	14.95	Tanktics	24.00	18.95
Dnieper River Line	30.00	24.95	Pacific Coast Hwy	29.95	23.95	Temple Of Apschai	39.95	29.95
Dodge Racer	34.95	27.95	Protector	34.95	27.95	Text Wizard	99.95	75.95
Dog Daze	22.95	19.95	Preppie	29.95	23.95	Tigers In The Snow	39.95	29.95
Eastern Front	29.95	23.95	Reptilian	34.95	27.95	Track Attack	29.95	23.95
Fort Apocalypse	34.95	27.95	Rescue At Rigel	29.95	23.95	Visicalc	250.00	199.95

Indicate type of computer, disk or cassette.  
For fast delivery, send Certified Check  
or Money Order.  
Personal checks require two weeks to process.  
C.O.D. orders add \$1.50.  
Master Charge or Visa orders add 3%  
(Include all embossed information on card)  
Add \$2.00 shipping and handling.  
Prices subject to change.

Make Checks and Money Orders payable to:  
**HEARTLAND SOFTWARE DISTR.**  
**P.O. Box 25517**  
**Cleveland, Ohio 44125**  
Ohio Residents add 6.5% Tax  
(216) 641-5055  
Order Lines Open 10 a.m. - 9:00 p.m. Mon.-Fri.  
Noon - 6:00 p.m. Sat.

Send \$1.00 for complete catalog

Apple is a Registered Trademark of Apple Computer, Inc. Atari is a Registered Trademark of Atari Inc.  
TRS-80 is a Registered Trademark of the Radio Shack Division of Tandy Corporation



641-5055

(216)



sectoid race, the Tollah. As Sud-den Smith, the player has 60 minutes to find ten humans held captive inside the labyrinth and beam them up to a rescue ship.

During the mission, the player is up against hostile Tollahs, two types of armed robots, a huge amoebic slug called a plasmoid, and a dangerous six-legged cerbanth. The player must find his way through the alien complex and rescue the prisoners – all in one hour.

*Crush, Crumble and Chomp!* and *Rescue at Rigel* are available on cassette for the VIC-20 (16K expander required), Atari 400/800 (32K), and TRS-80 (Level II, 16K), and on disk for the Atari 400/800 (32K), Apple (48K with Applesoft in ROM), and TRS-80 (TRSDOS 32K). The suggested retail price is \$29.95.

EPYX / Automated Simulations, Inc.  
1043 Kiel Court  
Sunnyvale, CA 94086

## Futuristic Game For The Apple

Interactive Fantasies has released *Empire II: Interstellar Sharks*, the second system in its Empire Gaming Trilogy. *Interstellar Sharks* is set in a futuristic civilization at the height of its material prosperity and monopolistic bureaucracy.

The game system provides a bureaucratic jungle; the player must navigate through webs of red tape and survive the sometimes clandestine dealings of big monopolies to achieve, not wealth, but the rewards of wealth. The player's ultimate goal is buying and outfitting his own spacecraft.

A manual and a softcover novella accompany the system. *Interstellar Sharks* is available in Applesoft, 48K, DOS 3.3, and re-tails for \$32.95.

Interactive Fantasies  
P.O. Box 22222  
Agoura, CA 91301  
(213)706-0661

# CALENDAR

**March 10-12, 1983.** National conference on the Use of Microcomputers in Special Education, Hartford, Connecticut. Program chairperson: Kathleen M. Hurley, Vice President of Research and Development, Developmental Learning Materials, Inc. (DLM), Allen, Texas. The conference will focus on the use of microcomputers in special education programs, and on adaptations and creation of software programs for specific exceptional needs. For further information, preregistration and housing forms, contact: John Grossi, Conference Manager, The Council for Exceptional Children, Department of Field Services, 1920 Association Drive, Reston, VA 22091.

**March 14-15, 1983.** Seventh annual conference of the Michigan Association for Computer Users in Learning, Dearborn, Michigan. Features sessions with Arthur Luerhman, Ramon Zamora, and David Moursund. It is expected to attract over 2,000 educators from the midwest. For information, contact: Betty VandenBosch Shaw, Coordinator of Mathematics, Flint Community Schools, 923 East Kearsley, Flint, MI 48502. (313) 762-1007.

**March 17-19, 1983.** Third annual Microcomputers in Education Conference – "Forward to the 3 C's: Communicating, Calculating and Computing" – directed by Paul Field, Chris Titus, Jon Titus, and David Larsen. Arizona State University, Tempe. A variety of workshops, demonstrations, and presentations is designed for anyone interested in innovative microcomputer applications in education. For information and registration materials, contact: Marilyn Sue Ford, B-47 Payne Hall, College of

Education, Arizona State University, Tempe, AZ 85287. (602)965-3322 or (602)965-7363.

**March 21-24, 1983.** Workshop: Personal Microcomputer Interfacing and Scientific Instrumentation Automation. \$595. The workshop is hands-on, with the participant designing and testing concepts with the actual hardware. For more information, call or write Dr. Linda Leffel, C.E.C., Virginia Tech, Blacksburg, VA 24061. (703)961-4848.

**April 28-30, 1983.** Ed • Com/Spring '83, national computer conference and exposition for educators of all levels. Washington, DC. Nationally recognized educators to address, evaluate, and analyze the developments of computers in education in more than 300 session hours featuring demonstrations, seminars, hands-on sessions, panels and MicroCourses. There will be exhibits of hardware, software and publications. For information contact: Carol Houts, Judeo Computer Expos, Inc., 2629 North Scottsdale Road, Suite 201, Scottsdale, AZ 85257. (602) 990-1715 or (800) 528-2355 outside Arizona.

**COMPUTE!** welcomes notices of upcoming events and requests that the sponsors send a short description, their name and phone number, and an address to which interested readers may write for further information.

Please send notices at least three months before the date of the event to: *Calendar*, P.O. Box 5406, Greensboro, NC 27403.

New Product releases are selected from submissions for reasons of timeliness, available space, and general interest to our readers. We regret that we are unable to select all new product submissions for publication. Readers should be aware that we present here some edited version of material submitted by vendors and are unable to vouch for its accuracy at time of publication.



# Lycos Computer Marketing & Consultants

TO ORDER

CALL US

TOLL FREE 800-233-8760

In PA 1-717-398-4079

## ATARI SPECIALS

800 48K... \$539.00

810 Disk Drive ... \$429.00  
32K RAM ..... \$ 79.00  
400 32K RAM ... \$179.00



A Warner Communications Company

### PERCOM : In Stock

Single Drive ..... CALL  
Dual Drive ..... CALL  
(Read all Atari Disks)

## PRINTERS

Okidata 82A ..... \$479.00  
Okidata 83A ..... \$719.00  
Okidata 84 ..... \$1089.00  
Citoh ..... CALL  
Prowriter I ..... \$499.00  
Prowriter II ..... CALL  
SMITH CORONA TP-1 ..... \$625.00  
NEC ..... CALL  
(Interfacing Available)

### JOYSTICKS : In Stock

Atari CX-40 ..... \$18.00  
LeStick ..... \$34.00  
Wico Command Control ..... \$24.00  
WICO RED BALL ..... \$27.95  
STICK STAND ..... \$ 6.75

### Computer Covers

800 ..... \$6.99  
400 ..... \$6.99  
810 ..... \$6.99

### DISKETTES : In Stock

Maxell MD1 ..... (10) ..... \$34.00  
Maxell MD2 ..... (10) ..... \$44.00  
Elephant ..... (10) ..... \$21.00

### THIRD PARTY SOFTWARE ATARI PROGRAM EXCHANGE

Eastern Front 1941 ..... \$25.50  
Avalanche ..... \$15.50  
Outlaw/Howitzer ..... \$15.50  
Dog Daze ..... \$15.50  
Wizard of War ..... \$31.00  
Gorf ..... \$31.00  
Frogger ..... \$26.00

### BUSINESS SOFTWARE : In Stock

Atari Word Processing ..... \$109.00  
Letter Perfect ..... \$129.00  
Test Wizard ..... \$ 89.00  
Datasm/65 ..... \$125.00  
Interlisp ..... \$125.00

Monkey Wrench ..... \$ 42.00  
Utility Disk ..... \$ 36.50  
Ultimate Renumber ..... \$ 15.50

## ATARI HARDWARE

410 Cassette Recorder ..... \$75.00  
825 Printer ..... \$585.00  
830 Phone Modem ..... \$149.00  
850 Interface ..... \$164.00

### PACKAGES

CX481 Entertainer ..... \$69.00  
CX482 Educator ..... \$125.00  
CX483 Programmer ..... \$49.00  
CX494 Communicator ..... \$325.00

### SOFTWARE

CXL4012 MISSILE COMMAND ..... \$28.75  
CXL4013 ASTEROID ..... \$28.75  
CXL4020 CENTIPEDE ..... \$32.75  
CXL4022 PACMAN ..... \$32.75  
CXL4011 STAR RAIDER ..... \$34.75  
CXL4004 BASKETBALL ..... \$26.75  
CXL4006 SUPER BREAKOUT ..... \$28.75  
CXL4008 SPACE INVADER ..... \$28.75  
CX8130 CAVERNS OF MARS ..... \$31.75  
CX4108 HANGMAN ..... \$12.75  
CX4102 KINGDOM ..... \$12.75  
CX4112 STATES & CAPITALS ..... \$12.75  
CX4114 EUROPEAN COUNTRIES ..... \$12.75  
CX4109 GRAPHIT ..... \$16.75  
CX4121 ENERGY CZAR ..... \$12.75  
CX4123 SCRAM ..... \$19.75  
CX4101 PROGRAMMING I ..... \$19.75  
CX4106 PROGRAMMING II ..... \$22.75  
CX4117 PROGRAMMING III ..... \$22.75  
CXL4015 TELELINK ..... \$21.75  
CX4119 FRENCH ..... \$39.75  
CX4118 GERMAN ..... \$39.75  
CX4120 SPANISH ..... \$39.75  
CX4120 SPANISH ..... \$39.75  
CXL4007 MUSIC COMPOSER ..... \$33.75  
CXL4002 ATARI BASIC ..... \$45.75  
CX8126 MICROSOFT BASIC ..... \$65.75  
CXL4003 ASSEMBLER EDITOR ..... \$45.75  
CX8126 MACROASSEMBLER ..... \$69.75  
CXL4018 PILOT HOME ..... \$65.75  
CX405 PILOT EDUCATOR ..... \$99.75  
CX415 HOME FILING MANAGER ..... \$41.75  
CX414 BOOKKEEPER ..... \$119.75

### NEW RELEASES

CHOP LIFTER ..... \$27.75  
APPLE PANIC ..... \$23.75  
PREPPIE ..... \$19.95

### THIRD PARTY SOFTWARE

for atari 800 or 400

#### K-BYTE

KRAZY SHOOTOUT ..... \$35.00  
K-DOS ..... \$65.00  
K-STAR PATROL ..... \$37.75  
K-RAZY ANTICS ..... \$37.75  
K-RAZY KRITTERS ..... \$37.75  
Q-BALL JOYSTICK KIT ..... \$6.75

#### AUTOMATED SIMULATIONS

Star Warrior ..... \$28.00  
Crush, Crumble & Chomp ..... \$23.00

WE CARRY MANY OTHER THIRD PARTY PRODUCTS  
YOU CAN CALL FOR PRICES ON AND ASK FOR  
YOUR FREE ATARI PRODUCT CATALOG.



### VIC-20 ..... \$189.00

VIC1530 DATASSETTE ..... \$67.00  
VIC1540 DISK DRIVE ..... \$499.00  
VIC1515 PRINTER ..... \$355.00  
VIC1210 3K RAM ..... \$35.00  
VIC1110 8K RAM ..... \$52.00  
VIC1211A SUPER EXPANDER ..... \$53.00

#### VIC-20 SOFTWARE

VIC1212 PROGRAMMER AID ..... \$45.00  
VIC1213 VICMON ..... \$45.00  
VIC1906 SUPER ALIEN ..... \$23.00  
VIC1914 ADVENTURE  
LAND ADVENTURE ..... \$35.00  
VIC1915 PRIVATE COVE  
ADVENTURE ..... \$35.00  
VIC1916 MISSION IMPOSSIBLE ..... \$35.00  
VIC1917 THE COUNT ADVENTURE ..... \$35.00  
VIC1919 SARGON II CHESS ..... \$35.00

#### THIRD PARTY SOFTWARE

ALIEN BLITZ ..... \$21.00  
Omega Race ..... \$35.00  
Gorf ..... \$32.00  
16K RAM/ROM ..... \$99.00  
AMOK ..... \$21.00  
SUPER HANGMAN ..... \$16.00  
SPIDERS OF MARS ..... \$45.00



POLICY



In-Stock items shipped within 24 hours of order  
Personal checks require four weeks clearance  
before shipping. PA residents add sales tax.  
All products subject to availability and price  
change. Add 4 % for Mastercard and Visa.

TO ORDER  
CALL TOLL FREE  
800-233-8760

In PA 1-717-398-4079  
or send order to  
Lycos Computer  
P.O. Box 5088  
Jersey Shore, PA 17740



# PRODUCT MART

## PROGRAMMING A VIC-20? Beginner or Expert.

**PAL®**

Programmers Aids  
and Logs



**Can Help YOU!**

Look what you get!

- **EZ KEY** Quick Guide to all keys, pokes, reverses, CHRS, set 1 - set 2
- **FULL COLOR** color combination chart
- **EZ GRAPH** graphics programming aid
- **LOTS** of tear-out SCREEN LAYOUT forms and various programming forms and worksheets
- **BASIC-LY EZ** condensed basic dictionary
- **SOFTWARE & HINTS** Log Sheets
- **TAPE CASSETTE** Log Book and MORE!

**EVERYTHING YOU NEED FOR  
EZ Programming!**

Send **\$9.95** + \$1.50 shipping (CA res. add 6% tax)

Check, Money Order, Bankcard - no C.O.D.'s to:

**PM PRODUCTS**

4455 Torrance Blvd., #177, Torrance, CA 90503

☆ dealer inquiries invited ☆

**Commodore 64  
& Accessories**

Write or Call for pricing and complimentary  
Commodore 64 Memory Map.

Also:  
C. Itoh, Hayes, Epson, Televideo,  
Diskettes, Cassettes, etc.

**DUKE'S DIGITAL DEN**  
P.O. Box 158, Westland, MI 48185  
(313) 326-6488  
5 pm - 8 pm Mon-Fri

## ★ VIC-20 ★ GAMEMASTER

4 games on 1 cassette for 5K VIC-20

### BACKGAMMON

A great game! Our best seller.

### BLACKJACK TUTOR

Not just a game! Teaches best strategy.

### MAZE-MAN

Munching action. Key or joystick.

### CHECKERS

A defensive game.

**\$29.95**

### 8K BACKGAMMON

4 Levels with Doubling.

**\$19.95**

24hr Order line: 1(313) 456-8581

Send check or money order plus 50c to:

Visa — **RAR-TECH** — MC

Box 761, Rochester, Michigan 48063

\*VIC-Registered Trademark of Commodore

## VIC-20

We are dedicated to supporting the VIC-20 and 64.  
Write for a FREE CATALOG containing all our products

### NEW ITEMS!

### HARDWARE

UPA-20 Standard Centronics Cable... \$19.95

Driver Listing Included!

UCA-20 Universal Cassette Cable... \$19.95

Use any cassette machine!

16K RAM/ROM Board Jumped for any 8K block

Socketed Board with support chips... \$18.95

Populated with 8K... \$49.95

Populated with 16K... \$79.95

2732 EPROMs for RAM/ROM Board... @ \$7.50

3 Slot Memory Port Expander... \$14.95

### SOFTWARE

WORDWIZ for the Unexpanded VIC-20... \$14.95

A nice small Word Processor

Mailing List requires 8K minimum... \$14.95

Sorts, selects, and prints labels

### FREE DISASSEMBLER PROGRAM

when you send for our FREE CATALOG. Please specify  
make and model computer with your request.

### WORLD ELECTRONICS

177 27th Street

Brooklyn, N.Y. 11232

A Division of World International Trading Corp.



**PERSONAL PERIPHERAL  
PRODUCTS presents:**

## SPEAKEASY

VIC-20  
SPEECH



VIC-20  
SPEECH

### CARTRIDGE & "VOCAL CHORD" SOFTWARE

**\$54.95**

Watch major software houses for pro-  
ducts which are decoded for SPEAKEASY

### ALSO: BARE BONES BOARDS

16K Ram Expander For VIC-20 Kit \$54.95

Assembled & Tested \$69.95

3 Slot Expansion Board for VIC-20

Switched and Fused Kit \$29.95

Assembled & Tested \$39.95

ADD \$2.00 Total Order Handling/III Residents Add 6% Sales Tax

### PERSONAL PERIPHERAL PRODUCTS

P.O. BOX 3423

FOX VALLEY MALL

AURORA, IL 60505 • (312) 961-2347

VIC IS A TRADEMARK OF COMMODORE



## VIC-20

### VIC-20 INTERFACING BLUE BOOK

Did you know that your VIC can be used to  
control a 99c toy motor so effectively that it  
runs like a precision machine? Or that you can  
build an accurate digital thermometer using  
the VIC and four parts costing less than \$5?

These and other 18 interfacing projects  
selected for usefulness, ease of construction  
and low cost are detailed in the VIC-20 Inter-  
facing Blue Book, a veritable gold mine of prac-  
tical information on how to build a variety of in-  
terfaces for your computer.

Projects include: Connecting VIC to your  
stereo; Pickup digital lock; Capacitance  
meter; Liquid level sensor; Telephone dialer;  
Voice output; 8K/16K RAM/ROM expansion;  
128K RAM expansion; 8-bit precision D/A; 8-bit  
A/D converter; MX-80 interface and more.

Written by a college professor in a friendly  
and informative style, the Blue Book gives you  
theory of operation, schematics, program  
listings, parts list, construction hints and  
sources of materials for each one of the 20 pro-  
jects.

If you want to get the most out of your VIC  
this book is a must. Cost is \$14.95 (less than  
75c per project!). Price includes postage.

**microsignal** Dept C

P.O. BOX 22  
MILLWOOD NY 10546

VIC-20



## VIC-20

<b>SNAKMAN</b> .....	\$19.95
(Just like your favorite arcade game)	
<b>TUNNEL PATROL</b> .....	\$12.95
(Arcade game)	
<b>HOME INVENTORY</b> .....	\$12.95
<b>TAPEWORM</b> .....	\$12.95
(Keep track of your records & tapes)	
<b>TICKERTAPE</b> .....	\$16.95
(Maintain profile of investments)	
<b>HOME BUDGET</b> .....	\$12.95
(Profile personal income)	

### EMBASSY COMPUTER PRODUCTS

P.O. Box 88  
Little Neck, N.Y. 11363

Check or money order. No COD's. N.Y. Residents add 8.25% sales tax. Add. \$1.50 for postage and handling.

— DEALER INQUIRIES INVITED —  
— PROGRAMMERS WANTED —  
VIC Trademark of Commodore

## ATARI\* OWNERS

Two convenient utilities on a high quality Memorex diskette for only \$14.95.  
And we'll pay postage

**D: CAT** Put this file on all your disks and you'll have an automatic catalog of all files on your disk, plus you'll be able to run, load, or enter any BASIC program at the push of a key.

**D: RENUMBER** This program will automatically renumber your BASIC programs at your selected increment. Automatically changes GOTO, GOSUB, and TRAP references, and gives warning on all nonnumeric line numbers.

Send check or money order for \$14.95 to:  
Family Computers  
P.O. Box 1160  
Stinnett, TX 79083 (806) 878-2139

\*Trademark of Atari, Inc.

## SOFTWARE FOR

# COMMODORE for 64 & VIC:

the Staff: Polyphonic Music Editor & generator. Enter up to 93 measures of 3 part harmony on easy to use graphic display. Specify disk or cassette. \$19.95 for 64, \$14.95 for VIC (requires min. 3K exp) **for CBM Pet, 4000 & 8000 series:** Superscript Word Processor by Precision Software Ltd. Beats anything on the market. \$249.00

Check or Visa, MasterCard accepted

**PROFESSIONAL MICRO SERVICE**  
100 W. 22nd St., Baltimore, Md. 21218  
301-366-0010

Dealer inquiries invited.

## Fantastic NEW Programs for your COMMODORE 64

**MUSIC MAGIC:** The easy and fun way to use your 64's marvelous sound system. You can delay the tone, sustain or release it or change the pitch. Sound generators in the form of triangle, sawtooth, square waves and white noise are all accessed directly from your keyboard.

**SPRITE WRITER:** A simple means of creating sprite graphics. Sprites are moveable, high-resolution programmable objects that can be made into nearly any shape. With the 64, up to 8 different Sprites can be created as moveable figures for simultaneous display on 3 separate screen levels.

A-1 Services (Full Service Authorized Commodore Dealer)  
7103 W. Clearwater, H. 111  
Kennewick, WA 99336  
(509) 783-4980 or (509) 783-9566

Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_ St.: \_\_\_\_\_ Zip: \_\_\_\_\_

\*\*\*\*\*FREE\*\*\*\*\*  
Software catalog included with your order.

Music Magic: \_\_\_\_\_ Tapes @ \$19.95 or \_\_\_\_\_ Disks @ \$24.95 ea.

Sprite Writer: \_\_\_\_\_ Tapes @ \$19.95 or \_\_\_\_\_ Disks @ \$24.95 ea.

Or see your Commodore Dealer (Dealer inquiries invited)

## Verbatim® Diskettes



Top-quality Verbatim® Diskettes from **Tech•Data**, your complete word and data processing supply center. Dealer inquiries invited.

Call Toll Free  
**1-800-237-8931.**  
In Florida, call  
**813-577-2794.**

**Tech•Data Corporation**  
3251 Tech Drive North  
St. Petersburg, FL 33702

## VIC PET VIC PET VIC PET VIC PET VIC PET

Are you tired of long waits to load and save on Cassette? Like to have the standard LOAD/SAVE plus an extremely fast and reliable capability? Then you need...

### The Rom Rabbit

**NEW!**  
Rabbit on ROM Cartridge for VIC. Can be used with other cartridges since it has a piggy-back connector which saves "wear and tear" on your VIC's connector.



Loads and saves an 8K program in about 30 seconds. Try it - your Pet or VIC normally takes 3 minutes!

Easy to install. It just plugs in.

1. Much faster cassette load/save
2. Memory test
3. 12 commands in all

VIC  
or PET

\$39.95

Quantity Discounts for educational institutions.

Visa  
and  
M.C.

Specify 3.0 (2001 PET) or 4.0 (4001 or 8032) or VIC

**Eastern House**

3239 Linda Dr  
Winston Salem, N.C. 27106  
(919) 924-2889 (919) 748-8445

**FREE**

Write for your  
free catalog of

## Software and Books

for your  
**PET, VIC  
and  
Commodore 64**

TIS, Inc.  
Box 921 Dept. C  
Los Alamos, NM 87544

## ATARI® 810 DISK DRIVE ADJUSTMENT KIT

It takes more than a speed adjustment to properly set up an Atari® 810 Disk Drive.

DO IT RIGHT

### STARTER KIT \$29.00

Test Disk - Cleaner - Tools  
Special Oil - Swabs and  
Complete Instructions

### REPLACEMENT KIT \$6.95

Cleaner - Special Oil - Swabs



**The Programmers Workshop**  
5230 Clark Ave., Suite 23  
Lakewood, CA 90712  
Phone (213) 804-1475

ATARI® is a registered trademark of Warner Communications

## INTELLIGENT SOFTWARE FOR COMMODORE COMPUTERS

At last, an affordable electronic spreadsheet. **Copycalc** 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 on your printer. For \$20 (\$15 with another program), this program can justify the cost of your Commodore. Requires 6k; version available for standard VIC.

**Word Processor Plus** was not designed to demonstrate what computers are capable of doing, to be an expensive toy, or to instill awe or fear or even admiration into its user; W/P+ 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, for all the Commodore computers (R8-232C version available for VIC and 64); \$30 (10k RAM, printer req'd.). Upgrades for old W/P copies (below V4.0) \$15.

Prices include documentation and shipping; Calif. residents add 6%. Please specify hardware configuration when ordering. Other programs available (sorry, no games).  
**William Robbins, Box 3745, San Rafael, CA 94912**



# Advertisers Index

Reader Service Number/ Advertiser	Page	Reader Service Number/ Advertiser	Page	Reader Service Number/ Advertiser	Page
102 A-1 Services	239	166 GP Microsystems	227	230 Robec, Inc.	123
103 AB Computers	66,67,105	167 Gator Marketing Enterprises Inc.	203	231 SJB Distributors, Inc.	159
104 Aardvark-80	77	168 Heartland Software Distributors	235	232 Screensonics Inc.	232
105 Abacus Software	83	169 Human Engineered Software	53	233 Skeena Computer Services Ltd.	144
106 A-Bit-Better Software	175	170 In Home Software	63,65	234 Skyles Electric Works	143,169,219
107 Academy Software	118	171 Intec Peripherals Corp.	216	235 Small Systems Engineering	35
108 Adventure International	49,91	172 Intelligent Software	239	236 D. Smith & Co.	214
109 The Alien Group	161,173	173 Interesting Software	215	237 The Software Connection	81
110 A.N.A.L.O.G. Software	59	174 JMC	127	238 Software Publishers, Inc.	103
111 Anthro-Digital Software	107	175 J.V. Software	25	239 Software To Go	132
112 Apple Computer Inc.	12,13	176 Krell Software Corp.	109	240 South Eastern Computer Outlet	158
113 Apple Country Limited	230	177 Leading Edge Products, Inc.	IFC,IBC	241 Specific Software	229
114 Apopros Technology	228	178 Lightning Software	151	242 Spinnaker	2,3
115 Arfon Microelectronics	157	179 Lyco Computer	237	Sport 'N' Sound	141
Artworx	42	180 MTG Technical Sales	231	243 Star Micronics Inc.	95
116 Batteries Included	41,105	181 Macrotronics	176	244 subLogic Communications	24
117 B. L. & W.	142	182 Merlin Enterprises	226	245 Sunshine Peripherals	219
118 Böegner Industries Corp.	163	183 Microbits	179	246 Swift Software Inc.	147
119 Bröderbund Software	19	Micro-Ed Inc.	137	247 Syntax Software Inc.	201
120 CAI Instruments	195	184 Micro Magic Software	225	248 Tech Data Corp.	83,239
121 CE Software	176	185 Microsignal	238	249 Tele Soft, Inc.	224
122 Cab-Tek, Inc.	191	186 Microspec Ltd.	83	250 Tiny Tek, Inc.	227
123 Cardco, Inc.	79,111	187 Micro-Systems	31	251 TIS, Inc.	239
124 The Code Works	212	188 Microsystems Exchange	135	252 Toronto Pet Users Group	132
125 Comm*Data Computer House, Inc.	115	189 Micro World Electronix Inc.	20	253 Torrey Engberg Smith Co.	224
126 Commodore Business Machines	BC	190 Midwest Micro Associates	199	254 Totl Software	211
127 Compuserve	209,211	191 MMG Micro Software	197	255 Tronix Publishing, Inc.	37,39
128 Compuserve	11	192 Mooseware Incorporated	212	256 U. S. Technologies	218
129 Computability	177	193 Morris Software	214	257 United Microware Industries, Inc.	93
130 Computer Discount of America	144	194 Mosaic Electronics	4	University Microfilms International	168
131 Computer Mail Order	72,73	195 National VIC-20 Users Group	115	258 Victory Software Corp.	46
132 ComputerMat	199	196 NEXA Corporation	175	259 World Electronics	238
133 Computer Outlet	128,129	197 Nibbles & Bits, Inc.	54	260 Wunderware	195
134 Computer Place	229	198 Nufekop	55	261 York 10 Computerware	233
135 Computer Software Associates	200	199 OEM Inc.	218		
136 Computertime, Inc.	203	200 Olympic Sales Co.	229		
137 Concom Enterprises	132	201 On Line Computer Centers of OKC	89		
138 Cosmic Computers Unlimited	223	202 Optimized Systems Software Inc.	75		
139 Comstar	182	203 Optomam Consumer Products	227		
140 Continental Software Co.	7	204 Oxford Computer Systems Ltd.	85		
141 Creative Software	47	205 P.R. Software	214		
142 Data-20	17	206 P.R.I.C.E.	234		
143 Data Equipment Supply Corp.	113	207 Pacific Coast Software	163		
144 Data Faire	216	208 Pacific Exchanges	123,175		
145 Datamost Inc.	46,57	209 Percom Data	15		
146 Digital Interface Systems Co.	54	210 Peripherals Unlimited	170		
147 Don't Ask Computer Software	27	211 Personal Peripheral Products	238		
148 Duke's Digital Den	238	212 Pixell Software	195		
149 Dynabyte Software	139	213 PM Products	238		
150 Dynacomp, Inc.	120,121	214 Precision Software	86,87		
151 Eastern House Software	231,239	215 Precision Technology	214		
152 ECRL	224	216 Prickly Pear Software	152		
153 Educational Software	45	217 Professional Micro Service	239		
154 Elcomp Publishing Inc.	133	218 Professional Software Inc.	1,9		
155 Embassy Computer Products	239	219 Program Design, Inc.	23		
156 The English Software Company	20	220 The Program Store	148,149		
157 EPYX / Automated Simulations, Inc.	61	221 The Programmer's Institute	117,197,203		
158 Eric Martins	227	222 The Programmer's Workshop	103,239		
159 EXATRON	167	223 Protecto Enterprises	201,215		
160 Falk-Baker Associates	100	224 Quality Software	51		
161 Family Computers	239	225 Quantum Data Inc.	28,29		
162 F.C.C. Inc.	196	226 Questar International, Inc.	107		
163 Foxfire Systems, Inc.	217	227 Quick Brown Fox	155		
164 French Silk	193	228 Rapidwriter	139		
165 FROBCO	24	229 Rar-Tech	238		

COMPUTE! Back Issues	181
COMPUTE! Books	221
COMPUTE! Magazine	33
COMPUTE! Subscriber Service	211
Programming The PET/CBM	165



# COMPUTE!

My Computer Is:

☐ PET ☐ Apple ☐ Atari ☐ OSI ☐ VIC-20 ☐ TI 99/4A ☐ Sinclair ZX-81  
☐ Radio Shack Color Computer ☐ Other \_\_\_\_\_ ☐ Don't yet have one...

☐ \$20.00 One Year US Subscription  
☐ \$36.00 Two Year US Subscription  
☐ \$54.00 Three Year US Subscription

(Readers outside of the US, please see our foreign readers subscription card or inquire for rates).

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

☐ Payment Enclosed ☐ VISA ☐ Bill me

☐ MasterCard ☐ American Express

Account No. \_\_\_\_\_ Expires \_\_\_\_\_ / \_\_\_\_\_

331101

For Fastest Service,  
 Call Our **Toll-Free**  
 US Order Line  
**800-334-0868**  
 In NC call 919-275-9809

# COMPUTE!

Subscription rates outside the US:

☐ \$25.00 Canada  
☐ \$38.00 Europe, Australia/Air Delivery  
☐ \$48.00 Middle East/Air Delivery  
☐ \$68.00 Elsewhere/Air Delivery  
☐ \$25.00 International Surface Mail (lengthy, unreliable delivery)

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Postal Code \_\_\_\_\_

Country \_\_\_\_\_

Payment must accompany this card.

Payment in US Funds drawn on a US Bank; International Money Order; or charge card: ☐ VISA ☐ MasterCard ☐ American Express

Account No. \_\_\_\_\_ Expires \_\_\_\_\_ / \_\_\_\_\_

331101

# Foreign Readers

## COMPUTE! Books

Quan.	Title	Price	S/H	Total
_____	The Beginner's Guide to Buying A Personal Computer	\$3.95 +	\$1.00*	_____
_____	COMPUTE!'s First Book of Atari	12.95 +	2.00*	_____
_____	Inside Atari DOS	19.95 +	2.00*	_____
_____	COMPUTE!'s First Book of PET/CBM	12.95 +	2.00*	_____
_____	Programming the PET/CBM	24.95 +	3.00**	_____
_____	Every Kid's First Book of Robots and Computers	4.95 +	1.00*	_____
_____	COMPUTE!'s First Book of VIC	12.95 +	2.00*	_____
_____	COMPUTE!'s Second Book of Atari	12.95 +	2.00*	_____

For air mail outside US: \*\$5.00 / \*\*\$10.00

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Country \_\_\_\_\_

Allow 4-5 weeks for delivery.

For Fastest Service  
 Call Our **TOLL FREE**  
 US Order Line  
**800-334-0868**  
 In NC call 919-275-9809

All orders must be prepaid (money order, check, or charge). All payments must be in US funds. NC residents add 4% sales tax.

☐ Payment enclosed  
 Please charge my: ☐ VISA  
☐ MC ☐ Am. Express  
 Acc't No. \_\_\_\_\_

Expires \_\_\_\_\_ / \_\_\_\_\_

## The Editor's Feedback:

Computer: ☐ Pet ☐ Apple ☐ Atari ☐ OSI ☐ VIC-20 ☐ TI 99/4A ☐ Sinclair ZX-81  
☐ Radio Shack Color Computer ☐ Other \_\_\_\_\_ ☐ Don't yet have one...

Are you a **COMPUTE!** Subscriber? ☐ Yes ☐ No I would like to see:

<input type="checkbox"/> More <input type="checkbox"/> Fewer	Specific applications programs.	<input type="checkbox"/> More <input type="checkbox"/> Fewer	Games.
<input type="checkbox"/> More <input type="checkbox"/> Fewer	BASIC programs.	<input type="checkbox"/> More <input type="checkbox"/> Fewer	Reviews of game software.
<input type="checkbox"/> More <input type="checkbox"/> Fewer	Machine language programs.	<input type="checkbox"/> More <input type="checkbox"/> Fewer	Reviews of business software.
<input type="checkbox"/> More <input type="checkbox"/> Fewer	Tutorials.	<input type="checkbox"/> More <input type="checkbox"/> Fewer	Reviews of educational software.
<input type="checkbox"/> More <input type="checkbox"/> Fewer	Educational articles.	<input type="checkbox"/> More <input type="checkbox"/> Fewer	Reviews of hardware.
<input type="checkbox"/> More <input type="checkbox"/> Fewer	Detailed explanations of programs.	<input type="checkbox"/> More <input type="checkbox"/> Fewer	

What do you like best about **COMPUTE!**?

What do you like least?



Place  
Stamp  
Here



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

**COMPUTE! Magazine**

P.O. Box 914  
Farmingdale, NY 11737

**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 2312 GREENSBORO, NC

POSTAGE WILL BE PAID BY ADDRESSEE

**COMPUTE! Magazine**

P.O. Box 914  
Farmingdale, NY 11737



Place  
Stamp  
Here



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

**COMPUTE! Magazine**

Post Office Box 5406  
Greensboro, NC 27403

**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 2312 GREENSBORO, NC

POSTAGE WILL BE PAID BY ADDRESSEE

**COMPUTE! Books**

Post Office Box 5406  
Greensboro, NC 27403





## Introduce A Friend To COMPUTE!

### Save \$10.00 Off The Newsstand Price

One year, 12 issue subscriptions are \$20.00 in the U.S., \$25.00 (U.S. funds) in Canada.

#### PLEASE PRINT.

Please charge my:

☐ VISA ☐ MasterCard ☐ American Express

Acc't No \_\_\_\_\_

Exp. \_\_\_\_ / \_\_\_\_

YOUR NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_

ZIP \_\_\_\_\_

\$ \_\_\_\_\_ payment enclosed ☐ Bill me later

Please enter my ☐ RENEWAL ☐ NEW SUBSCRIPTION at the same time.

GIFT TO \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_

ZIP \_\_\_\_\_

☐ Renewal ☐ New subscription

SIGN CARD: \_\_\_\_\_

GIFT TO \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_

ZIP \_\_\_\_\_

☐ Renewal ☐ New subscription

SIGN CARD: \_\_\_\_\_

631101

## Introduce A Friend To COMPUTE!

### Save \$10.00 Off The Newsstand Price

One year, 12 issue subscriptions are \$20.00 in the U.S., \$25.00 (U.S. funds) in Canada.

#### PLEASE PRINT.

Please charge my:

☐ VISA ☐ MasterCard ☐ American Express

Acc't No \_\_\_\_\_

Exp. \_\_\_\_ / \_\_\_\_

YOUR NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_

ZIP \_\_\_\_\_

\$ \_\_\_\_\_ payment enclosed ☐ Bill me later

Please enter my ☐ RENEWAL ☐ NEW SUBSCRIPTION at the same time.

GIFT TO \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_

ZIP \_\_\_\_\_

☐ Renewal ☐ New subscription

SIGN CARD: \_\_\_\_\_

GIFT TO \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_

ZIP \_\_\_\_\_

☐ Renewal ☐ New subscription

 [www.commodore.ca](http://www.commodore.ca)

631101





NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 2312 GREENSBORO, NC

POSTAGE WILL BE PAID BY ADDRESSEE

**COMPUTE!**

P.O. Box 914

Farmingdale, NY 11737



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 2312 GREENSBORO, NC

POSTAGE WILL BE PAID BY ADDRESSEE

**COMPUTE!**

P.O. Box 914

Farmingdale, NY 11737





## COMPUTE!'s FREE Reader Information Service

Use these cards to request FREE information about the products advertised in this issue. Clearly print or type your full name and address. Only one card should be used per person. Circle the numbers that correspond to the key number appearing in the advertisers index.

Send in the card and the advertisers will receive your inquiry. Although every effort is made to insure that only advertisers wishing to provide product information have reader service numbers, **COMPUTE!** cannot be responsible if advertisers do not provide literature to readers.

Please use these cards *only* for subscribing or for requesting product information. Editorial and customer service inquiries should be addressed to: **COMPUTE!**, P.O. Box 5406, Greensboro, NC 27403. Check the expiration date on the card to insure proper handling.

## COMPUTE!

101	102	103	104	105	106	107	108	109	110	111
112	113	114	115	116	117	118	119	120	121	122
123	124	125	126	127	128	129	130	131	132	133
134	135	136	137	138	139	140	141	142	143	144
145	146	147	148	149	150	151	152	153	154	155
156	157	158	159	160	161	162	163	164	165	166
167	168	169	170	171	172	173	174	175	176	177
178	179	180	181	182	183	184	185	186	187	188
189	190	191	192	193	194	195	196	197	198	199
200	201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220	221
222	223	224	225	226	227	228	229	230	231	232
233	234	235	236	237	238	239	240	241	242	243
244	245	246	247	248	249	250	251	252	253	254
255	256	257	258	259	260	261	262	263	264	265
266	267	268	269	270	271	272	273	274	275	276
277	278	279	280	281	282	283	284	285	286	287
288	289	290	291	292	293	294	295	296	297	298
299	300	301	302	303	304	305	306	307	308	309
310	311	312	313	314	315	316	317	318	319	320
321	322	323	324	325	326	327	328	329	330	331
332	333	334	335	336	337	338	339	340	341	342
343	344	345	346	347	348	349	350			

Circle 101 for a one year new subscription to  
**COMPUTE!** 12 monthly issues for \$20.

Please print or type your full name and address.  
Limit one card per person.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State/Province \_\_\_\_\_

Zip \_\_\_\_\_

Country \_\_\_\_\_

Please include zip code for return of card.

 [www.commodore.ca](http://www.commodore.ca)





**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 27346 PHILADELPHIA, PA

POSTAGE WILL BE PAID BY ADDRESSEE

**COMPUTE!**

P.O. Box 11747

Philadelphia, PA 19101

NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES





# COMPUTE!

101	102	103	104	105	106	107	108	109	110	111
112	113	114	115	116	117	118	119	120	121	122
123	124	125	126	127	128	129	130	131	132	133
134	135	136	137	138	139	140	141	142	143	144
145	146	147	148	149	150	151	152	153	154	155
156	157	158	159	160	161	162	163	164	165	166
167	168	169	170	171	172	173	174	175	176	177
178	179	180	181	182	183	184	185	186	187	188
189	190	191	192	193	194	195	196	197	198	199
200	201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220	221
222	223	224	225	226	227	228	229	230	231	232
233	234	235	236	237	238	239	240	241	242	243
244	245	246	247	248	249	250	251	252	253	254
255	256	257	258	259	260	261	262	263	264	265
266	267	268	269	270	271	272	273	274	275	276
277	278	279	280	281	282	283	284	285	286	287
288	289	290	291	292	293	294	295	296	297	298
299	300	301	302	303	304	305	306	307	308	309
310	311	312	313	314	315	316	317	318	319	320
321	322	323	324	325	326	327	328	329	330	331
332	333	334	335	336	337	338	339	340	341	342
343	344	345	346	347	348	349	350			

Circle 101 for a one year new subscription to  
**COMPUTE!:** 12 monthly issues for \$20.

Please print or type your full name and address.  
Limit one card per person.

Name

Address

City

State/Province

Zip

Country

Please include zip code. Expiration: 3/31/83

C0183

# COMPUTE!

101	102	103	104	105	106	107	108	109	110	111
112	113	114	115	116	117	118	119	120	121	122
123	124	125	126	127	128	129	130	131	132	133
134	135	136	137	138	139	140	141	142	143	144
145	146	147	148	149	150	151	152	153	154	155
156	157	158	159	160	161	162	163	164	165	166
167	168	169	170	171	172	173	174	175	176	177
178	179	180	181	182	183	184	185	186	187	188
189	190	191	192	193	194	195	196	197	198	199
200	201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220	221
222	223	224	225	226	227	228	229	230	231	232
233	234	235	236	237	238	239	240	241	242	243
244	245	246	247	248	249	250	251	252	253	254
255	256	257	258	259	260	261	262	263	264	265
266	267	268	269	270	271	272	273	274	275	276
277	278	279	280	281	282	283	284	285	286	287
288	289	290	291	292	293	294	295	296	297	298
299	300	301	302	303	304	305	306	307	308	309
310	311	312	313	314	315	316	317	318	319	320
321	322	323	324	325	326	327	328	329	330	331
332	333	334	335	336	337	338	339	340	341	342
343	344	345	346	347	348	349	350			

Circle 101 for a one year new subscription to  
**COMPUTE!:** 12 monthly issues for \$20.

Please print or type your full name and address.  
Limit one card per person.

Name

Address

City

State/Province

Zip

Country

Please include zip code. Expiration: 3/31/83

C0189





NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

**BUSINESS REPLY MAIL**

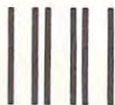
FIRST CLASS PERMIT NO. 27346 PHILADELPHIA, PA

POSTAGE WILL BE PAID BY ADDRESSEE

**COMPUTE!**

P.O. Box 11747

Philadelphia, PA 19101



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 27346 PHILADELPHIA, PA

POSTAGE WILL BE PAID BY ADDRESSEE

**COMPUTE!**

P.O. Box 11747

Philadelphia, PA 19101





# THE LEADING EDGE IN PRINTERS

## ONE GREAT LINE. ONE GREAT WARRANTY.

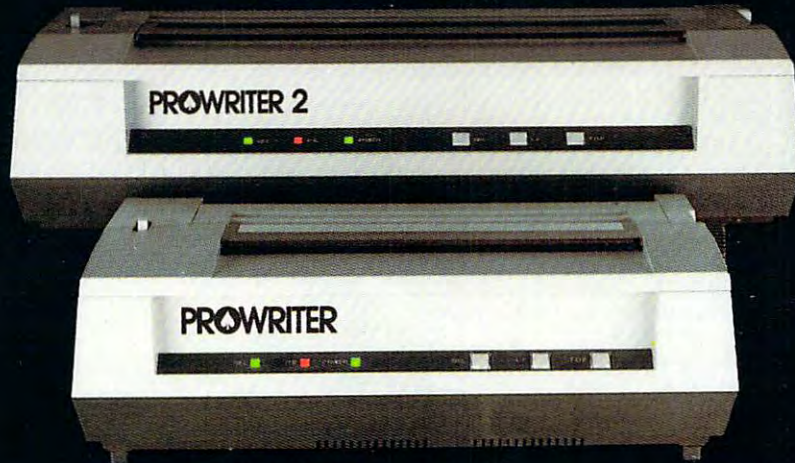
Finally, there's one full family of printers that covers every business or word processing application—all from C. Itoh, a company known for packing more product into less price, and all distributed exclusively by Leading Edge, a company known for searching out and providing that very thing. Which means that one call to one source can get you any printer, any time you need it, for any purpose. All backed by a full years' warranty from Leading Edge. (Try *that* on any other line of printers.)

### THE PRO'S.

**The Prowriters: business printers—and more.** The “more” is a dot-matrix process with more dots. It gives you denser, correspondence quality copy (as opposed to business quality copy, which looks like a bad job of spray-painting).

**Prowriter:** 120 cps. 80 columns dot matrix compressable to 136. 10" carriage. Parallel or serial interface.

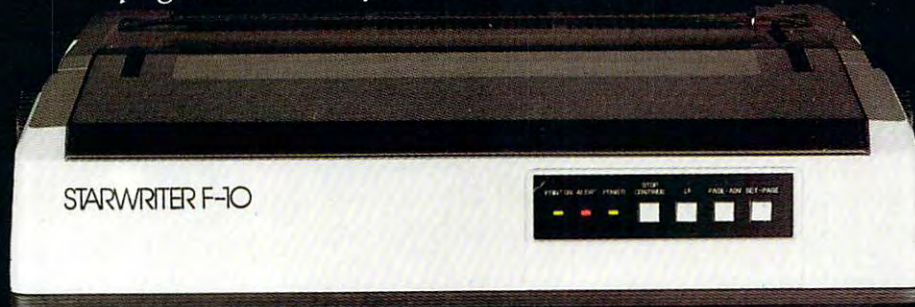
**Prowriter 2:** Same as Prowriter, except 15" carriage allows full 136 columns in normal print mode. Parallel or serial interface.



### THE STAR.

**The Starwriter F-10.** In short (or more precisely, in a sleek 6" high, 30-pound unit), it gives you more of just about everything—except bulk and noise—than any other printer in its price range. It's a 40 cps letter-quality daisy-wheel with a bunch of built-in functions to simplify and speed up word processing.

It plugs into almost any micro on the market, serial or parallel.



### THE MASTER.

**The Printmaster F-10.** Does all the same good stuff as the Starwriter except, at 55 cps, the Master does it faster.



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.

[www.commodore.ca](http://www.commodore.ca)



# WHEN WE ANNOUNCED THE COMMODORE 64 FOR \$595, OUR COMPETITORS SAID WE COULDN'T DO IT. THAT'S BECAUSE THEY COULDN'T DO IT.

The reason is that, unlike our competitors, we make our own IC chips. *Plus* all the parts of the computer they go into.

So Commodore can get more advanced computers to market sooner than anybody else. And we can get them there for a lot less money.

## WHAT PRICE POWER?

For your \$595,\* the Commodore 64™ gives you a built-in user memory of 64K. This is hundreds of dollars less than computers of comparable power.

Let's you think that the Commodore 64 is some stripped-down loss leader, a look at its available peripherals and interfaces will quickly convince you otherwise.

## SOFTWARE THAT WORKS HARD.

The supply of software for the Commodore 64 will be extensive. And with the optional plug-in Z80 microprocessor, the Commodore 64 can accommodate the enormous amount of software available in CP/M®.

Add in the number of programs available in BASIC and you'll find that there are virtually no applications, from word processing to spreadsheets, that the Commodore 64 can't handle with the greatest of ease.

## PERIPHERALS WITH VISION.

The Commodore 64 interfaces with all the peripherals you could want for total personal computing: disk drives, printers and a telephone modem that's about \$100, including a free hour's access to some of the more popular computer information services. Including Commodore's own Information Network for users.

## RUN YOUR BUSINESS BY DAY.

## SAVE THE EARTH BY NIGHT.

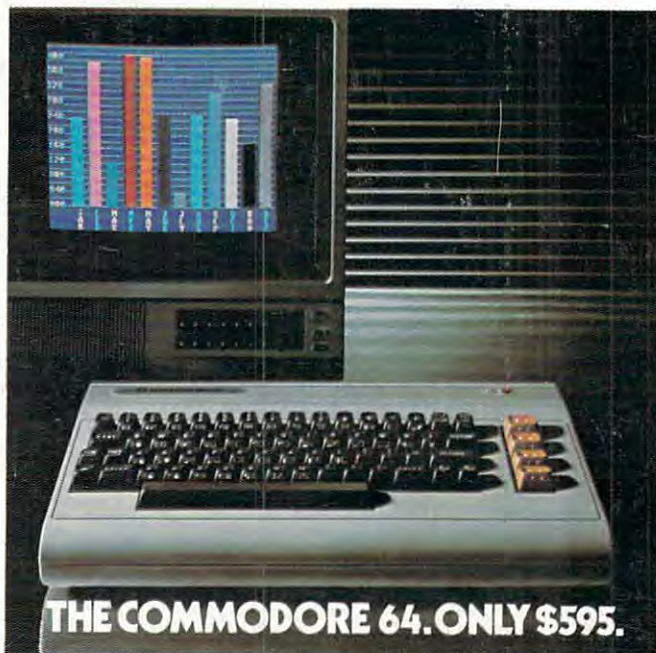
At the end of a business day, the Commodore 64 can go into your briefcase and ride home with you for an evening's fun and games.

Because of its superior video quality (320x200 pixel resolution, 16 available colors and 3D Sprite graphics), the Commodore 64 surpasses the best of the video game machines on the market. Yet, because it's such a powerful computer, it allows you to invent game programs that a game machine will never be able to play; as well as enjoy Commodore's own video game cartridges.

## ATTACK, DECAY, SUSTAIN, RELEASE.

If you're a musicologist, you already know what an ADSR (attack, decay, sustain, release) envelope is. If you're not, you can learn this and much more about music with the Commodore 64's music synthesizing features.

It's a full-scale compositional tool. Besides a programmable ADSR envelope generator, it has 3 voices (each with a 9-octave range) and 4 waveforms for truly sophisticated composition and playback—through your home audio system, if you



wish. It has sound quality you'll find only on separate, music-only synthesizers. And graphics and storage ability you won't find on any separate synthesizer.

## DON'T WAIT.

The predictable effect of advanced technology is that it produces less expensive, more capable products the longer you wait.

If you've been waiting for this to happen to personal computers, your wait is over.

See the Commodore 64 soon at your local Commodore Computer dealer and compare it with the best the competition has to offer.

You can bet that's what the competition will be doing.

Commodore Business Machines  
Personal Systems Division  
P.O. Box 500, Conshohocken, Pennsylvania 19428

Please send me more information on the Commodore 64™

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Zip \_\_\_\_\_ Phone \_\_\_\_\_

**commodore**  
COMPUTER

CPT-1

\*Manufacturer's Suggested Retail Price: July 1, 1982. Disk drives and printers are not included in prices. The 64's price may change without notice. CP/M® is a registered trademark of Digital Research, Inc.