Copy Atari Boot Tapes To Disk

C. Scott Davis
Broomfield, CO

If you're an Atari owner who purchased a disk drive after you bought your initial system, probably one of the first things you did was transfer your program library from cassette to diskette. I know I did. Everything was going along fine until I got to a boot tape. They're the ones you load by powering-up the system while depressing the START key. The game "SHOOT" appearing in the September 1981 issue of **COMPUTE!** is an example.

Not being satisfied with leaving several programs on cassette, I had to find a way to put them on disk. After a little research I developed a program that did the job. Considerable credit goes to Bob Nalbone, who had already developed his own program to read and display data from cassette tapes.

To use the program, simply boot up your system with the BASIC cartridge in place, the disk drive turned on with a DOS disk inserted, and a blank formatted disk handy. Run the program from this article. When finished, you should have a boot disk containing the program from your boot tape. A boot disk is loaded by powering up your disk drive, inserting the disk, and then powering up your computer while depressing the START key.

Here's an explanation of the program:

Lines 180 - 210 read the first four bytes of information from the tape. The number of records and starting address for loading are contained in bytes two, three, and four.

Lines 220 - 370 display system parameters as well as information just obtained from the boot tape. This could be useful if the tape can't be copied because of lack of memory space.

Line 380 calculates the starting address for a work area to be used in transferring data from tape to disk. 500 bytes above the area used by BASIC was selected.

Line 390 calculates the address of the last location required for the work space.

Lines 400 - 480 check to make sure your system has sufficient space to make the transfer. Note that a boot tape may contain as many as 256 records (128 bytes each) requiring a total of 32K of free space. Most tapes should be much smaller.

Lines 490 - 570 place the code for a short machine language routine into reserved memory starting at location 1536 decimal. This routine will read the tape and store the data in the work area previously defined. Machine language is required because BASIC isn't fast enough for more than the first record on the tape. Table 1 shows the assembly language version of this code.

Line 620 opens the cassette for input. The parameter 128 specifies data with short inter-record gaps.

Line 630 calls the routine to read the tape. The work area starting address and the tape length in bytes are passed via the USR function.

Lines 650 - 670 check for an error in the tape reading attempt.

Lines 720 - 740 set up parameters for writing data onto disk. The locations and values used were derived from the *Atari Technical Users Notes.*

Lines 750 - 800 provide a routine to write a single sector of data to disk. See Table 2.

Lines 810 - 870 provide a loop to manipulate several parameters and call the machine routine. The variable START contains the starting address of the next 128 bytes of data to be written.

Line 820 POKEs the low byte of the STARTing address into memory.

Line 830 POKEs the high byte of START into memory.

Line 840 takes care of the disk sector number to be written.

Line 850 calls the USR routine to do the write to disk.

Line 860 increments the starting address for the next write operation.

www.commodore.ca

Table 1.

Decimal Data	Assembly Code	
104	PLA	Pull the number of USR parameters from the stack
162,16	LDX #$10	Place $10 into the x register for an offset into IOCB #1
169,7	LDA #$07	$07 is control code for character read operation
157,66,3	STA $0342,X	Place that $07 into ICCOM of IOCB #1
104	PLA	Pull the high byte of variable START from the stack
157,69,3	STA $0345,X	Place it into ICBAH of IOCB #1
104	PLA	Pull the low byte of START from the stack
157,68,3	STA $0344,X	Place it into ICBAL of IOCB #1
104	PLA	Pull the high byte of variable FLEN from the stack
157,73,3	STA $0349,X	Place it into ICBLH of IOCB #1
104	PLA	Pull the low byte of FLEN from the stack
157,72,3	STA $0348,X	Place it into ICBLL of IOCB #1
32,86,228	JSR $E453	Jump to CIOV
16,4	BPL $04	Conditional branch forward by 4 if no error
169,1	LDA $01	Put a $01 in A
133,212	STA $D4	Place the 1 in the USR return location
96	RTS	Done

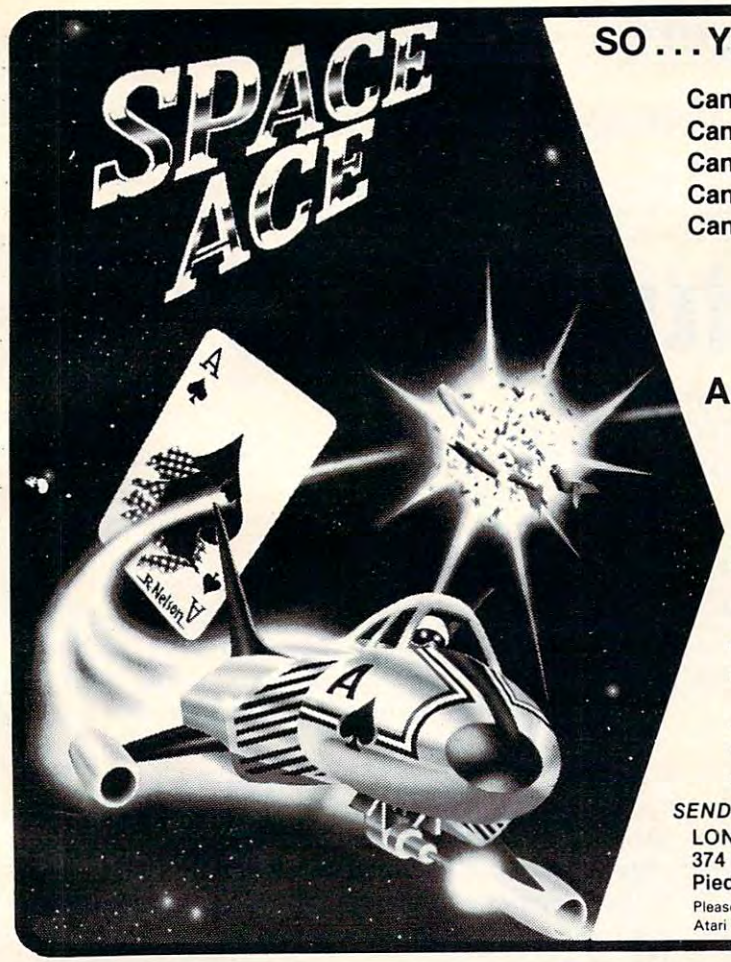
Table 2.

Decimal Data	Assembly Code	
104	PLA	Pull the number of USR parameters from the stack
32,83,228	JSR $E453	Jump to DSKINV to write a sector
96	RTS	Done

```
100 GRAPHICS 0
110 DIM A$(1)
120 PRINT
130 PRINT "PLACE BOOT TAPE IN PLAYER"
140 PRINT "REWIND TAPE - ";
150 PRINT "DEPRESS PLAY BUTTON"
160 PRINT "PRESS RETURN KEY"
170 PRINT
180 OPEN #1,4,0,"C:"
190 GET #1,A:GET #1,NREC
200 GET #1,ADL:GET #1,ADH
210 CLOSE #1
220 PRINT "SYSTEM PARAMETERS:"
230 PRINT
240 BTOP=PEEK(144)+256*PEEK(145)
250 PRINT "BASIC MEMTOP = ";BTOP
260 OTOP=PEEK(741)+256*PEEK(742)
270 PRINT "OS MEMTOP = ";OTOP
280 PRINT "FREE RAM = ";OTOP-BTOP
290 PRINT
300 START=ADL+256*ADH
310 PRINT "YOUR BOOT TAPE NORMALLY"
320 PRINT "LOADS STARTING AT ";START
330 IF NREC=0 THEN NREC=256
340 PRINT "CONTAINS ";NREC;" RECORDS"
    ;
350 FLEN=128*NREC
360 PRINT " = ";FLEN;" BYTES"
370 PRINT
380 START=BTOP+500
390 LAST=START+FLEN
400 IF LAST<OTOP THEN 490
410 PRINT "WORK AREA REQUIRED"
420 PRINT
430 PRINT START," TO ";LAST
440 PRINT
450 PRINT "INSUFFICIENT FREE RAM"
460 PRINT
470 PRINT "SORRY"
480 STOP
490 FOR A=1536 TO 1569
500 READ D
510 POKE A,D
520 NEXT A
530 DATA 104,162,16,169,7,157,66,3
540 DATA 104,157,69,3,104,157,68,3
550 DATA 104,157,73,3,104,157,72,3
560 DATA 32,86,228,16,4,169,1,133,212
570 DATA 96
580 PRINT "REWIND THE TAPE AGAIN"
590 PRINT "DEPRESS PLAY BUTTON"
600 PRINT "PRESS RETURN"
610 PRINT
620 OPEN #1,4,128,"C:"
630 X=USR(1536,START,FLEN)
640 CLOSE #1
650 IF X<>1 THEN 680
660 PRINT "TAPE READ ERROR"
670 STOP
680 PRINT "PUT A FORMATTED DISK IN"
690 PRINT "DRIVE #1 - PRESS RETURN"
700 INPUT A$
710 PRINT
720 POKE 769,1:REM DUNIT=1
730 POKE 770,87:REM WRITE=87
740 POKE 779,0:REM DAUX1=0
750 FOR A=1536 TO 1540
760 READ D
770 POKE A,D
780 NEXT A
790 DATA 104,32,83,228
800 DATA 96
810 FOR SECTOR=1 TO NREC
820 POKE 772,START-256*INT(START/256)
830 POKE 773,INT(START/256)
840 POKE 778,SECTOR
850 X=USR(1536)
860 START=START+128
870 NEXT SECTOR
880 PRINT
890 PRINT "DONE"
900 END
```

©

www.commodore.ca



SO . . . YOU THINK YOU'RE A SPACE ACE!

Can you blast through the deadly asteroid fields?
Can you survive robot space bombs?
Can you handle invisible Silurian space mines?
Can you dodge a rotating death vortex?
Can you defeat the alien battle cruisers?

GOOD LUCK CHARLEY!

Arcade Quality Graphics and Sound

Relentless Non-Stop Action

SO . . . YOU THINK YOU CAN HANDLE IT?

Try it, if you're right, you're a . . . SPACE ACE!

A great new and challenging space game by Greg Young

- **Hi-res Graphics**
- **Requires 16K and all of the potential of the Atari™ 400/800**
- **Disk/Cassette**
- **Joy stick**
- **100% machine language**
- **Multiple levels of play**
- **Great Audio**
- **Time limit options**
- **Bonus scoring**

$29.95

SEND CHECK OR MONEY ORDER TO:

LONDON SOFTWARE
374 Wildwood Avenue
Piedmont, CA 94611

Ph. orders (415) 893-1090
Visa/Mastercharge
Dealer Inquiries Invited.

Please add $1.50 postage & handling. Calif. residents add additional $1.95 tax.
Atari 400/800 is a registered trademark of Atari, Inc.

METEOR STORM

MADE EXCLUSIVELY FOR THE

*ATARI

Dealer Inquiries Invited

METEOR STORM Is a FAST-ACTION, Arcade Quality, game. Written in machine language especially for the Atari. You, as the Pilot of a Fighter space ship, must rescue as many people from the besieged city of Zarton as you possibly can. You'll have to fight your way through a meteor storm and aliens, with your lasers blasting a path. Then you must dock with the mother ship and safely deliver your precious cargo of human lives. This is your chance to be the HERO of Zarton.

16K Tape or Disk $29.95

Ask for Meteor Storm at your local computer store or order direct from us. Add $2.00 for shipping. Use your Visa, M/C.

Royal Software

2160 West 11th Ave., Eugene, Oregon 97402
(503) 683-5361

www.commodore.ca

A routine for Upgrade and 4.0 BASIC (except 4.0, 40-column model) PETs that saves screen images on disk and has other applications.

PET: Picture Files

Elizabeth Deal
Malvern, PA

PET knows four types of disk files. It's time we add another, except that it really isn't new – just a program file under a new name. The set of subroutines in the listing shows a way to use a disk as a storage device for screen images. The routine is for Upgrade PET. Conversions to BASIC 4 (80 column) are coded in.

The save/load method described here need not be limited to the screen; it can handle any area of memory. This opens up some interesting possibilities for BASIC, without touching machine code directly.

At present, if you or your children have ever wanted to save a picture from the screen onto a disk file, and bring it back by pressing one shifted key, then this routine is just for you. We use it as an instant subroutine with *Power* (Professional Software), but it can be used without *Power*. The code shows bare-bones essentials. You can customize it for your hardware setup or for different applications.

The Mechanics

The lines that actually do the work are 330-500. The code is a translation into BASIC from the machine language monitor save and load routines, which here function as such. The save command is particularly powerful, in that from within BASIC we can easily save any area of memory.

The subroutine in lines 330-500 needs only this information:

(1) device number (DV)

(2) file name FL$

(3) address of file name; pointer in 68/69 gives address for 218/219

(4) length of file name.

(5) start (S1-S2) and end (S3/S4) addresses for writing.

The picture files are program files, quick and compact. Code conversion is not needed. Characters in reverse, quotes, commas, colons, and other such nasties cause us no problem whatsoever. Loading does not cause a change in BASIC pointers, and, since it does not cause the automatic execution from the first line of text, you don't have to code around that issue.

Disk errors do not cause any problems. The curious necessity of pressing a STOP key in the event of FILE NOT FOUND condition has been eliminated (line 460). The message prints by itself if file does not exist, hence this code is more feasible for use within a program than the semi-direct Power-mode, a necessity for users without *Power*.

I have hard coded device 8 and drive 1. Most of you have interrogation routines on the demo disk; they can make the setup more flexible. The program does ask for a file name and permits you to gracefully get out (type X) before any disk activity takes place. Limit your input to 12 characters, and be careful not to push cursor-down and clear-screen during input. Once again, existing get/input routines are a neater solution.

Cautions

Do not change the business part of the program without first understanding it.

Screen images, if loaded via an ordinary LOAD command by mistake, cause a crash. For that reason, files saved by my routine have a clearly visible "P." (for picture) prefix. This overcomes the only (I think) dangerous feature of the program. If you have a habit of saying "LOAD"P*",8" then this is a good time to plan to stretch the habit to three letters. Of course, one experience guarantees fast learning. This program does not check the end-load address. It is unlikely you have a "P." file starting at the screen and going all the way into the interface chips.

The load command is tricky, in that it normally loads into the same place as where the code came from. This means that, unless you're careful, you may mess up a program in memory if you inadvertently ask for a display of a wrong file. The coding

www.commodore.ca

SJB DISTRIBUTORS. THE MOST COMPETITIVE PRICES ON COMMODORE PRODUCTS.

commodore

INTERFACES

ADA-1450 Serial	$149
ADA-1600 Parallel	149
RS232 cable for Vic or 64,6m	30
Video/Audio cable for 64 & monitor	25

MONITORS — Great resolution for the CBM 64 or VIC

Panasonic, 16" Color	$360
Amdek Color I	360
Panasonic, 9" b&w	130

BUSINESS SOFTWARE

Spellmaster Dictionary (great for WordPro!)	$199
OZZ Data Base System (8050)	240
Silicon Office (database, wp)	995 (New)
Wordcraft 80	289
VisiCalc (new expanded)	199
Dow Jones Portfolio Management System (RS232)	120
WordPro 4+ or 5+	299
The Manager	199
Galaxy One (games)	39
Legal Time Accounting	425
I.R.M.A.	295
BPI A/R, G/L, Job Cost, Inventory, Payroll	325/pkg

SJB carries many other lines of equipment and products. Call us for our new fall catalogue.

MasterCard, Visa, Money Order, Bank Check
COD (add $5) accepted.
Add 3% surcharge for credit cards.
In stock items shipped within 48 hours, F.O.B., Dallas, TX.
All products shipped with manufacturer's warranty.

TO ORDER CALL TOLL FREE
800-527-4893 800-442-1048 (Within Texas)
SJB will meet any competitive price under similar in-stock conditions.

SJB DISTRIBUTORS, INC.
10520 Plano Road, Suite 206
Dallas, Texas 75238
(214) 343-1328

Prices are subject to change without notice.

SOFTWARE FOR CBM 64

Word Processing	$80
Computer Tutoring Game	50
CBM EasyCalc (for the 64)	call
CBM EasyFinance	call
CBM EasyPlot	call
CBM EasyScan (appointment manager)	call
Sprite-Magic (build sprites on screen, save to disk or cassette)	30
Assembler Package for CBM 64 (cassette) Editor (creates and updates source code), Assembler, Loader, Disassembler	50
Mailing List	50
IEEE Interface	90
Parallel Interface	99
RS232 Interface (modems, printers)	40

VIC PRODUCTS

VIC 20 Computer, 5K	$199
Vic Datasette Recorder	60
Vic 1540 Disk Drive	467
VIC MODEM (for CBM 64)	100
VIC 1525 Graphic Printer (for CBM 64)	325
8K Memory Expansion Cartridge	49
16K RAM	95
24K RAM	149
IEEE Interface	80
Gorf (great arcade game)	$39
Omega Race	39
Midnight Drive	23
Super Alien	23
Vic Super Expander	55
Vic Cassette Recreation Pack	46
Vic Cassette Home Finance Pack	46

Arcade Joysticks — Heavy duty with 2 firing buttons! Great for the VIC or 64 ..... $25

SuperPET (5 languages, 2 processors)	$1409
CBM 8032 Computer, 80 column	1029
CBM Memory Expansion, 64K	359
PET 4032,40 Column	795
CBM 8050,1Mg. Dual Drive	1259
CBM 8250,2Mg. Dual Drive	1760
CBM D9060,5 Mg. Hard Disk	2795
CBM D9090,7.5 Mg. Hard Disk	3195
CBM 4040,340K Dual Drive	919
CBM 2031,170K Single Drive	489

PRINTERS — LETTER QUALITY

CBM 8300,40cps	$1450
Diablo 620,25cps	1350
Nec Spinwriter 7700,55cps	2350
Nec Spinwriter 3500,35cps	1600

PRINTERS — DOT MATRIX

CBM 4022,80cps/graphics	$395
CBM 8023,150 cps/graphics	589
Okidata 82A,120cps/serial or par	449
Nec 8023A(parallel)	499

www.commodore.ca

in lines 460-500 prevents this from happening. Your variations on this theme may exclude the starting address test in line 490, but be careful what you're doing.

The message end of line 490 is never executed by my program, as the failure to find a program file with a "P." prefix is actually detected in line 460. I keep line 490 for safety, in the event of skipping "P." in line 210 or in versions of the routine or in the event of an existing "P." file that is not a screen file.

For loading via this program you may, of course, use "*" for a file name, as "P.*" will result, bringing in the first picture file.

Do not add the "P." prefix when you are asking to write or read; the routine does it for you and prints it as an input prompt, but you can't change it. The only time "P." in "P.ELEPHANT*" is mandatory is when you want to load the elephant while in the monitor mode (and don't use Power!). Needless to say, "P." must be used when you save screen via the monitor if you plan to read by this code.

Consider the bottom line useless. It is saved, but is used by my routine for asking file name and for floppy error messages. Bottom line seldom is used anyway, so it shouldn't be too painful to forget it. You may change the end address to skip saving that line.

Go easy on the RETURN key after a picture has been displayed, if that picture happens to be a program text or if numbers exist on the left edge. You may or may not want to enter the lines into your program.

Power Mode

The code in lines 110-120 is my hookup to *Power*. Many of you are familiar with Charles Brannon's Keyprint routine, which dumps the screen to printer when a key is pressed. This *Power* hookup works in a similar fashion: pressing a user-designated shifted key dumps the screen image onto a floppy or brings an old image back. The shifted key does not print and, miracle of useful miracles, the cursor stays in place.

Program Mode Suggestions

Don't worry if you don't have *Power*. You can use the routine just about as listed. But it has to be done in a program. You have to arrange for starting and ending the procedure without scrolling the screen. The reason is that, in contrast to *Power*'s instant subroutines, PET's direct "execute" type commands must be typed on the screen, and the cursor hops down. Both events usually mangle the picture.

The simplest thing is to transfer your picture to another area of the PET before saving. Changing top of the PET pointer will protect the picture. You can then save the entire alternate screen area (change the addresses). After loading it by the quick load method, you can transfer the image back, for further work, or whatever.

Swapping the screen prior to input activity into an alternate area is a good idea anyway in very serious uses. You will then not need fancy user-proof input routines, your picture being safe elsewhere.

Some Applications For Picture Files

Many uses are obvious. Your child's masterpiece can be preserved (several times, while working). Graphs and other displays can be saved. Tiny sections of programs can be saved and brought back without disturbing a program in memory. You can save an annotated history of your floppy on the floppy. You can debug programs which are heavily screen oriented, by being able to quickly overlay and compare various outputs you've previously saved as picture files. Fixing the pointer chain can be a building block for a BASIC disk append routine. And more.

Non-Upgrade PETs

The table shows the system addresses used in the code so that if anything goes wrong you can track it down. Most addresses are identical in Upgrade and 4.0 BASIC. Addresses of two ROM routines differ. Provided that they function in the same way (the Micromon code seems to tell me they do), 4.0 users should experience no difficulty.

Upgrade	BASIC #4	Meaning
SC = 32768	same	screen
68/69	same	last used variable (FL$)
212	same	device
209	same	length of file name
218/219	same	address of file name
136/137	same	temp. storage/rnd #
157	same	load flag = 0
251/252	same	save start address
201/202	same	save end address
LR = 62242	62294	load routine $F356
SR = 63140	63203	save routine $F6E3

Additionally, 80-column PETs have a 2000-byte screen. This is reflected in the screen end address correction in line 300, as well as in longer strings of blanks. Be careful of three-way concatenation if memory is getting short.

References

1. *CBM User Manual* (Upgrade) Monitor listing.
2. Butterfield, BASIC4 Memory map and ROM routines, **COMPUTE!**, November/December 1980, #7.
3. Butterfield, Upgrade Memory map, **COMPUTE!**, November/December 1979, #1.
4. Micromon code where one gets load subroutine address.

www.commodore.ca

5. Butterfield disk utilities where one gets instructions about disk.
6. Collins, "Host Equipment Test," *The Microcomputer Magazine* (Commodore-PA), also in the *Transactor* (Commodore-Canada).

```
110 REM"W 170:WRITE PIC TO FLOPPY
120 REM"R 180:READ TO SCREEN
130 STOP
170 LF=0:GOTO190:REM W (ON DEVICE 8
180 LF=1         :REM R    DRIVE 1)
190 DV=8:DR$="1":FL$=""
200 IFLF=0THENFL$="@"
210 FL$=FL$+DR$+":P."
220 GOSUB270:GOSUB550
230 E1=1:GOSUB630:IFE1GOTO250
240 FL$=FL$+I$:GOSUB330
250 PRINTH$;:RETURN
260 REM---SOME SYS CONSTANTS------
270 GOSUB520:IFTP=0THENSTOP
280 SC=32768:LR=62242:SR=63140
290 S1=0:S2=128:S3=232:S4=131
295 IFTP=2THENLR=62294:SR=63203
300 IFTP=3THENLR=62294:SR=63203:S3=208:S4=135
310 FF=20:RETURN
320 REM---READ/WRITE FILE---------
330 CLOSE15:OPEN15,DV,15
340 IFLFTHENGOSUB460:IFE1THENRETURN
350 POKE212,DV:POKE209,LEN(FL$)
360 POKE136,PEEK(68):POKE137,PEEK(69)
370 AD=PEEK(136)+256*PEEK(137)+1
380 AD=PEEK(AD)+256*PEEK(AD+1)
390 POKE218,AD-256*INT(AD/256):POKE219,AD/256
400 IFLFTHENPOKE157,0:SYS(LR):GOSUB430:CLOSE15
    :RETURN
410 POKE251,S1:POKE252,S2:POKE201,S3:POKE202,S
    4:SYS(SR)
420 REM---FLOPPY STATUS-----------
430 INPUT#15,E1,E$,E2,E3:IFE1=0THENPRINTH$M1$;
    :RETURN
440 PRINTH$BL$H$" *"E1;E$,E2;E3;:CLOSE15:RETUR
    N
450 REM---LEGAL TO LOAD?----------
460 CLOSEFF:OPENFF,DV,3,FL$+",P":GOSUB430:IFE1
    THENRETURN
470 GET#FF,I$:LA=ASC(I$+CHR$(0))
480 GET#FF,I$:CLOSEFF:LA=LA+256*ASC(I$)
490 IFLA<>SCTHENPRINTH$M2$;:E1=1
500 RETURN
510 REM---J.COLLINS TYPE TEST-----
520 A=PEEK(57345):TP=0:IFATHENTP=1:IFAAND1THEN
    TP=3:IFAAND4THENTP=2
530 RETURN:ORIG=0,UPGR=1,4/40=2,4/80=3
540 REM---MESSAGES----------------
550 H$="{HOME}{24 DOWN}":REM[HOME,24DOWN]
560 BL$="
      ":REM[39BLANKS]
570 IFTP=3THENBL$=BL$+BL$+CHR$(32)
580 BL$=BL$+CHR$(20)+" ":M1$=" OK"
590 M2$=" * ??"
600 PRINTH$BL$;:REM CLEAR BOTTOM LINE
610 RETURN
620 REM---CONFIRM,ASK FILE NAME---
630 LL$="WRITE ":IFLFTHENLL$="READ "
640 PRINTH$"{REV}    X/FILE NAME{OFF} "LL$FL$;
    :GOSUB680
650 IFASC(I$)=88THENPRINTH$M1$;:RETURN
660 E1=0:RETURN
670 REM---INPUT------------------
680 CLOSEFF:OPENFF,0:INPUT#FF,I$:CLOSEFF:RETUR
    N
690 REM------------------------.
```

Commodore 64 Owners

COMPUTE! is looking for articles on the new Commodore 64 computer. If you've written an interesting program – a game, a data base manager, any program you think might be of value to others – you could become a **COMPUTE!** author. In the coming months, we will be publishing a Sprite Editor, a music composition program, and many more exciting applications for the 64. What's more, we're bringing out a book on the 64's sound and graphics.

For consideration for publication in **COMPUTE!** or in our upcoming book, write anything from a couple of paragraphs to several pages of documentation, enclose a tape with your program recorded twice, and mail it to: Editor, **COMPUTE!** Magazine, P.O. Box 5406, Greensboro, NC 27403. If you want the materials returned, please enclose an SASE.

www.commodore.ca

Building on an intriguing video display technique ("Marquee," February 1982, p. 135), this program makes it easy to add horizontal scrolling which is independent of BASIC. Line 20 can accept a string either from the keyboard or a DATA statement READ. The rest is automatic and, because this routine uses interrupts, it is "transparent" to other things BASIC is doing at the time. It works as printed for Upgrade and 4.0 BASIC PET/CBM's. If you have an 80-column screen, change the 40 in line 864 to an 80. Change the speed by changing the five in line 864.

Calling Routine For Marquee

Kenneth Finn
Bedford, NY

"Marquee," by Mark Bernstein (**COMPUTE!**, February 1982, #21), is an exciting program that gives the capability to make the top line of the screen into a billboard with strings moving from right to left across it.

Since the program is in machine language, it requires a special set-up to use from BASIC. The way the program was originally written, you load the Accumulator and X register of the 6502 with the address of the string you want printed before calling the routine. In his article he coded such a string for demonstration. However, when you are writing a BASIC program, setting up such a string is not so easy.

The following routine can be used in any BASIC program to make Marquee work simply and easily for you. The trick is that locations 68 and 69 contain an address for the location of the last referenced string in the BASIC program. Thus, we must make our BASIC program reference the correct string, then tack on a chr$(0) to it as an end marker, and then indirectly get its address. The following program does this for you in the form of a subroutine.

```
 10 INPUT /ENTER STRING/;A$
 20 LET A$=A$+CHR$(0) : GOSUB100
 30 REM
 40 GOTO 10
 50 END
 60 REM
 70 REM
100 REM MARQUE CALLING SUBROUTINE
103 REM
105 IF PEEK(145)<>46 THEN 105
110 POKE1009,PEEK((PEEK(68)+2+PEEK(69)*256):
    REM HI BYTE
120 POKE1011,PEEK((PEEK(68)+1+PEEK(69)*256):
    REM LO BYTE
130 SYS1008:RETURN
140 REM
150 REM
```

The above routine makes using Marquee from BASIC simple and makes the routine even more valuable.

```
10 GOSUB800
20 INPUT A$:A$=A$+CHR$(0): REM OR READ A
    $ (FROM A DATA STATEMENT IN PROGRAM)
30 POKE1009,PEEK(PEEK(68)+PEEK(69)*256+2
    ):REM HIGH BYTE
40 POKE1011,PEEK(PEEK(68)+PEEK(69)*256+1
    ):REM LOW BYTE
50 SYS1008
60 END
800 REM MARQUEE MACHINE LANGUAGE
810 FOR ADRES=864TO1015:READ DATTA: POKE
     ADRES,DATTA:NEXT ADRES
820 RETURN
864 DATA 40,0,5,85,228,7
870 DATA 5,40,160,1,185,0
876 DATA128,153,255,127,200,204
882 DATA96,3,208,244,32,161
888 DATA3,205,97,3,240,15
894 DATA192,255,240,11,200,140
900 DATA101,3,172,96,3,153
906 DATA255,127,96,172,96,3
912 DATA169,32,153,255,127,238
918 DATA103,3,173,103,3,205
924 DATA96,3,176,48,96,172
930 DATA101,3,177,0,41,191
936 DATA96,141,0,0,142,1
942 DATA0,169,0,141,103,3
948 DATA141,101,3,173,144,0
954 DATA141,99,3,173,145,0
960 DATA141,100,3,120,169,223
966 DATA141,144,0,169,3,141
972 DATA145,0,88,96,120,173
978 DATA99,3,141,144,0,173
984 DATA100,3,141,145,0,88
990 DATA96,206,102,3,16,9
996 DATA32,104,3,173,98,3
1002 DATA141,102,3,108,99,3
1008 DATA162,3,169,248,32,169
1014 DATA3,96
```

©

www.commodore.ca

A gentle introduction to PET interfacing with a simple example to let your computer control external devices.

PET Interfacing

Mike Baskerville
Compton, CA

Technological advances in the field of microprocessor interfacing permit the computer to control large amounts of current and voltage. Silicon devices such as the diode, transistors, and thyristors allow the computer to function as a very flexible control mechanism.

The intent of this article is to open the door for users who would like to do something with their PET/CBM other than send electronic mail and dazzle their friends with the PET's computing abilities.

The user port on the PET/CBM is one of the few things that has not changed from the first 4K PET to the current 32K CBM. It is driven by POKEs and read with PEEKs. Machine language programming allows very quick responses, making the port priceless. Those of you not familiar with the user port, pay close attention: you may be in for a pleasant surprise.

The 6522 VIA (Versatile Interface Adaptor) is the IC (integrated circuit) which gives us the user port. It provides a parallel eight-bit bidirectional data port as well as serial in and out for those great sound effects. Bidirectional means that data can be read or written and is an important feature because many hardware applications require monitoring as well as control. The eight-bit parallel port can control eight devices, or a combination of monitoring and control can be obtained without additional decoding or multiplexing.

Data seen on the port in the output mode is a one or a zero in binary. The corresponding measured quantities are +2.4 volts (binary one) or something less than +0.5 volts, which corresponds to the binary zero. Knowing this, and having a little knowledge of semiconductors and digital logic, you can easily control lights, TVs, radios, security systems, tape recorders, or just about anything that can be turned on and off.

Obviously, I can't (in one article) show how to interface to any device, but I will introduce a simple interface and trust that, with a little creativity, many users will adopt their own style and applications.

Like money in the bank, a buffer is a good idea. A buffer adds a margin of safety between you and the computer (we don't want to lose that 6522 VIA). For the purpose of buffering I have used AND gates, NAND gates, and/or hex inverters. In order to maintain compatibility, TTL (Transistor-Transistor Logic) IC's should be utilized. This compatibility assures proper voltage, current, and switching levels for the buffer. At this point, I recommend that anyone seriously interested in interfacing acquire a TTL data book. Many are on the market. *The TTL Data Book* (Texas Instruments) is fine. The 6522 VIA is manufactured by MOS Technology / Commodore Semiconductor Group. Their address is Valley Forge Corp. Center, 950 Rittenhouse Rd., Norristown, PA, (215)666-7950.

Our simple demonstration interface could control a lamp to provide home security or just to show off the versatility of your PET. You will need a NAND gate (SN74LS00), a 5 volt DC power supply, a NPN transistor, a SPST relay, a 10K resistor, and some means of bringing it all together.

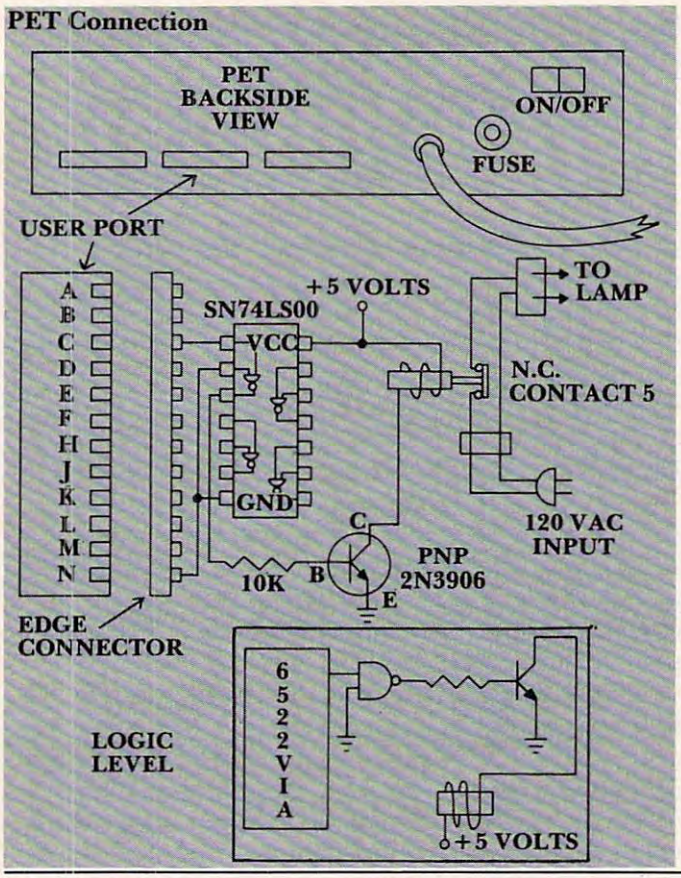
The circuit shown in Figure 1 operates as follows: one of the inputs to the NAND gate is grounded, and the other is connected to the output of the user port. When the port goes low (POKE 59471,0), the NAND gate output goes high (which will forward bias the transistor and energize the relay coil). The contacts open and the lamp goes out. The 10K resistor between the base of the transistor and the NAND gate insures that only a small current will forward bias the transistor – insuring long life and saturation of the transistor. To turn the light on (POKE 59471,1), the port goes high, causing the NAND gate to go low; thus the transistor loses its bias and the coil voltage drops to zero. The lamp comes on. With this circuit configuration, and a relay with a one-amp contact rating, you can easily control a 100 watt light bulb.

It is a good idea to test your circuit before making the final connection to the computer. An additional advantage of the buffer (the NAND gate) is that the circuit can be tested by grounding both inputs of the NAND gate. This will simulate a low output from the user port. By removing one of the grounds, the NAND gate output will go low, simulating a high output on the port. A nice feature of TTL is that an open input is interpreted the same as a logic level one.

Driving the circuit can be as simple as pressing a button on the computer. If a triac is used, instead of the relay, the light could be dimmed and brightened as well as turned off and on. The sample program allows a time delay for the circuit.

This particular application of the user port is only one of the unlimited possibilities for your PET/CBM. I hope you have as much fun developing your interfaces as I do mine.

www.commodore.ca




```
100 REM      SAMPLE PROGRAM FOR USER PORT I/O
110 PRINT"{CLEAR}":POKE59468,12
120 POKE59459,1:REM       SETS PA-0 FOR OUTPUT

130 P$="{HOME}{12 DOWN}{17 RIGHT}"
140 T$="{HOME}{03 DOWN}{09 RIGHT}"
150 T1$="{HOME}{21 DOWN}{09 RIGHT}"
160 T3$="COMPUTERIZED LAMP CONTROL"
170 T4$="{10 RIGHT}PRESS"
180 T5$="{02 DOWN}{04 RIGHT}{REV} L {OFF}IGHT ~
    {REV} D {OFF}ARK "
190 L$=" LAMP ON  "
200 L1$="{REV} LAMP ON {OFF}"
210 O$=" LAMP OFF  "
220 O1$="{REV} LAMP OFF {OFF}"
230 PRINTT$;T3$;T1$;T4$;T1$;T5$
240 A$="L":GOTO270
250 REM     THIS ROUTINE SETS PA-0 HIGH OR LOW

260 GET A$
270 IF A$="L" THEN POKE 59471,1:PRINTP$;L$:B$=
    "L"
280 IF A$="D" THEN POKE 59471,0:PRINTP$;O$:B$=
    "O"
290 A=A+1:IFA>30 THEN GOSUB 320
300 GOTO 260
310 REM     FLASHING INDICATOR ROUTINE
320 IF B$="L" AND B1$="S" THEN PRINTP$;L$:A=0:
    B1$="":RETURN
330 IF B$="L" THEN PRINTP$;L1$:A=0:B1$="S":RET
    URN
340 IF B1$="S" THEN PRINTP$;O$:A=0:B1$="":RETU
    RN
350 PRINTP$;O1$:A=0:B1$="S"
360 RETURN
```


MODEM

for the ATARI 400/800™ Computer

- NO ATARI 850™ INTERFACE MODULE NEEDED
- SMART TERMINAL SOFTWARE
- 16K TAPE/DISK
- DIRECT CONNECT
- CONNECTS TO JOYSTICK PORT

"Everything you need to plug in and use"

MODEM. The inexpensive communications package for Atari computers. State-of-the-art electronics and advanced programming make it easy to use and dependable. The smart choice for Atari owners. Ask for it by name: MODEM.

MICROBITS
434 W. 1st
Albany, OR 97321
(503) 967-9075

ONLY
$199.00

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 16K, $19.95 Disk 24K
TALKING* BANDIT: All the high powered gambling in software graphics $16.95 Cass 16K, $19.95 Disk 24K
TALKING* NAME THAT TUNE: 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. $18.95 Cass 32K, $21.95 Disk 40K
CANNON HUNT: Two player game, capture the cannon and win the war. But don't move in the wrong direction. Play for points. $16.95 Cass 16K, $19.95 Disk 24K
ALIEN COMANDOS: Protect your Galactic Base from an invasion of Alien Saucers of unknown origin. $22.95 Cass 16K, $25.95 Disk 24K, Machine Language.
CHECK ONE: ☐ With Voice ☐ Without Voice
TALKING* PROGRAMS available with speech programmed for voice box by Allen Group. Note: If you order speech you must have the voice box or program will not run. Order at least two programs and buy the voice box at a special price.

SOFTWARE AUTHORS: We are now accepting original programs for AtariTM and VIC 20 computers. Send for your author's kit.
A Jan Company Enterprise

MICRO MAGIC SOFTWARE
P.O. BOX 13428
COLUMBUS, OH 43213

ATTENTION ATARI OWNERS*

32K Mosaic Boards $119.95
Don't Settle For Second Best
ATARI* 800 Disk Back Up Utility
32K Boot Cassette 48K Disk $24.95
make all back ups Dos Compatable
100% Machine Language
Please Specify 32K or 48K
*Atari Registed Trademark of Atari Inc.

C. J. SOFTWARE INC.
P.O. Box 54739 • Oklahoma City, Okla. 73154

www.commodore.ca

You can customize your Atari BASIC by adding new commands to the language itself. To demonstrate how to do it, the program below adds five DOS commands to BASIC – including a directory command. There are two versions of the same program. Program 1 is a BASIC loader. You type it in normally and it will create a machine language program for you from the information in the DATA statements. Program 2 is a disassembly of the same routine. It shows how the machine language works and is useful to programmers who know machine language or want to learn more about it. It's not necessary, however, to understand Program 2 in order to make good use of Program 1.

The Atari Wedge: Adding Commands To Atari BASIC

Charles Brannon
Editorial Assistant

A letter was published recently in **COMPUTE!**'s "Ask The Readers" column, regretting the need for "this POKE or that POKE" to accomplish various tasks. The required solution is an "expanded command set." An enticing prospect, adding commands to a language, and a seemingly impossible one, too.

Atari BASIC, like most microcomputer BASICs, is "burned" into nonvolatile ROM memory. The machine language routines to list, save, edit, and run your program cannot be altered or "patched" in any way. (However, on a 48K Atari, you can copy the BASIC cartridge to disk as a binary file, modify it with a "machine language monitor," and load it into the top of memory where it will act almost as a ROM cartridge.)

The most common (and easiest to implement) extension of a language is the addition of "immediate mode" commands. These direct commands, which are not usually executed in a program, but from the keyboard, include RUN, SAVE, LIST, NEW, DOS, etc. Thanks to Atari's modular Operating System (OS), we can easily add this type of command.

An Overview Of Atari's Operating System

To understand how the Atari Wedge works, we'll have to delve into the mysterious 10K ROM. If you just want to use the program and aren't concerned about the technical details, feel free to skip ahead. The Operating System (OS) of a computer is responsible for all input and output to and from disk, cassette, printer, and keyboard. It can also perform such chores as memory management and screen display. On many microcomputers, the OS does not exist as a separate entity, but is incorporated into the BASIC interpreter.

The Atari, on the other hand, is the first microcomputer with a general-purpose "plug-in" operating system. This goes hand in hand with the use of program and game cartridges. All programs running on an Atari use a common set of routines, from floating point arithmetic to high-resolution graphics routines such as PLOT, DRAWTO, and FILL.

A Mini-language

So, instead of BASIC providing a marginal operating system (which on many machines is a maze of machine language calls, requiring incompatible register setup and initialization), we have a BASIC cartridge which uses "universal" OS routines. A good OS simulates a mini-language. It provides documented, unchanging (between various revisions), unified subroutines with full parameter passing and error-checking.

Furthermore, a good OS is *extensible*. All the major routines and subroutines are accessed *indirectly*, through pointers. That is why the Atari is so flexible. If you want to change the personality of your computer, just change one of the *vectors* of a given routine to point to your machine language routine. Your program can then pass on control to the default program.

A Flexible Computer

This indirection is visible throughout the Atari. At the low end is color indirection, where you can change the color of anything drawn to another color merely by changing one *color register*. The default character set pointer can be changed to point to a user-designed character set. The system

www.commodore.ca

interrupt routines and display list interrupts are all fully accessible via a table of pointers. The BREAK key can be masked; the keyboard scan routine can be modified or bypassed; exotic peripherals can be serviced. And *all* input/output devices are user-definable, from the keyboard to the disk drive.

A notable peculiarity of the Atari is that not just the disk drive or printer, but also the TV screen and keyboard, are considered "peripherals." You don't print a character to the screen on the Atari; you send a character or buffer to the Editor device.

Chain Of Command

Through the hierarchy of a subset of the OS, the CIO (Central Input/Output), BASIC politely requests a line of input from screen and keyboard. After BASIC makes this request, control is passed to CIO, which calls the Editor. The Editor lets the user enter a "line" of text (which can be up to three screen lines long). The user can use cursor controls to edit the line or to move the cursor anywhere on the screen to edit another line.

When RETURN is pressed, the line the cursor is on is placed into a buffer (block of memory). Next, CIO gives this information to the calling routine via another buffer. The CIO is designed to be easy to use from machine language. If you think it sounds complicated, imagine performing all these tasks *without* an operating system!

Driving A Wedge

We don't have to modify BASIC at all. We just "wedge" our way into the Editor device, "E:". As intimated, even the "system" devices such as "E:" or "D:", the disk "driver," can be replaced. Usually, however, you don't want to replace a vectored routine; you just want to insert an additional task. In this case, you point the vector to your routine, which performs the little extra task and then calls the main routine. This "bypass" explains the term *wedge*.

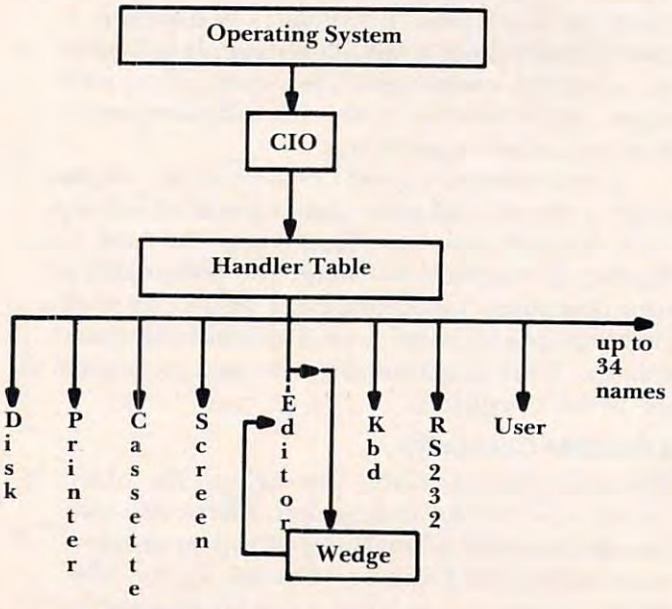


Figure 1. Wedging Into a Vector

The Handler table contains the names of all the devices. If you wanted to, you could change the name of the cassette device (C:) to another character, such as T: (for Tape), by finding the "C" in the table and changing it to a "T". Along with each name, the Handler table includes an address that points to another table of addresses that point to all the functions of that particular device. This is multi-level indirection. There is even a vector that points to a list of vectors!

We want to modify the Editor, so we change the first vector to point to *our* list of vectors. All we really need to do is change one of the vectors in the Editor's list of vectors, the "Get Character" address. Since this list is in ROM, at $E400, we need to copy this 16-byte table to RAM, modify it, and re-point the Handler table to our RAM version of the Editor Handler table.

A Monitor Monarchy

Now that we've got the Operating System calling our routine instead of the Editor in ROM, we've got total control of almost all console input/output. The Get Character routine, instead of calling E:, asks us for an ASCII character, presumably from the screen and keyboard. We comply by calling the default routine in ROM.

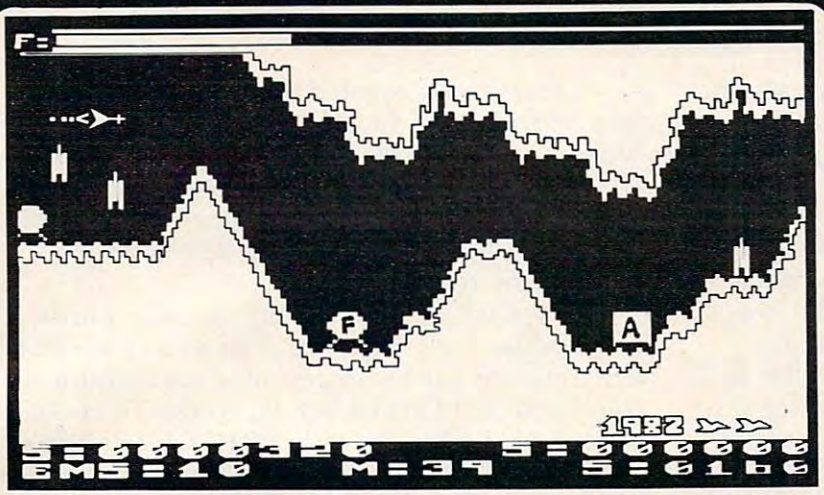
This seems rather roundabout, doesn't it? But we reserve the right to monitor all characters returned to the Operating system, and hence, BASIC. We get to examine every line of input before that line is returned to BASIC, where any strange new commands would be scorned with an error message.

So, we just catch the carriage return code and leisurely examine the input buffer, located at $0580. All we have to do is compare it against a table of commands, and, if we find a match, execute the command. If not, we just return the line to CIO (and CIO gives it back to BASIC) on the assumption that it's either a blank line, a BASIC command, or a syntax error. Sounds simple, but such a "parsing" routine is quite a headache to code and understand.

A REMarkable Solution

After we've intercepted and executed the line, how do we prevent a syntax error when we return the line to BASIC? (And since we've "cut in," we have to follow protocol and return *something*.) One solution would be to erase the buffer by filling it with spaces. An easier trick would be to change the first character of the line to a period, e.g., "SCRATCH D:TEMP" would become ".CRATCH D:TEMP". Since BASIC interprets a leading period as an

www.commodore.ca



AIRSTRIKE

NEW! ©AIRSTRIKE FOR THE ATARI 400/800 16K

- INTRODUCING THE NEW ARCADE-STYLE GAME FOR ATARI COMPUTERS !
- SUPERB FINE SCROLLING GRAPHICS AND DAZZLING ARRAY OF COLOUR.
- FIGHT YOUR WAY THROUGH CAVERNS AND TUNNELS WITH ATTACKING MISSILES, FUEL AND AMMO DUMPS TO CONTEND WITH !
- 100% MACHINE CODE PROGRAM FOR ONE OR TWO PLAYERS.
- MULTIPLE SKILL LEVELS.

AVAILABLE NOW ON 16K CASSETTE • **$39.95**

ASK YOUR DEALER NOW FOR A DEMONSTRATION.
ATARI IS A T.M. OF ATARI INC.

DEALERS! DON'T DELAY CONTACT US TODAY TO BECOME A STOCKIST OF AIRSTRIKE ! MORE INCREDIBLE PROGRAMS DUE SHORTLY

ENGLISH SOFTWARE COMPANY

DEPT. C, P.O. BOX 3185, REDONDO BEACH, CA 90277 (213)372-3440

---

3 EXCITING NEW GAMES

GENESIS SOFTWARE

GENESIS SOFTWARE

RUM RUNNER

You have a boat of bootleg rum you are trying to take from Bimini to Miami, but you must cross the Devil's Triangle. You must avoid islands, debris, sharks, and many other obstacles along your trip or be caught in the Triangle forever. Great sounds, custom character sets, PM graphics, and fine scrolling used.

STARFIGHTERS

You will be engaging in combat training with your Starfighter. This is real time training at the speed of light, requiring coordination and dexterity to stay alive. Planning and skillful moves are also required at sublight speeds. High Res, PM graphics, and great sound effects.

FORESITE

You need strategy and Foresite to become an expert at this game. Each player takes turns trying to capture as many of the 64 squares as possible while defending squares from your enemy. Uses special graphic characters.

ATARI

400/800 Computer
16K Disk or Cassette

MICRO COMPUTER DISTRIBUTING

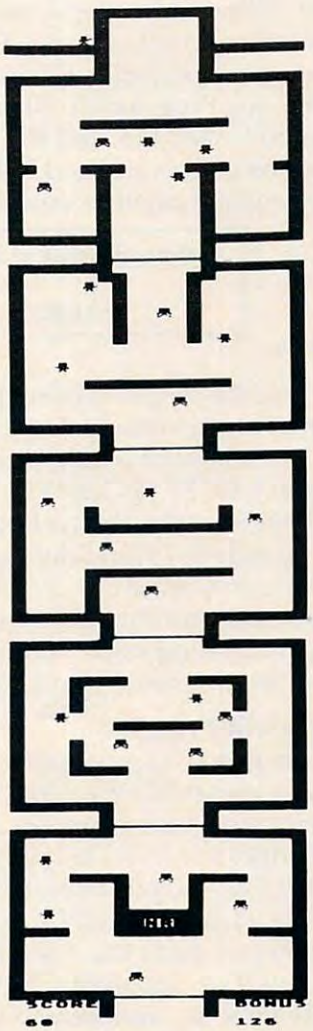
To Order Call Toll Free
West 1-800-648-3311 Disk $21.95
East 1-800-223-8950 Cassette $19.95
Dealer Inquiries Welcome

MasterCard VISA

GENESIS SOFTWARE 1057 WERNIMONT CIRCLE COLORADO SPRINGS, CO 80916 (303) 591-9292

ANDROID ATTACK

FOR ATARI



Fight your way down through the Top-Secret underground laboratory to save the runaway nuclear reactor, then try to save yourself before the Androids get you!

16K cassette, 32K disk (SPECIFY!)

Ask for ANDROID ATTACK at your local dealer or send $18.95 + $2.00 shipping. Write for our illustrated list of games for your ATARI.

PRETZELLAND SOFTWARE
2005 A WHITTAKER RD
YPSILANTI, MI 48197

www.commodore.ca

abbreviation for "REM" (don't ask me why, it's just a lucky fluke), BASIC conveniently ignores the command *and* returns READY (which it wouldn't if we merely blanked out the line).

The parser routine makes it easy for you to add commands. Just place the name of each command, followed by a zero, and the address where you want control to be transferred after the command is recognized, in COMTBL (COMmand TaBLe, see Program 2). The length of the line is found in LENGTH, and the second character after the command is returned in PARMS (since this is where any parameters would be).

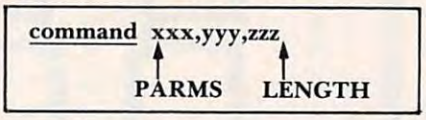


Figure 2.

Note that the length is one character past the end of the string, assuming you number from zero. Your command processor can find the command string in LBUFF ($0580).

Theoretically, this technique can be used to add commands to *any* language environment. You only have to find a way to make the language processor ignore commands when you return the line (such as blanking it out). Of course, the commands themselves are usually language-specific.

Copious Commands

Now the way is open to add a plethora of BASIC utility commands. Of course, these will have to be written in machine language and interfaced with the Wedge. I've included the resident DOS commands LOCK, UNLOCK, RENAME, and SCRATCH, as well as DIR to print the directory.

You can study the assembly listing (Program 2). If you have an assembler, try typing it in and modifying it. It contains a wealth of techniques and information, such as pattern matching, indirect subroutine calls, making a routine "RESET-proof," using CIO for input/output from machine language, long branching, modular programming, calling BASIC's ERROR routine, even "pressing" SYSTEM RESET from within a program.

Using Wedge 1.0

A machine language program can be hard to even enter into the Atari without an assembler. Program 1 will write the machine language to disk in the form of an "AUTORUN.SYS" file. Save this program so you can write copies to any disk. When you boot this disk, the AUTORUN file will automatically load and initialize the Wedge. You can use the Wedge's "console DOS" directly, without waiting for the disk utility package (DUP.SYS) to load in, and without losing any programs in memory.

Commands provided are DIR (lists the directory of drive one), LOCK, UNLOCK, SCRATCH (delete), and RENAME. Remember to include the D: (or D2: for drive two, if you have one) in the filename with all the commands except DIR. With RENAME, use the convention RENAME D:-oldname,newname".

The Wedge is "persistent"; in other words, it re-initializes itself when you press SYSTEM RESET, so it's kind of hard to get rid of it. An additional command, KILL, removes the Wedge. You can bring back the Wedge with: PRINT USR(7936)..

These commands are just a start. Many others are possible: RENUMBER, FIND, AUTO line number, UPDATE (removes unused variables from the variable name table), and more. If you come up with a useful BASIC utility in machine language, send it to **COMPUTE!** to be incorporated into a future version of the Wedge.

Talking Back

We've managed to intercept BASIC at the command level. In future issues, we'll go into how you can tell BASIC what to do from machine language. We'll even try to pursue that elusive aim – actually adding commands to a running program.

Program 1: BASIC Loader

```
100 REM WEDGE BASIC LOADER
110 GRAPHICS 0:? "Insert a DOS 2.0S d
    iskette"
120 ? "with DOS.SYS in drive 1."
130 ? :? "Press RETURN when you have
    done this."
140 IF PEEK(764)<>12 THEN 140
150 POKE 764,255
160 ? :? "Now writing the Wedge AUTOR
    UN.SYS file"
170 TRAP 190
180 OPEN #1,8,0,"D:AUTORUN.SYS":TRAP
    40000:GOTO 200
190 CLOSE #1:? :? "Can't open AUTORUN
    .SYS for write.":END
200 PUT #1,255:PUT #1,255:REM $FFFF H
    EADER
210 PUT #1,0:PUT #1,31:REM $1F00 STAR
    T
220 PUT #1,74:PUT #1,33:REM $214A END
230 FOR I=7936 TO 8522+6:REM INCLUDE
    6-BYTE AUTORUN
240 READ A:TRAP 310:PUT #1,A:TRAP 400
    00
250 CKSUM=CKSUM+A
260 NEXT I
270 IF CKSUM<>60435 THEN ? "{BELL}Bad
     number in DATA statements.":ERR=
    1
280 CLOSE #1
290 IF  NOT ERR THEN ? :? "DATA ok, w
    rite successful."
300 END
310 ? :? "Error-";PEEK(195);" when at
    tempting disk write.":CLOSE #1:EN
    D
320 REM
330 REM Following is the decimal
```

www.commodore.ca

FIRST BORN IN 1978!

the original & continuously updated

CCA Data Management System

Now Available For Atari Computers	$ 99.50
For Apple Computers	150.00
For CPM Based Computers	225.00

CCA Data Management System

Uses

- Business
  - Accounts Receivable
  - Accounts Payable
  - Inventories
  - Billing
  - Lists and Rosters
- Home Phone Lists
  - Budgets, Hobbies

Features And Capabilities

- Long record lengths
- Up to 24 fields per record
- **Not Copy Guarded**
- Alpha numeric items
- Numeric only items
- Add, update, scan, etc. files
- 10-Level sort ascending, descending, allows alphabetizing data file.
- Contact your local dealer for details or write us for our catalog

DIVISION OF CUSTOM ELECTRONICS, INC.
SOFTWARE

238 Exchange St., Chicopee, Massachusetts 01013
(413) 592-4761
Mastercard & VISA Accepted
• Dealer And Distributor Inquiries Invited
• Closed Mondays — Open Daily 'Til 5:30 — Fridays 'Til 8

ATARI® Christmas Music!

Compare! 1. Glorious **Four** Part Harmony
2. **Accurate** Song Reproduction
3. Requires **Only** Basic Cartridge

Volume I: Silent Night, Angels From Realms of Glory, We Three Kings, Go Tell It On The Mountain, Joy To The World, O' Come, O' Come Immanuel, Good Christian Men Rejoice, Bring A Torch, Coventry Carol, It Came Upon A Midnight Clear.

Volume II: The First Noel, What Child Is This, Hark The Herald Angels Sing, There's A Song In The Air, O' Little Town Of Bethlehem, Angels We Have Heard, Away In A Manger, While Shepherds Watched, O Come All Ye Faithful, God Rest Ye Merry Gentlemen.

Volume III: Jingle Bells, All Through The Night, Please Put A Penny, We Wish You A Merry Christmas, O' Sanctissima, Wassailing Song, Deck The Halls, O Christmas Tree, Good King Wenceslas, I Saw Three Ships.

Specify: **Version 1** (8/24K Tape - 16/32K Disk)
* **Version 2** (32K Tape - 40K Disk)

* Prices:	Any Single Volume	Any Two Volumes	All Three Volumes
Tape -	$12.95	$21.95	$29.95
Disk -	14.95	25.95	34.95

Add $2.00 per volume ordered for lyrics.

B.I.G. Software
533 Airport Blvd. #518
Burlingame, Ca. 94010
(415) 347-1063

ATARI is a registered trademark of Atari, Inc.
* California residents add 6½% sales tax.
Dealer inquiries invited.

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

VISA MasterCard

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

NEW FOR YOUR ATARI

MAGIC MAIL*

An exciting New Data Base Mailing and Personal Information System for your Atari 400/800** Personal Computer. Never before have all these features been designed into a single Mailing and Information System, so easy to use and so powerful.

COMPARE THESE FEATURES:

- Data Fields: Name, Address, City, State, Zip Code, Area Code, Phone Number, Birthday (m/d/y), and Entry Type.
- Up to 1027 records per Diskette!
- Less than 1 second Search Time over 95% of your Data, and 2-4 seconds over the other 5%.***
- Up to 62 SEPARATE and UNIQUE files permitted per Diskette.
- Multiple Disk Drive compatibility.
- Built in SORT, capable of Sorting ANY Data File by ANY Field with up to 10 Subfields.
- Command-Driven with simple English-like commands: FIND, MODIFY, PRINT, ADD, SORT, etc.
- Position Independent & Position Dependent Fields.
- Files compatible with Atari DOS II.**
- Every Diskette Pre-tested for Bad Sectors and recording integrity.
- Designed for Epson MX-80 Printer.
- Print Mailing Labels and Directory.
- 100% Machine Language.
- 90 Day Buyer Protection Guarantee.

Call or write for FREE additional information.

*MAGIC MAIL is a Registered Trademark of A-BIT-BETTER Software
**ATARI is a Registered Trademark of Atari Inc.
***Search time is for an Indexed File.

ABBS
A-Bit-Better Software
Post Office Box 28
Laurel Md 20707
(301) 953-7256

ONLY $59.95
*Plus tax, shipping and handling. (2 diskette system)

VISA AND MASTERCARD ACCEPTED.

Dealer Inquiries Invited.

www.commodore.ca

```
340 REM equivalent of Wedge 1.0
350 REM Must be typed in perfectly
360 REM in order to function.
370 REM
7936 DATA 104,165,12,141,37,31
7942 DATA 165,13,141,38,31,169
7948 DATA 36,133,12,169,31,133
7954 DATA 13,32,43,31,32,92
7960 DATA 31,169,75,141,231,2
7966 DATA 169,33,141,232,2,96
7972 DATA 32,64,21,32,11,31
7978 DATA 96,169,80,141,68,3
7984 DATA 169,31,141,69,3,169
7990 DATA 0,141,73,3,169,12
7996 DATA 141,72,3,169,11,141
8002 DATA 66,3,162,0,32,86
8008 DATA 228,152,48,1,96,76
8014 DATA 55,33,65,116,97,114
8020 DATA 105,32,87,101,100,103
8026 DATA 101,155,160,0,185,26
8032 DATA 3,201,69,240,7,200
8038 DATA 200,192,34,208,243,96
8044 DATA 200,169,165,153,26,3
8050 DATA 200,169,31,153,26,3
8056 DATA 162,0,189,0,228,157
8062 DATA 165,31,232,224,16,208
8068 DATA 245,169,184,141,169,31
8074 DATA 169,31,141,170,31,24
8080 DATA 173,4,228,105,1,141
8086 DATA 186,31,173,5,228,105
8092 DATA 0,141,187,31,169,0
8098 DATA 133,203,96,251,243,51
8104 DATA 246,184,31,163,246,51
8110 DATA 246,60,246,76,228,243
8116 DATA 56,1,1,125,32,32
8122 DATA 62,246,8,201,155,240
8128 DATA 4,230,203,40,96,140
8134 DATA 181,31,142,182,31,165
8140 DATA 203,240,86,169,51,133
8146 DATA 205,169,32,133,206,160
8152 DATA 0,177,205,217,128,5
8158 DATA 208,12,200,177,205,240
8164 DATA 40,196,203,208,240,76
8170 DATA 37,32,201,255,240,53
8176 DATA 160,0,177,205,240,9
8182 DATA 230,205,144,2,230,206
8188 DATA 76,242,31,24,165,205
8194 DATA 105,3,133,205,144,2
8200 DATA 230,206,76,215,31,200
8206 DATA 132,204,177,205,141,183
8212 DATA 31,200,177,205,141,184
8218 DATA 31,108,183,31,160,0
8224 DATA 169,46,153,128,5,169
8230 DATA 0,133,203,169,155,172
8236 DATA 181,31,174,182,31,40
8242 DATA 96,68,73,82,0,125
8248 DATA 32,83,67,82,65,84
8254 DATA 67,72,0,22,33,76
8260 DATA 79,67,75,0,27,33
8266 DATA 85,78,76,79,67,75
8272 DATA 0,32,33,82,69,78
8278 DATA 65,77,69,0,37,33
8284 DATA 75,73,76,76,0,42
8290 DATA 33,255,155,50,54,32
8296 DATA 70,82,69,69,32,83
8302 DATA 69,67,84,79,82,83
8308 DATA 155,155,0,0,68,58
8314 DATA 42,46,42,162,80,169
8320 DATA 12,157,66,3,32,86
8326 DATA 228,162,80,169,3,157
8332 DATA 66,3,169,6,157,74
8338 DATA 3,169,120,157,68,3
8344 DATA 169,32,157,69,3,32
8350 DATA 86,228,152,16,3,76
8356 DATA 55,33,162,80,169,5
8362 DATA 157,66,3,169,100,157
8368 DATA 68,3,141,68,3,169
8374 DATA 32,157,69,3,141,69
8380 DATA 3,169,20,157,72,3
8386 DATA 141,72,3,32,86,228
8392 DATA 152,48,13,169,9,141
8398 DATA 66,3,162,0,32,86
8404 DATA 228,76,166,32,162,80
8410 DATA 169,12,157,66,3,32
8416 DATA 86,228,76,30,32,162
8422 DATA 80,157,66,3,169,0
8428 DATA 157,73,3,164,203,153
8434 DATA 128,5,56,152,229,204
8440 DATA 157,72,3,24,169,128
8446 DATA 101,204,157,68,3,169
8452 DATA 5,105,0,157,69,3
8458 DATA 32,86,228,152,16,3
8464 DATA 76,55,33,76,30,32
8470 DATA 169,33,76,229,32,169
8476 DATA 35,76,229,32,169,36
8482 DATA 76,229,32,169,32,76
8488 DATA 229,32,173,37,31,133
8494 DATA 12,173,38,31,133,13
8500 DATA 76,116,228,72,162,80
8506 DATA 169,12,157,66,3,32
8512 DATA 86,228,104,162,255,154
8518 DATA 133,185,76,64,185
9000 REM DATA FOR AUTORUN ADDRESS
9010 DATA 224,2,225,2,1,31
9020 REM END OF DATA STATEMENTS
```

Program 2: Wedge Disassembly

```
0100 ; The Atari Wedge
0110 ;
0120             *=$1F00
0130 ICCOM    =$0342
0140 ICBADR   =$0344
0150 ICBLEN   =$0348
0160 ICAUX1   =$034A
0170 COPN     =$03
0180 CPTXTR   =$09
0190 CGTXTR   =$05
0200 CPBINR   =$0B
0210 CCLOSE   =$0C
0220 CIO      =$E456
0230 OPDIR    =$06
0240 HATABS   =$031A
0250 LBUFF    =$0580
0260 LENGTH   =$CB
0270 MEMLO    =$02E7
0280 PARMS    =$CC
0290 COM      =$CD
0300 DOSINIT  =$0C
0310 ENTRY    PLA                ;For BA
    SIC initialization
0320 ; Make wedge "RESET-proof"
0330 INIT
0340          LDA DOSINIT        ;Save D
    OS
0350          STA REINIT+1       ;initia
    lization
0360          LDA DOSINIT+1      ;inside
     the REINIT
0370          STA REINIT+2       ;JSR ca
    ll
0380 ;
0390 INIT2    LDA #REINIT&255 ;Replac
    e DOS init
0400          STA DOSINIT        ;with W
    edge
0410          LDA #REINIT/256 ;init
0420          STA DOSINIT+1
0430          JSR MSG ;Print message
0440          JSR ECHANGE        ; hooku
```

www.commodore.ca

Experience the Magazine of the Future . . .

MAGATARI™

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.

"Received my first copy . . . it's great! Please rush to me one of each back issue, so I'll have a complete set."
R.G., Chicago, IL

"Not only are the games fun and the applications useful, but the quality of the programs is excellent."
S.P., Midwest Computer Software Sales

COMING SOON: VicVideo for the Vic-20 and PCM magazine for the IBM personal computer.
Plus Educational Software for the Atari 400/800.

ORDERING INFORMATION

Subscriptions*	Cassette	Diskette
Year	$50.00	$75.00
½ Year	$30.00	$45.00
Trial Issue	$10.00	$15.00

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

See your local dealer or order direct:
THE PROGRAMMER'S INSTITUTE
a division of FUTUREHOUSE
P.O. BOX 3191, DEPT. 1-C
CHAPEL HILL, NC 27514

VISA MasterCard

1-919-489-2198
10 AM - 9 PM, Mon - Sat

ATARI 400

NOW OFFERING!

48 K MEMORY EXPANSION

ORDER KIT FACTORY DIRECT
124.95
SUGG. RETAIL $139.95
ADD $2.00 FOR SHIPPING AND HANDLING

FACTORY INSTALLATION
169.95
ADD $5.00 FOR SHIPPING AND HANDLING

- 90 DAY GUARANTEE ON OUR PARTS AND LABOR
- EASY TO ASSEMBLE KIT WITH DETAILED INSTRUCTIONS
- NO POWER SUPPLY PROBLEMS
- COMPLETELY COMPATIBLE WITH ALL ATARI COMPUTER SOFTWARE

SEND CHECK OR MONEY ORDER TO:
DYNAMIC TECHNOLOGIES
P.O. BOX 351
ALLEN, TEXAS 75002
(214) 542-6012
TEXAS RESIDENTS ADD 5% SALES TAX
ORDER 7 DAYS A WEEK 24 HOURS A DAY

VISA MasterCard

DEALERS:
IN THE EAST CONTACT-
JERSEY SYSTEMS:
IN N.J. (201) 287-9462
(800) 526-3647

www.commodore.ca

```
    p new E:
0450            LDA #ENDWEDGE&255 ;Bump
     up
0460            STA MEMLO
0470            LDA #ENDWEDGE/256 ;low
    memory pointer
0480            STA MEMLO+1
0490            RTS
0500 ;
0510 REINIT     JSR XXXX          ;XXXX is
     filled in with DOSINIT
0520            JSR INIT2
0530 XXXX       RTS
0540 ;
0550 ; Print "welcome" message
0560 ;
0570 MSG        LDA #WMSG&255     ;Store a
    ddress of
0580            STA ICBADR        ;message
0590            LDA #WMSG/256
0600            STA ICBADR+1
0610            LDA #0            ;Set len
    gth
0620            STA ICBLEN+1
0630            LDA #12
0640            STA ICBLEN
0650            LDA #CPBINR       ;Ignore
    carriage-returns
0660            STA ICCOM
0670            LDX #0            ;File 0,
     the editor
0680            JSR CIO           ;Call CI
    O to print it
0690            TYA
0700            BMI ERR           ;If no e
    rror, return
0710            RTS
0720 ERR        JMP ERROR
0730 ;
0740 WMSG       .BYTE "Atari Wedge",155
0760 ;
0770 ; Following replaces the old E:
0780 ;
0790 ECHANGE    LDY #0            ;Search
    for E:
0800 ELOOP      LDA HATABS,Y      ;in hand
    ler table
0810            CMP #'E
0820            BEQ EFOUND        ;Found e
    nd?
0830            INY               ;no, nex
    t entry
0840            INY
0850            CPY #34           ;end of
    table?
0860            BNE ELOOP
0870            RTS               ;return
0880 ;
0890 ; Store new handler table addres
    s
0900 ;
0910 EFOUND     INY
0920            LDA #WEDGETAB&255
0930            STA HATABS,Y
0940            INY
0950            LDA #WEDGETAB/256
0960            STA HATABS,Y
0970 ; Transfer Editor table to Wedge
    table
0980            LDX #0
0990 XFER       LDA $E400,X
1000            STA WEDGETAB,X
1010            INX
1020            CPX #16
1030            BNE XFER
1040 ; Patch in MYINPUT routine
1050            LDA #MYINPUT-1&255
1060            STA WEDGETAB+4
1070            LDA #MYINPUT-1/256
1080            STA WEDGETAB+5
1090            CLC
1100            LDA $E404         ; Get ch
    aracter address
1110            ADC #1            ; Actual
     address is +1
1120            STA MYINPUT+1     ; Egads!
1130            LDA $E405         ; Self-m
    odifying code!
1140            ADC #0            ;(Accept
     any carry)
1150            STA MYINPUT+2
1160            LDA #0
1170            STA LENGTH        ;Clear l
    ength initially
1180            RTS
1190 ;
1200 ; Wedge handler address table
1210 WEDGETAB   *=*+16
1220 YSAVE      *=*+1             ;Used to
     save Y register
1230 XSAVE      *=*+1             ;Ditto f
    or X
1240 JUMPADR    *=*+2             ;used fo
    r indirect JMP
1250 MYINPUT
1260 ; The $F63E address is actually
    placed here by above code
1270 ; to permit this routine to run
    on the Revision B OS
1280 ; (where it wouldn't be $F63E)
1290            JSR $F63E         ;Get a c
    haracter from E:
1300            PHP
1310            CMP #155          ;End of
    line? (CR)
1320            BEQ ENDLINE       ;Yes, co
    mplete line ready
1330            INC LENGTH
1340            PLP
1350            RTS               ;No, let
     CIO have the character
1360 ENDLINE
1370            STY YSAVE         ;Save Y
    for CIO
1380            STX XSAVE
1390            LDA LENGTH
1400            BEQ RETURN.LINE
1410 LOOKUP
1420            LDA #COMTBL&255 ;Set up
     indirect pointer for
1430            STA COM
1440            LDA #COMTBL/256 ;comman
    d table
1450            STA COM+1
1460 NEXTCOM    LDY #0
1470 COMPLOOP
1480            LDA (COM),Y       ;Compare
     command against line buffer
1490            CMP LBUFF,Y       ;Okay so
     far?
1500            BNE NOTSAME       ;no matc
    h
1510            INY
1520            LDA (COM),Y       ;is next
     character null?
1530            BEQ COMFOUND      ;yes, co
    mmand found
1540            CPY LENGTH        ;exceede
    d limits?
1550            BNE COMPLOOP      ;if not,
```

www.commodore.ca

COMPUTE!'s Second Book Of Atari

After only three years on the market, the Atari 400/800 microcomputers have become among the most popular personal computers ever made. So it was no surprise when *COMPUTE!'s First Book of Atari*, a collection of the best Atari articles published during 1980-81 in **COMPUTE!** Magazine, also became a "bestseller" with Atari enthusiasts. The first printing sold out in just a few months.

That's why we've followed up with *COMPUTE!'s Second Book of Atari*. Available immediately, the *Second Book of Atari* continues **COMPUTE!**'s tradition for personal computer users.

But the *Second Book of Atari* differs from the *First Book* in one important respect – all the articles are totally new and previously unpublished. The *Second Book of Atari* includes such interesting articles as "Page Flipping," "Fun With Scrolling," "Perfect Pitch," "Player-Missile Drawing Editor," and "TextPlot Makes a Game." Whole chapters are devoted to subjects such as "Advanced Graphics and Game Utilities," "Programming Techniques," and "Beyond BASIC." With 250 pages – more than 25 percent thicker than the *First Book* at the same price – the *Second Book of Atari* is crammed with information and ready-to-type program listings. And the book is spiral-bound to lie flat and is fully indexed for quick reference.

Best of all, *COMPUTE!'s Second Book of Atari*, like **COMPUTE!** Magazine itself, is written and edited to appeal to all computer enthusiasts – beginners and experts alike. Priced at only $12.95.

iv Introduction . . . . . Robert Lock

1 Chapter One. Utilities.

2 Atari BASIC Joystick Routine . . . . . Kirk Gregg
5 Joystick Tester . . . . . Robert Rochon
7 Keyboard Input Or Controlled Escape . . . . . Brian Van Cleve
9 POKE TAB In BASIC . . . . . Lawrence R. Stark
11 The 49 Second Screen Dump . . . . . David Newcorn
15 Memory Test . . . . . Ed Stewart

21 Chapter Two. Programming Techniques.

23 Atari BASIC String Manipulation Tricks . . . . . David E. Carew
26 Using The Atari Forced Read Mode . . . . . Frank C. Jones
33 A Simple Screen Editor For Atari Data Files . . . . Lawrence R. Stark
36 Plotting Made Easy . . . . . John Scarborough
41 Graphics Generator . . . . . Matthias M. Giwer
44 Analyze Your Program – An Atari BASIC Utility . . . . . Fred Pinho
51 Inside Atari Microsoft BASIC: A First Look . . . . . Jim Butterfield

53 Chapter Three. Advanced Graphics And Games Utilities.

55 Player-Missile Drawing Editor . . . . . E. H. Foerster
67 Point Set Graphics . . . . . Douglas Winsand
76 Page Flipping . . . . . Rick Williams
78 An Introduction To Display List Interrupts . . . . . Alan Watson
85 Extending Atari High Resolution Graphics . . . . . Phil Dunn
85 Part 1: The Polygon Fill Subroutine
92 Part 2: Textured Graphics
114 Part 3: Multi-colored Graphics In Mode 8
160 Textplot Makes A Game . . . . . David Plotkin
169 Fun With Scrolling . . . . . David Plotkin

183 Chapter Four. Applications.

185 A Simple Text Editor . . . . . Osvaldo Ramirez
194 The Atari Keyboard Speaks Out . . . . . Walter M. Lee
198 Atari Screen As Strip Chart Recorder . . . . . Helmut Schmidt
209 Fast Banner . . . . . Sol Guber
213 Perfect Pitch . . . . . Fred Coffey

219 Chapter Five. Beyond BASIC.

221 Put Your USR Code Into A BASIC Program Automatically . . F. T. Meiere
225 Back Up Your Machine Language Programs With BASIC . . Ed Stewart
229 Loading Binary DOS Files From BASIC . . . . . Robert E. Alleger
249 The Resident Disk Handler . . . . . Frank Kastenholz

248 Listing Conventions
249 Index

Available at computer dealers and bookstores nationwide. To order directly call TOLL FREE 800-334-0868. In North Carolina call 919-275-9809. Or send check or money order to **COMPUTE! Books**, P.O. Box 5406, Greensboro, NC 27403.

Add $2.00 shipping and handling. Outside the U.S., add $4.00 for air mail, $2.00 for surface mail. All orders prepaid, U.S. funds only.

www.commodore.ca

```
      continue comparison
1560            JMP RETURN.LINE ;give l
    ine to language
1570 NOTSAME    CMP #255        ;End of
    table?
1580            BEQ RETURN.LINE
1590            LDY #0          ;No, ski
    p over command
1600 FINDEND    LDA (COM),Y
1610            BEQ ENDCOM      ;Hit the
     zero yet?
1620            INC COM         ;No, nex
    t character
1630            BCC NOINC1
1640            INC COM+1
1650 NOINC1     JMP FINDEND     ;continue
     until null byte found
1660 ENDCOM     CLC             ;Add 3 to
     skip over null byte
1670            LDA COM         ;and JMP
    address
1680            ADC #3
1690            STA COM
1700            BCC NOINC2      ;Check fo
    r carry
1710            INC COM+1
1720 NOINC2     JMP NEXTCOM
1730 COMFOUND
1740            INY
1750            STY PARMS       ;Y is ind
    ex into parameters
1760            LDA (COM),Y     ;Load JU
    MPADR with command address
1770            STA JUMPADR
1780            INY
1790            LDA (COM),Y
1800            STA JUMPADR+1
1810            JMP (JUMPADR)   ;Execute
    !
1820 EXIT       LDY #0          ;Command
    s return here
1830            LDA #'.         ;Change
    first character to
1840            STA LBUFF,Y     ;".", or
     REM
1850 ;                          Allows B
    ASIC to ignore line
1860 RETURN.LINE
1870            LDA #0
1880            STA LENGTH
1890            LDA #155        ;Return
    EOL to CIO
1900            LDY YSAVE       ;Restore
     Y
1910            LDX XSAVE       ;and X
1920            PLP             ;and pro
    cessor status
1930            RTS             ;That's
    it
1940 COMTBL
1950 ; Wedge commands and command tab
    le
1960 ; Format is:
1970 ; .BYTE "COMMAND",0
1980 ; .WORD COMMAND.ADDRESS
1990 ; End of table is
2000 ; .BYTE 255
2010            .BYTE "DIR",0
2020            .WORD DIR
2030            .BYTE "SCRATCH",0
2040            .WORD SCRATCH
2050            .BYTE "LOCK",0
2060            .WORD LOCK
2070            .BYTE "UNLOCK",0
2080            .WORD UNLOCK
2090            .BYTE "RENAME",0
2100            .WORD RENAME
2110            .BYTE "KILL",0
2120            .WORD KILL
2130            .BYTE 255
2140 ;
2150 DIRBUF     *=*+20
2160 DIRNAME    .BYTE "D:*.*"
2170 ;
2180 ; Start of commands:
2190 ;
2200 DIR
2210            LDX #$50        ; IOCB#5
2220            LDA #CCLOSE
2230            STA ICCOM,X
2240            JSR CIO  ;CLOSE#5
2250 ; OPEN#5,6,0,"D:*.*"
2260            LDX #$50        ;channel
    #5
2270            LDA #COPN       ;open co
    mmand
2280            STA ICCOM,X
2290            LDA #OPDIR      ;special
     "directory" command
2300            STA ICAUX1,X
2310            LDA #DIRNAME&255 ;filen
    ame (wildcard)
2320            STA ICBADR,X
2330            LDA #DIRNAME/256
2340            STA ICBADR+1,X
2350            JSR CIO         ;set it
    up!
2360            TYA
2370            BPL NOERR1
2380            JMP ERROR
2390 ; Print a line to the Editor
2400 NOERR1
2410 NEXT       LDX #$50        ;#5
2420            LDA #CGTXTR     ;Get a l
    ine
2430            STA ICCOM,X
2440            LDA #DIRBUF&255 ;Put it
     into the buffer
2450            STA ICBADR,X
2460            STA ICBADR
2470            LDA #DIRBUF/256
2480            STA ICBADR+1,X
2490            STA ICBADR+1
2500            LDA #20          ;Maxim
    um length is 20
2510            STA ICBLEN,X     ;(actua
    lly 17)
2520            STA ICBLEN
2530            JSR CIO
2540            TYA             ;Check
    for end of file
2550            BMI ENDIR       ;On err
    or, finished directory
2560 NOERR2     LDA #CPTXTR     ;Put te
    xt record (print a line)
2570            STA ICCOM
2580            LDX #0          ;Channe
    l 0 is open to the Editor
2590            JSR CIO
2600            JMP NEXT        ;Read n
    ext line
2610 ;
2620 ENDIR      LDX #$50        ;CLOSE#
    5
2630            LDA #CCLOSE
2640            STA ICCOM,X
2650            JSR CIO
2660            JMP EXIT
2670 ;End of directory routine
2680 ;
```

www.commodore.ca

ComputAbility
presents the Newest in Joysticks and Software Products

Starfighter™

The Ultimate Joystick
- 2 Year Warranty
- More Accurate
- Easier to Hold

$16.95

SLIK STIK™

Suncom

- 90 Day Warranty
- Same as Starfighter except made of softer materials.

$9.95

LEFTY JOYSTICK ADAPTOR
Adapts to *any* Atari Joystick.
Moves fire button to top Right. **$9.95**

EXTENSION CABLE (5 ft.)
Adapts to *any* Atari controller. **$6.95**

ALL JOYSTICKS WORK WITH: Atari VCS, Sears Telegame, Commodore VIC-20, Atari 400/800 (All products have registered trademarks)

30 Day Money Back Guarantee

SUPER SPECIALS

CHOPLIFTER $22.95 disk

RASTER BLASTER $19.95 disk

K-RAZY SHOOTOUT $31.95 cartridge

Prices effective only through November 30, 1982.

FROGGER $24.50 disk/tape

CANYON CLIMBER $19.95 disk/tape

Buy any 3 programs and receive a FREE* SLIK STIK

ATARI

CONVERSATIONAL LANGUAGES - T	43.95
INVITATION TO PROGRAMMING 2 & 3 - T	21.95
MUSIC COMPOSER - C	32.95
MY FIRST ALPHABET - D	28.95
TOUCH TYPING - T	18.95
WORD PROCESSOR - D	112.95
BOOKKEEPER - D	112.95
HOME FILING MANAGER - D	37.95
MAILING LIST - T	18.95
ASTEROIDS - C	26.95
CAVERNS OF MARS - D	28.95
CENTIPEDE - C	32.95
COMPUTER CHESS - C	26.95
MISSILE COMMAND - C	26.95
PAC-MAN - C	32.95
SPACE INVADERS - C	26.95
SUPER BREAKOUT - C	26.95
STAR RAIDERS - C	32.95
ASSEMBLY EDITOR - C	44.95
BASIC - C	44.95
MACROASSEMBLER - D	65.95
MICROSOFT BASIC - D	65.95
PILOT (HOME PACKAGE) - C	58.95

APX

ALL ITEMS - 20% OFF RETAIL. WE CARRY THE ENTIRE APX CATALOG!

DATASOFT

SHOOTING ARCADE - D/T	23.95
PACIFIC COAST HIGHWAY - D/T	23.95
CLOWNS & BALLOONS - D/T	23.95
TUMBLEBUGS - D	23.95
MICROPAINTER - D	27.95
BASIC COMPILER - D	74.95
TEXT WIZARD - D	74.95

ON-LINE

JAWBREAKER - D/T	23.95
ULTIMA I - D/T	31.95
CROSSFIRE - D/T	23.95
ULYSSES & GOLDEN FLEECE - D	27.95
SOFTPORN ADVENTURE - D	23.95
THE NEXT STEP - D	31.95
MISSION: ASTEROIDS - D	20.95
THE WIZARD & THE PRINCESS - D	25.95
THRESHOLD - D	31.95
ULTIMA II - D	44.95
MOUSKATTACK - D	27.95

BRODERBUND

APPLE PANIC - D/T	23.95
STELLAR SHUTTLE - D/T	23.95
DAVID'S MIDNIGHT MAGIC - D	27.95
STAR BLAZER - D	25.50
TRACK ATTACK - D	23.95
LABYRINTH - D	23.95
SERPENTINE - D	23.95
DUELING DIGITS - D	23.95
DEADLY SECRETS - D	27.95

SYNAPSE

PROTECTOR - D/T	23.95
SLIME - D/T	23.95
CHICKEN - D/T	23.95
SHAMUS - D/T	23.95
FORT APOCALYPSE - D/T	23.95
FILE MANAGER 800+ - D	79.95
DISK MANAGER - D	23.95
PAGE 6 - D	23.95

ROKLAN

DELUXE INVADERS - D	27.95
GORF - D/C	31.95
WIZARD OF WOR - D/C	31.95

ANALOG

RACE IN SPACE - D/T	20.95
CARNIVAL - D/T	20.95
SUNDAY DRIVER - D/T	23.95
CRASH DIVE! - D/T	23.95

ADVENTURE INTERNATIONAL

REAR GUARD - D	20.95
PREPPIE - D/T	23.95
S.A.G.A. ADVENTURES - D	23.95

AUTOMATED SIMULATIONS

TEMPLE OF APSHAI - D/T	31.95
UPPER REACHES OF APSHAI - D/T	16.95
CRUSH, CRUMBLE & CHOMP - D/T	23.95
RICOCHET - D/T	16.95
CRYPT OF THE UNDEAD - D/T	23.95

I.D.S.I.

POOL 1.5 - D	27.95
POOL 400 - C	31.95
SPEEDWAY BLAST - C	31.95

GEBELLI

EMBARGO - C	39.95
FIREBIRD - C	39.95

SIRIUS

SNAKE BYTE - D	23.95
SPACE EGGS - D	23.95
CYCLOD - D	23.95
SNEAKERS - D	23.95

QUALITY

ALI BABA - D	26.50

THORN

CALL FOR ITEMS AND PRICES

D - Disk T - Cassette C - Cartridge

WE CARRY HUNDREDS OF ITEMS FOR ATARI 400/800, if you don't see it here, please call.

* COUPON PROGRAM

The purchase of each program (with the exception of Super Specials, Atari and APX) will earn you 1 COMPUTABILITY DIVIDEND COUPON. Save 3 coupons and redeem them for your choice of Slik Stik, a Lefty Adaptor, or an Extension Cable. You pay only a $2.50 shipping and handling charge.

ORDERING INFORMATION

To order by mail send money order, certified check or personal check (allow 14 days to clear) to COMPUTABILITY. Include $2.00 shipping on software orders and $2.50 shipping on hardware orders (FREE OR PURCHASED).
Mastercard & VISA please include card number and expiration date.
WI residents please add 5% sales tax. Outside of continental U.S.A. please add 15% shipping (U.S. Funds only).
Prices subject to change without notice.

Order Hours: 12 pm - 9 pm C.S.T.

Computability
P.O. Box 17882
Milwaukee, WI
53209

Mastercard/VISA Order Toll Free

800-558-0003

In Wisc. Call 414/351-2007

www.commodore.ca

```
2690 ;Following routine is used by lo
     ck
2700 ;unlock, scratch, and rename
2710 ;Filename buffer is in LBUFF
2720 ;e.g. LOCK D:TEMP
2730 ; this      ^   portion is used
2740 ; to tell CIO the filename.
2750 CALLCIO
2760          LDX #$50         ;Use file
      5 (XIO n,#5,etc.)
2770          STA ICCOM,X      ;Store co
     mmand
2780          LDA #0           ;Clear MS
     B
2790          STA ICBLEN+1,X   ;of lengt
     h
2800          LDY LENGTH
2810          STA LBUFF,Y
2820          SEC              ;Get leng
     th
2830          TYA              ;of filen
     ame
2840          SBC PARMS        ;(skip ov
     er command name)
2850          STA ICBLEN,X
2860          CLC
2870          LDA #LBUFF&255   ;PARMS is
      start of parameters,
2880          ADC PARMS        ;the spac
     e in LBUFF
2890          STA ICBADR,X     ;after th
     e command
2900          LDA #LBUFF/256
2910          ADC #0           ;Catch an
     y carry
2920          STA ICBADR+1,X
2930          JSR CIO ; Do the job
2940          TYA
2950          BPL NOERR3
2960          JMP ERROR
2970 NOERR3   JMP EXIT
2980 ;
2990 SCRATCH  LDA #33
3000          JMP CALLCIO
3010 LOCK     LDA #35
3020          JMP CALLCIO
3030 UNLOCK   LDA #36
3040          JMP CALLCIO
3050 RENAME   LDA #32
3060          JMP CALLCIO
3070 ;
3080 ;Remove Wedge
3090 ;
3100 KILL     LDA REINIT+1 ;Restore ol
     d DOS
3110          STA DOSINIT  ;vector
3120          LDA REINIT+2
3130          STA DOSINIT+1
3140          JMP $E474    ;"Press" SY
     STEM RESET
3150 ;
3160 ;
3170 ; End of current wedge
3180 ; (Although more commands can be
      added.)
3190 ; See future issues of COMPUTE!
3200 ;
3210 ERROR    PHA          ;Save error
     code
3220          LDX #$50     ;close file 5
3230          LDA #CCLOSE
3240          STA ICCOM,X
3250          JSR CIO
3260          PLA          ;retrieve er
     ror code
3270          LDX #$FF     ;reset stack
3280          TXS
3290          STA $B9      ;tell BASIC
     the error code
3300          JMP $B940    ;call the ER
     ROR routine
3310 ;                      in the BASI
     C cartridge
3320 ;
3330 ENDWEDGE
3340 ; Autorun
3350 ;
3360          *=$02E0
3370          .WORD INIT
3380 ;
3390          .END
```

©

ATACOMP presents

100% machine language arcade games.
All require 16K ATARI and cassette recorder.

CANNON COUPE Scream down the curving speedway as you blast the rocks, cops and UFO's. 20 game options. $14

BUGGIES Can you clear the board before the Buggies munch you? $14

THE SWARM Protect your flower garden from the hoards of invading knats. Bonus scoring. $14

MYRIAPOD Zap the segmenting Myriapod before it slithers down the screen. Extra pods and spiders. $14

Special Offer:
$11 each game when you order two or more.

ATACOMP
RR3 Box 21
Coggon, IA 52218

ATARI SPECIALS

ARCADE PLUS

☐ Ghost Hunter (Disk)	34.95	Now	29.50
☐ Ghost Hunter (Cass)	29.95	Now	25.50
☐ Arcade Pro Football (Disk)	34.95	Now	29.50
☐ Arcade Pro Football (Cass)	29.95	Now	25.50
☐ Preppie (Disk)	29.95	Now	25.50
☐ Preppie (Cass)	24.95	Now	19.50

ON—LINE SYSTEMS

☐ HI-RES Adv #0: Mission Asteroid (Disk)	24.95	Now	19.50
☐ HI-RES Adv #2: Wiz & Princess (Disk)	32.95	Now	29.50
☐ Crossfire (Disk)	29.95	Now	25.50
☐ Mousekattack (Disk)	34.95	Now	29.50
☐ Jawbreaker (Disk & Cass)	29.95	Now	25.50
☐ Threshold (Disk)	39.95	Now	33.50
☐ Softporn Adventure (Disk)	29.95	Now	25.50
☐ The Next Step (Disk)	39.95	Now	33.50
☐ Frogger (Avail. Spring)(Disk & Cass)	34.95	Now	29.50

BRODERBUND SOFTWARE

☐ Apple Panic (Disk)	29.95	Now	25.50

BUDGECO

☐ RASTER BLASTER (Disk)	29.95	Now	25.50

CAVALIER

☐ Bug Attack (Avail. Spring)(Disk & Cass)	29.95	Now	25.50

DATA SOFT

☐ Bishops Square (Disk)	29.95	Now	25.50
☐ Tumble Bugs (Dung Beetles) (Disk)	29.95	Now	25.50
☐ Canyon Climber (Disk)	29.95	Now	25.50
☐ Canyon Climber (Cass)	24.95	Now	19.50
☐ Le Stick (Accs)	39.95	Now	33.50

ICC INTERNATIONAL COMPUTER CENTER
MEADOW PARK PLAZA
22811 HAWTHORNE BLVD., TORRANCE, CA 90505
(213) 373-6771

www.commodore.ca

This tutorial article presents several interesting extensions for the XIO(FILL) program on page 54 of the Atari BASIC Reference Manual.

A Fill-In On XIO(FILL)

Gretchen Schabtach
Alexandria, VA

Your Atari readily fills line drawings of figures with color using a special application of the XIO statement. However, the example in the *BASIC Reference Manual* (see page 54) can be expanded upon to demonstrate the strengths and limitations of this application. A critical point about XIO filling is that filling stops when a pixel which has been previously filled with color is encountered. Thus, interesting effects occur when the Atari is commanded to fill overlapping figures with color.

To get the most from the following short programs, begin by running the demonstration program on page 54 of the *BASIC Reference Manual*. Then run Program 1. Program 1 generates three rectangles, randomly positioned, with random proportions, and fills them from top to bottom and left to right with three different colors. Observe what happens when the figures overlap.

Moving line by line, from top to bottom and left to right, the fill stops when a colored pixel is encountered. Thus, when the program generates two overlapping rectangles, filling of the second rectangle stops whenever the first filled rectangle is encountered – and does not resume even if the second rectangle extends to the right beyond the first rectangle.

With a few modifications, Program 1 is not only illuminating with regard to the XIO(FILL) function, but also much more interesting. First, randomly change the colors to be used in filling. Second, generate rectangles continuously. To do this, make the following changes:

```
 20 N=INT(RND(0)*3+1)
160    (i.e., delete)
170 GOTO 20
```

After you've modified the program as specified above, run it and admire the changes. Now, add a little music to your life. This is easily accomplished by adding the following statements:

```
 81 I=INT(RND(0)*256)
 82 SOUND 1,I,10,4
 84 SOUND 2,255-I,10,4
```

Try this, and then delete line 150. This will speed things up a little and make them even more interesting.

Finally, black backgrounds can become tiresome. To randomly change the background color, type in the following:

```
 11 REM : CHANGE BACKGROUND
 12 B=INT(RND(0)*16)
 13 SETCOLOR 4,B,2
166 REM : CHANGE BACKGRD SO GOTO 12
170 GOTO 12
```

Your final program listing should look like that shown in Program 2.

There are further simple and interesting modifications. For example, vary the constants in statements which include random number generators – those containing (RND(0)); or delete +16 in line 10 and provide yourself with a text window in which you can write commentary on what the viewer sees; or change the characteristics of the shapes generated to be filled with color (lines 40 through 80). Your imagination will suggest other possibilities.

Program 1.

```
3 REM : DEMO OF XIO FILLING
5 REM : BY GRETCHEN SCHABTACH
6 REM : AND MERLIN(ATARI 800)
8 REM : SUPPRESS WINDOW IN GR.7
10 GRAPHICS 7+16
15 REM : ESTABLISH 3 FILL COLORS
20 FOR N=1 TO 3 STEP 1
30 COLOR N
35 REM : GENERATE FIGURE TO FILL
40 X1=INT(RND(0)*80)
50 Y1=INT(RND(0)*48)
60 X2=X1+INT(RND(0)*80)
70 Y2=Y1+INT(RND(0)*48)
80 IF X1=X2 OR Y1=Y2 THEN 40
90 PLOT X2,Y2
100 DRAWTO X2,Y1
110 DRAWTO X1,Y1
115 REM : FILL FIGURE
120 POSITION X1,Y2
130 POKE 765,N
140 XIO 18,#6,0,0,"S:"
150 FOR W=1 TO 400:NEXT W
155 REM : CHANGE COLOR FOR NEXT
    FIGURE
160 NEXT N
165 REM :GENERATE NEW FIGURE
170 GOTO 10
```

Program 2.

```
3 REM : DEMO OF XIO FILLING #2
5 REM : BY GRETCHEN SCHABTACH
```

www.commodore.ca

```
6 REM : AND MERLIN (ATARI 800)
8 REM : SUPPRESS WINDOW IN GR.7
10 GRAPHICS 7+16
11 REM :CHANGE BACKGROUND
12 B=INT(RND(0)*16)
13 SETCOLOR 4,B,2
15 REM : ESTABLISH 3 FILL COLORS
20 N=INT(RND(0)*3+1)
30 COLOR N
35 REM : GENERATE FIGURE TO FILL
40 X1=INT(RND(0)*80)
50 Y1=INT(RND(0)*48)
60 X2=X1+INT(RND(0)*80)
70 Y2=Y1+INT(RND(0)*48)
80 IF X1=X2 OR Y1=Y2 THEN 40
81 I=INT(RND(0)*256)
82 SOUND 1,I,10,4
84 SOUND 2,255-I,10,4
90 PLOT X2,Y2
100 DRAWTO X2,Y1
110 DRAWTO X1,Y1
115 REM : FILL FIGURE
120 POSITION X1,Y2
130 POKE 765,N
140 XIO 18,#6,0,0,"S:"
155 REM : CHANGE COLOR FOR NEXT
    FIGURE
165 REM :GENERATE NEW FIGURE
166 REM :CHANGE BACKGRD SO GOTO 12
170 GOTO 12
```

©

VIXEN:™ The magazine for *VIC-20 users© 1982
*VIC-20 is a trademark of Commodore Business Machines, Inc.

Vixen 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. Novice and pro alike, VIXEN is the magazine for you. Be a sly little fox for only $43 a year - Subscribe to:

VIXEN™

P. O. Box 507, Deer Park, Texas 77536
P.S. Foxhounds; look for Foxtales on side 2.
Vixen is a division of : Foxfire Systems, Inc.
3811 Newton, Pasadena, Texas

Dealer Inquiries Invited
Texas residents add 5% Sales Tax
Canada and overseas $53
Orders pre-paid,
U.S. Dollars only

VIAC

VIC INTERFACE to ANY CASSETTE

Finally, there is an adapter that allows you to connect most any audio cassette recorder to the VIC-20*, PET*,CBM*, Commodore 64K*, and any Commodore* computers that employ the same existing 6-pin cassette interface. The VIAC has 3 plugs that connect directly to the microphone, earphone, and remote jacks of the recorder and a 6-pin edge connector cable that interfaces directly to the computer cassette slot. The computer controls start/stop of the cassette via it's remote jack.

- Record verbal remarks directly on the program tape.
- Has earphone jack and data LED indicator for tape editing ease.
- Requires no external power and is simple to operate.

Introductory Price only **$49.95**, order directly from:
Price plus 2.50 for shipping
Check, money order, COD
Calif. residents add 6% sales tax
Dealer inquiries welcome
*Trademark of Commodore Business Machines

INTEGRATED CONTROLS
1240-L LOGAN AVE.
COSTA MESA, CA 92626
(714)641-0181

PRICKLY-PEAR SOFTWARE

THE MOST INTERESTING AND PROFESSIONAL SOFTWARE AVAILABLE FOR THE VIC-20, ATARI, AND TRS-80 COLOR COMPUTER.

Astrology

Truly a classic, this program will accurately cast your complete horoscope. You just enter the date, time, and place of birth. The sun sign, rising sign, mid heaven (MC), lunar nodes, and planetary influences including houses and aspects between the planets will all be calculated, and a full chart drawn. You can also do progressed charts and transits. It will even tell you the day of the week you were born. The accompanying book will help you interpret this chart of your horoscope. The extent of the documentation is tremendous, even by our exceptionally high standards, and no previous knowledge of the subject is required. You can share in this wisdom which has been used for thousands of years in many cultures. This program was written by a professional Astrologer. Requires 16K memory (8K or bigger expander on Vic). **$34.95 tape — $39.95 disk**

★ ★ ★

Many other Programs, such as: Fantasy Gamer's Package, Gangbusters, Tarot, I Ching, Numerology, Great Word Game, Mathpac I, Football, and more!!!

Viking!

A simulation for 1 to 4 persons. Each begins as a landowner, and by farming their land, buying and selling land, expanding their fishing fleet, building on to their manufactory, increasing their population, equiping and training more soldiers, and regulating their taxes, each player tries to increase their economic power and rank until one becomes ruler over all. But beware plagues, rats, raiders, revolts, bad weather, and other misfortunes which may lie along the road to success. As you progress, see the map of your holdings increase. Playable in 1 to 2 hours, and different every time, you may have an addiction problem. Requires 16K memory (16K or bigger expander on Vic) **$19.95 tape — $24.95 disk**

★ ★ ★

You won't find better programs! Ours are debugged, user friendly, accurate, and fun to use. We have games, utilities, educational, and useful programs, and you will like doing business with us. If you have an **Atari, Vic-20,** or **Color Computer,** we want you as a customer.

SEND A STAMPED, SELF-ADDRESSED LONG ENVELOPE FOR COMPLETE CATALOGUE

SPECIFY SYSTEM

Your Personal check is welcome—no delay. Include $1.50 shipping for each program ordered. (Shipping free on $50.00 or larger orders). Az. residents add 4% sales tax. Orders shipped within two days.

At Your Local Dealer, or
Send Order To: **PRICKLY-PEAR SOFTWARE**
9822 E. Stella Road
Tucson, Arizona 85730
(602) 886-1505

www.commodore.ca

For information ranging from stock prices to the results of experiments, this program lets us easily analyze any information by displaying the data on a graph. It will also compute an equation to fit the data and then provide statistics to tell how good the fit is.

VIC Plotting

Matt Urnezis
Garland, TX

We can display a medium resolution graph on the VIC by dividing each standard screen location into four equal subsquares. In this way, the 400 positions used in the program have the potential to represent 1,600 separate data points. The price that is paid to achieve the higher resolution is that data is no longer simply POKEd on the screen. The program first has to PEEK the screen location and combine it with the new data point to be displayed. This new combination is then POKEd back on the screen (see Figure 1).

Besides graphing the data, the program will permit the user to statistically analyze the information by computing the equation for the straight line which best fits the data. Also listed is the coefficient of determination which tells how well the Y values are explained by the X values. This last item is the "standard error" of the estimate. This represents how far away the data points tend to be from the linear regression line. More thorough explanations of the meaning of each analysis can be found in most statistics books.

In determining the statistical results, I have not used any rounding routines. This will let you decide how accurate you want the results to be. Unless you have a specific need, I would suggest adding the following four lines to make the information more readable.

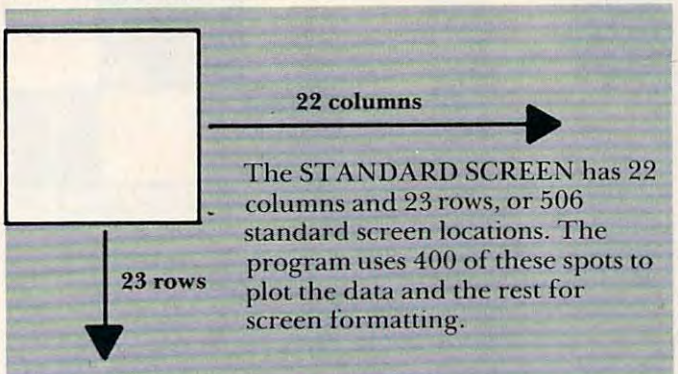


Figure 1A.

World's Most Cost Effective Development System

- Type your programs directly from your Commodore VIC-20 keyboard into the built-in 4 kilobyte ROM emulator
- Jumper direct to target ROM socket
- Test programs in circuit
- Burn them direct to EPROM with built-in EPROM programmer and power supply
- Burns & runs EPROMS for the Commodore VIC-20, too
- Software on EPROM included
- Comprehensive 25 page manual
- Fits EXP PORT or SUPER EXP Leaves user PORT free

PROMQUEEN CARTRIDGE COMPLETE ONLY $199.00

manual available separately for $20.00 credited on cartridge purchase
Jumper Cable, 2 ft: $18.50 with cartridge; 2732A EPROMS $12.50 each with cartridge

Gloucester Computer Bus Co. 6 Brooks Rd., Gloucester, MA 01930 617-283-7719

Shipping charges for all items extra, Mass. residents add 5% tax.
VISA AND MASTERCARD ACCEPTED

COMPU SENSE

"CARD/?"
[CARD/ PRINT]
****
UNIVERSAL CENTRONICS PARALLEL PRINTER INTERFACE FOR THE VIC-20® COMPUTER

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

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

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

$79.95

To order:
812 S. LIGHTNER
WICHITA, KS. 67218
(316) 684-4660
PERSONAL CHECK ACCEPTED
(ALLOW 3 WEEKS) OR C.O.D.
HANDLING CHARGES $1.50

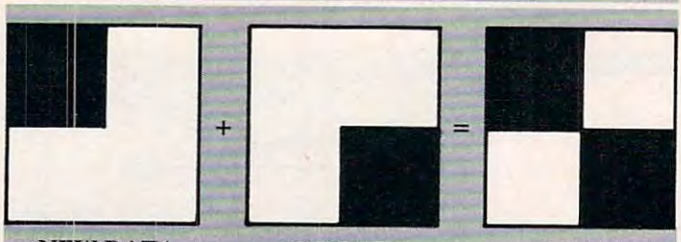
VIC-20® is a registered trademark of Commodore

www.commodore.ca

```
515 B=INT(B*1000+.5)/1000
516 C=INT(C*1000+.5)/1000
525 R2=INT(R2*1000+.5)/1000
535 SD=INT(SD*1000+.5)/1000
```

To plot the data, each standard screen location is divided into four subsquares.

Figure 1B.



NEW DATA **OLD DATA** **RESULT**

The program takes each data point and determines which screen location and subsquare should be used. It then PEEKs the screen location to see what data is already present. The program combines this PEEK with the new data and POKEs the result on the screen.

Figure 1C.

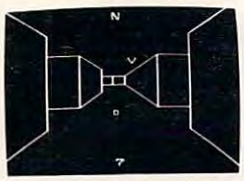
```
10 X=4*(PEEK(36866)AND128):S=X+64*
   (PEEK(36869)AND120)+463:C=
   38351+X:POKE36879,8
20 PRINT"{CLEAR}"SPC(197)"{PUR}    ~
   MEDIUM RESOLUTION","{DOWN}
       DATA ANALYSIS"
30 PRINT"{GRN}{DOWN}          BY MATT
   ":FORX=1TO2000:NEXT
40 DIMD%(15,4):FORX=0TO15:FORY=0TO
   4:READD%(X,Y):NEXT Y,X
50 DATA32,108,124,123,126,123,98,2
   55,123,97,124,225,124,255,
   226
60 DATA126,127,226,97,126,108,108,
   225,98,127,225,225,225,254
   ,251
70 DATA255,254,255,255,236,127,127
   ,251,252,127,226,251,226,2
   36,226
80 DATA97,252,236,97,97,98,98,254,
   98,252,251,251,251,160,251
90 DATA236,160,236,236,236,254,254
   ,254,254,160,252,252,160,2
   52,252
100 DATA160,160,160,160,160:PRINT"{
   CLEAR}"SPC(176)
110 INPUT"{BLU}THE X AXIS NAME";X$:
   INPUT"{CYN}{DOWN}THE Y AXI
   S NAME";Y$
120 INPUT"{GRN}{DOWN}HOW MANY X VAL
   UES";A:DIMP(1,A):PRINT"{CL
   CLEAR}"
130 FORX=1TOA:PRINT"{GRN}{02 DOWN}D
   ATA PAIR";X
140 INPUT"{BLU}{DOWN}THE X VALUE";P
   (0,X):INPUT"{CYN}THE Y VAL
   UE";P(1,X):NEXT
150 FORX=0TO1:H(X)=P(X,1):L(X)=P(X,
   1):FORY=1TOA
160 IFH(X)<P(X,Y)THENH(X)=P(X,Y)
170 IFL(X)>P(X,Y)THENL(X)=P(X,Y)
180 NEXTY:IFH(X)=L(X)THENH(X)=L(X)+
   2
190 NEXT:FORX=1TO800:NEXT:PRINT"{CL
   CLEAR}"SPC(181)"{PUR}TYPE ~
   1 WHEN"
200 PRINTSPC(29)"FINISHED",SPC(25)"
   WITH THE GRAPH."
210 FORX=1TO3000:NEXT:PRINT"{CLEAR}
   "SPC(6)"{GRN}DATA POINTS"
220 FORZ=0TO21:POKEC-1-22*Z,4:POKEC
   +22+Z,4:POKEC-22*Z,6:POKEC
   +Z,6:NEXT
230 POKES,109:FORZ=0TO9:POKES-22-44
   *Z,107:POKES+1+2*Z,113:POK
   ES-44-44*Z,93
240 POKES+2*Z+2,64:NEXT:Y=LEN(Y$):X
   =LEN(X$):IFY>20THENY=20:Y$
   =MID$(Y$,1,20)
250 IFX>20THENX=20:X$=MID$(X$,1,20)
260 FORZ=1TOY:R=ASC(MID$(Y$,Z,1))-6
   4:IF R<0THENR=R+64
270 POKES-463+22*Z+22*INT((20-Y)/2)
   ,R:NEXT:FORZ=1TOX:R=ASC(MI
   D$(X$,Z,1))-64
280 IFR<0THENR=R+64
290 POKES+22+Z+INT((20-X)/2),R:NEXT
300 FORB=1TOA:S(0)=0:S(1)=2:FORC=0T
   O1
310 N(C)=(P(C,B)-L(C))*19.99/(H(C)-
   L(C))
320 DN(C)=N(C)-INT(N(C)):IFDN(C)<.5
   THENS(C)=2-C
330 NEXTC:P=S-21+INT(N(0))-22*INT(N
   (1)):V=PEEK(P):FORZ=0TO15
340 IFV=D%(Z,0)THENRL=D%(Z,S(0)+S(1
   )):Z=15
350 NEXTZ:POKEP,RL:POKE36876,225:PO
   KE36878,15:FORX=1TO5
360 NEXTX:POKE36878,0:NEXTB
370 GETA$:IFA$><"1"GOTO370
380 PRINT"{CLEAR}"SPC(135)"CALCULAT
   ING DATA"
390 IFA>2GOTO410
400 PRINT "{CLEAR}"SPC(111)"THE DAT
   A WILL NOT","{DOWN}  GIVE ~
   MEANINGFULL","{DOWN}      ~
   RESULTS":GOTO550
```

www.commodore.ca

VIC-20®
COMMODORE

VICTORY SOFTWARE®

VIC-20®
COMMODORE



ADVENTURES

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

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 $6x10^{23}$ 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 the approximately 120 double spaced typed sheets. Keep a copy in your safety deposit box.

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
(3 Programs) **$14.95**
MOON BASE ALPHA—Destroy the meteor that is racing towards your base.
COMPUTER ADVENTURE—Re-live the excitement of getting your first adventure.
BIG BAD WOLF—Don't let the wolf gobble you up.

ADVENTURE PACK II
(3 Programs) **$14.95**
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.

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

VIC-20 OWNERS

We have CHALLENGING GAMES for your continuous enjoyment

A NEW LINE designed for VIC-20

All in at least 50% Machine Code

CHIMP CHASE ($14.95) Monkey moves around in zoo maze "opening cages". Robot zoo keeps pursue. Keyboard or joystick.

COSMIC CRUSADERS ($14.95) Lone spacecraft monitors space sectors to defend starbases from enemy forces. Joystick

• ULTIMATE TANK ($16.95) 1 or 2 players battle spiders and giant space eyes. Tank appears stationary while terrain moves for an 'inside the tank' feel. Joystick and Keyboard for No. 2 player.

COSMIC CRYSTALS ($16.95) 1 or 2 players defend crystals in force field vault in this original high resolution multi-color game. All machine code. Need game paddle.

REBEL DEFENDER ($19.95) 100% machine code, HI-RES, multi-color graphics, 1 or 2 player game. Paddles required. Rebel forces defend base against imperial stalkers and fighters. 8K expander required.

• ASSEMBLER/EDITOR ($15.95) Use VIC to assemble and edit machine code mneumonics. Uses variable names, labels, calculates branch offsets. Saves program on tape. Prints assembly listings.

*Requires 3K or 8K expander

Dealer Inquiries Invited

Check, money order, VISA, MASTERCARD
Prices plus $1.50 per game for shipping

LITTLE WIZARD DISTRIBUTING
622 North Broadway, #301
Milwaukee, Wisconsin 53202
(414) 273-5460

NEW TOUCH-N-LIGHT PEN for the VIC 20

Imagine this . . .

1. draw pictures
2. play games
3. answer questions

and much, much more.

All without touching the keyboard. Just point the Touch-N-Light Pen at the screen and watch the VIC come alive. No skill necessary.

Game & Educational Programs available

Suggested list price $75.00

N.Y. STATE RESIDENTS ADD TAX

Send Check or Money Order to:

Sunshine Peripherals
1229 East 28th Street
Brooklyn, N. Y. 11210

Dealer Inquiries Invited

VIC is a registered trademark of Commodore Business Machines

VIC 12K To 64K RAPIDWRITER

The Finest Word Processor

You Can Buy For Your VIC

Scrolling & Fast, Easy Editing
Standard CMB File Format
Up To 8 Pages In Memory
Fast Tape Techniques
In-text Calculations
Disk Compatible
Form Overlays

Tape System
$39.95
cassette and manual.

Complete Systems Available
Wide Choice Of Printers

Use For Reports, Letters, Data Files

RAPIDWRITER
91 Long Hill Rd.
Leverett, MA 01054
413-549-3744

Rapidwriter (c) H.D. Mfg. Inc. 1982
All rights reserved

COMPU SENSE

cardboard 6

An Expansion Interface for the VIC-20®

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

VIC-20® is a registered trademark of Commodore

$79.95

TO ORDER:
812 S. LIGHTNER
WICHITA, KS. 67218
(316) 684-4660
PERSONAL CHECKS ACCEPTED (ALLOW 3 WEEKS) OR C.O.D.
HANDLING CHARGES $1.50

www.commodore.ca

```
410 FORZ=ØTO1:FORW=1TOA:P1(Z)=P1(Z)
    +P(Z,W):W(Z)=W(Z)+P(Z,W)↑2
    :NEXTW,Z
420 FORW=1TOA:N=P(Ø,W)*P(1,W)+N:NEX
    TW
430 IFW(Ø)-P1(Ø)↑2=ØGOTO4ØØ
440 B=(N-P1(Ø)*P1(1)/A)/(W(Ø)-P1(Ø)
    ↑2/A)
450 C=P1(1)/A-B*P1(Ø)/A
460 SD=(W(1)-C*P1(1)-B*N)/(A-2):IFS
    D<=ØTHENSD=Ø:GOTO48Ø
470 SD=SD↑.5
480 IFW(1)-P1(1)↑2/A=ØTHENR2=Ø:GOTO
    5ØØ
490 R2=(C*P1(1)+B*N-P1(1)↑2/A)/(W(1
    )-P1(1)↑2/A)
500 PRINT"{CLEAR}"SPC(7)"{PUR}Y=X*A
    +B"
510 PRINT"{DOWN}{RED}  Y= {CYN}";Y$
    :PRINT"{RED}  X= {BLU}";X$
520 PRINT"{RED}  A={GRN}";B:PRINT"{
    RED}  B={GRN}";C
530 PRINT"{BLU}{Ø3 DOWN} COEF OF DE
    TERMINATION{GRN}";SPC(4)R2
540 PRINT"{BLU}{Ø3 DOWN} STD ERROR ~
    OF ESTIMATE{GRN}";SPC(4)SD
550 PRINT:END
```

©

Pacific Coast Software
3220 S. Brea Canyon Rd.; Diamond Bar, CA 91765
(714) 594 - 8210

- WHAT COMES IN A PACKAGE?
- HAS 64 REASONS TO OPEN?
- AND, IS AVAILABLE FOR YOU RIGHT NOW?

SOFTWARE FOR THE COMMODORE 64 !!!!!

Blackjack64	$15.95
* Sketch-Pad	9.95
* Maze-Raze	12.95
Home Accountant	29.95

* JOYSTICK COMPATIBLE

• • • Plus Much M-O-R-E • • •

Commodore 64 is a registered trademark of CBM

DEALER INQUIRIES ENCOURAGED !!

ADD $1.50 FOR SHIPPING...
CA. RESIDENTS ADD 6% STATE SALES TAX . . .

ATARI 800

16K	$635
32K	$725
48K	$765
410 Recorder	$ 75
810 Disk Drive	$439
820 Printer	$259
822 Printer	$259
825 Printer	$579
830 Modem	$155
850 Interface	$169
481 Entertainer	$ 79
482 Educator	$125
483 Programmer	$55
484 Communicator	$299
853 16K Ram	$79
New DOS 2 System	$29
CX30 Paddle	$18
CX40 Joy Stick	$18
CX853 16K RAM	$77
Microtek 16K RAM	$74
Microtek 32K RAM	$119
Ramdisk (128K)	$429
Intec 48K Board	$219
Intec 32K	$119

ATARI 400

16K	$265
32K	$385
48K	$485

MONITORS

BMC 12" Green	$85
Amdek	
300G	$169
Color I	$339
Color II	$699
Color III	$429
TI 10" Color	$349
Zenith 9" (Green	$119

PRINTERS

Smith Corona TP1	$699
Centronics 739-1	$519
Centronics 739-3	$619
Diablo 630 Special	$1799
Epson	
MX80 w/Graftrax	$449
MX80FT III	
MX100	

ATARI HOME COMPUTER PROGRAMS

HOME OFFICE

CX404 ATARI Word Processor	$119.00
CX8102 Calculator	$29.00
CX412 Dow Jones Investment Evaluator	$99.00
CX4109 Graph It Joystick optional	$17.00
CX4104 Mailing List	$20.00
CX4115 Mortgage & Loan Analysis	$13.00
CX4103 Statistics I	$20.00
CX8107 Stock Analysis	$20.00
CXL4015 TeleLink I	$23.00

HOME STUDY

CX4101 An Invitation to Programming I	$20.00
CX4106 An Invitation to Programming 2	$23.00
CX4117 An Invitation to Programming 3	$23.00
CX4107 Biorhythm	$13.00
Conversational Languages (ea.)	$46.00
CX4121 Energy Czar	$13.00
CX4114 European Countries & Capitals	$13.00
CX4108 Hangman, Joystick optional	$13.00
CX4102 Kingdom	$13.00
CXL 4007 Music Composer	$34.00
CX4123 Scram, uses joystick	$20.00
CX4112 States & Capitals	$13.00
CX4110 Touch Typing	$20.00

VIC 20 $239

Dataset	64
Disk Drive	489
Graphic Printer	329
8K Mem. Expander	49
16K Mem. Expander	98
24K Mem. Expander	179
Mini-Mother (3-slot)	59
RS232C Term. Int.	43
IEEE-488 Int.	84
Super Expander	49
Programers Aid Cart.	44
Vicmon	43
Spiders of Mars	36
Robot Blasters	30
Meteor Run	36
Sattelites & Meteors	36
Amok	29
Alien Blitz	29
Renaissance (Othello)	36
Pro Ref. Guide	14
Intor to Basic Pro.	18
Victerm	8
Pro Char. Set/ Game Ed.	11
Joystick/Paddles	$19
Light Pen by Simtec	129
Modem	89
Monitor Cables	12
Prom Simulator	199
80 Col. Card	179
Epson Mx70 for Vic	CALL

CALL FOR CATALOG

Alien	19
Cosmic Kamakazi	19
Vic Avengers	21
Super Slot	21
Super Alien	19
Super Lander	21
Draw Poker	20
Midnight Drive	21

HOME ENTERTAINMENT

PAC MAN	$35
CENTIPEDE	$35
CAVERNS OF MARS	$32
CXL4013 Asteroids	$29
CXL4004 Basketball	$27
CX4105 Blackjack	$13
CXL4009 Computer Chess	$29
CXL4012 Missile Command	$29
CXL4008 Space Invaders	$29
CXL4011 Star Raiders	$39
CXL4006 Super Breakout	$29
CXL4010 3-D Tic-Tac-Toe	$27
CXL4005 Video Easel	$24

PROGRAMMING LANGUAGES AND AIDS

CXL4003 Assembler Editor	$47
CXL4002 ATARI BASIC	$47
CX8126 ATARI Microsoft BASIC	$70
CXL 4018 PILOT	$72
CX405 PILOT (Educational)	$105

EKTYPE OFFICE SYSTEMS
1655 Whipple Rd., Hayward, CA 94544
(415)489-1532

Orders received by Nov. 30, 1982, will be 1% off Ad price.

In-stock items shipped same day you call. No risk, no deposit on C.O.D. orders. Pre-paid orders receive free shipping within the continental United States with no waiting period for certified checks or money orders.

www.commodore.ca

CARDETTE LETS YOU USE YOUR OWN CASSETTE PLAYER/RECORDER WITH YOUR VIC-20®

With the new CARDETTE from Cardco, Inc. you can interface any standard cassette player-recorder to save programs and load them with unerring ease into your VIC-20*.

No longer are you restricted to using only the VIC Datasette. Just add a CARDETTE and you can use the tape unit of YOUR choice.

The CARDETTE comes with all necessary cables and wires to complete the hook-up. There is nothing else to buy. All you need to supply is YOUR tape player/recorder and your tapes.

Price: Just $29.95

COMPU SENSE

To order
812 S. LIGHTNER
WICHITA, KS. 67218
(316) 684-4660

PERSONAL CHECKS ACCEPTED
(ALLOW 3 WEEKS) OR C.O.D.
HANDLING CHARGES $1.50

VIC-20® is a registered trademark of Commodore

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 $20.00 (2 years, $36.00; 3 years, $54.00. 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 919-975-9809

COMPU SENSE

CARDBOARD 3
AN ECONOMY EXPANSION INTERFACE
(Motherboard)
For The VIC-20® Personal Computer

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

- 16k RAM + 16k RAM + 3k RAM
- 16k RAM + 8k RAM + Super Expander
- 16k RAM + 8k RAM + Vic-Mon
- 16k RAM + 3k RAM + Programmer's Aid
- High quality T.R.W. gold plated connectors for longer life expectancy and more reliability.
- This board is fused to prevent any possible accidental damage to your VIC-20*.
- This product has a 90 day free replacement warranty covering everything except the fuse.

"CARDBOARD/3" is a product of: CARDCO, Inc.
MANUFACTURED IN THE U.S.A.

$29.95

To order:
812 S. LIGHTNER
WICHITA, KS. 67218
(316) 684-4660

PERSONAL CHECK ACCEPTED
(ALLOW 3 WEEKS) OR C.O.D.
HANDLING CHARGES $1.50

VIC-20* is a registered trademark of Commodore

Now Available

COMPUTE!'s First Book Of VIC

The newest title in COMPUTE!'s First Book series...

Our *First Book of VIC* contains the best of our VIC articles and applications published since the summer of 1981. In one convenient spiral bound volume, you'll find approximately 200 pages of information.

- ☐ **Chapter 1:** Getting Started
- ☐ **Chapter 2:** Diversions — Recreation and Education
- ☐ **Chapter 3:** Programming Techniques
- ☐ **Chapter 4:** Color and Graphics
- ☐ **Chapter 5:** Maps and Specifications
- ☐ **Chapter 6:** Machine Language

In addition to material previously published in **COMPUTE!**, several of the articles and programs including a screen print program, append, tutorials on screen formatting and keyboard input and others, are being published for the first time.

Order your copy of *COMPUTE!'s First Book Of VIC* today by calling TOLL FREE:

800-334-0868
In NC Call 919-275-9809

$12.95 plus $2 shipping and handling. MasterCard, Visa, and American Express accepted, or send your check or money order to: **COMPUTE! Books**, P.O. Box 5406, Greensboro, NC 27403. US funds only. Foreign orders add $4 for air mail, $2 for surface delivery.

www.commodore.ca

Telephone, message systems, teletext, newspapers, banks – many areas of modern life are being transformed by telecommunicating computers.

Telecommunications

What Is It?

Michael E. Day
Chief Engineer, Edge Technology
West Linn, OR

Tel·e·com·mu·ni·ca·tion: communication by radio, telephone, telegraph, television, etc.

Telecommunication within the computer industry generally refers to communicating with a computer via a modem. Such communication has been around for awhile, but until the advent of the personal computer there was little need for the average person to use it. With the personal computer becoming ever more popular, this is changing; and knowing about telecommunications is becoming more necessary.

Necessary Uses

Currently, personal computerists use telecommunications mainly for communicating with public access message systems around the country. This has been the "CB radio craze" of the computer industry. The novelty of it is wearing off and other uses for the modem are being considered.

At first consideration, a very simple use of the modem, conversing with a friend, would seem pointless, since talking to your friend over the telephone would be simpler. This is true if the friend is located locally. But if the friend lives far away, there might be large phone bills or else little contact with the friend. You could communicate with the friend by mail, but mail delays the message.

The computer can help by providing a means of communication that keeps down both the communication time and the costs. Not only does the computer send information more quickly than you can talk, but it also gets rid of the casual talk that extends the time.

Businesses have for some time used computers as a means of reducing communications costs. Also, the computer is a vital link which allows the deaf to communicate when they would otherwise not have that ability. In fact, most telephone companies provide the equipment to the deaf free of charge.

Public Uses

Of course, telecommunication is not limited to personal communications; information of many sorts, including almost any form of printed matter, can be transferred via the modem. Such things as letters, contracts, news, and special interest subjects can all be transmitted through the modem. The API and UPI news services have been doing this for many years. The weather services provide information this way as well.

Most of the information provided by the various information dispensers is in fact provided to them through a telecommunications network. Since the information is already in a form that computers can work with, it requires little work or reorganization to provide the information in a form that the average person can use.

...what about the computer? It needs its own type of information flow.

Some information services have sought to reorganize information to make it more readily recoverable. For example, the newspaper industry, spurred by increasing costs and decreasing income, is searching for ways to increase profits by reducing costs while extending and diversifying the types of services they perform.

The news industry is not alone. Telephone companies are exploring this area also, most noticeably by the electronic directory service. They hope to eliminate expensive telephone directories by providing a means to obtain information over the telephone itself. (The biggest problem to date: the terminal needed to access the information costs far more than the directory, even taking into account the cost of directory assistance currently provided by the operator.)

New Systems

The need for a well-defined and up-to-date method of communicating information, both nationally and internationally, has caused European countries to develop a replacement for the TELEX system. This new system, called "teletex," goes beyond TELEX by allowing almost any form of data to be transmitted. (The TELEX system allowed only uppercase letters, numbers, and a few special characters.)

Other telecommunications systems being implemented are the "videotex" and "teletext" (note the additional "t"). Rather than limiting

www.commodore.ca

themselves to text type data, these systems transmit graphic information in the form of pictures and use existing video transmission systems (TVs). Previously, the major method of graphics transfer was by a special modem and a facsimile machine (FAX for short) which provides a picture copy of the transmitted data. While a FAX machine is much slower in transmitting a page of text, its advantage is that it can send pictures.

All of this information flow is nice for people. But what about the computer? It needs its own type of information flow. The computer runs on programs, which can also be transferred with a modem. However, there are no standards in the business world for such transfers, primarily because there has been no need for them.

In the personal computer world, however, there is such a need. This is due to the large number of individuals owning machines, the variety of these machines, the numerous programs written to run on the machines, and the greater interest in being able to transfer programs. Public computer systems have been set up specifically to provide a centralized base for these programs. The most popular of these are the CPM based systems, referred to as RCPM (Remote CPM).

These systems maintain various programs for computers which run with the CPM operating system. The programs provided are "Public Domain" programs; this means that they are provided to the general public free of charge, for anyone's use. Some retain copyrights on the programs, but this is generally to prevent resale of the "free" program. Others simply do it for the advertisement. (You can use my program, but my name has to stay in it.) Others don't care; they just want to see their program out there.

Some programs by their very nature are "public domain" programs. For example, any program created on government time or equipment is in the public domain, unless it has security restrictions. This is also true of many programs from educational institutions. Finally, some programs have been around for so long that no one knows who the original author was.

Business Uses

Financial institutions are also heavily into telecommunication. They use telecommunication to keep in constant touch with their various branches. This way, there is an instant update in the main computer whenever a transaction occurs. They also use telecommunication to transfer money back and forth, since this reduces transit time, in turn reducing the "float" time in which the money is unusable.

Telecommunication is also what makes automatic teller machines possible. The automatic teller is in constant communication with the bank's central computer, so that your account is immediately updated when you perform a transaction at the machine.

Although the credit card industry also depends upon telecommunication to transfer funds, it has been somewhat lacking at the customer end. Despite efforts to improve the situation, it is still the general rule that if a card needs to be checked, the checking is done manually. Electronic checking of cards would mean less hassle to the customer: checking could be done more quickly, and stolen cards could be identified more readily.

An offshoot of the credit card is the debit card. With a credit card, you are not only paying for the credit card system's operation, but you are also paying for the use of someone else's money. With a debit card, however, you are using your own money, not borrowing it.

Telecommunication could allow you to call a store, browse through its catalog, place your order, and pay for it – all without leaving your living room. Even if you are only comparison shopping, the video catalog could help you narrow your selection by showing who is selling what and for how much. You would save time by not having to wander from store to store.

Other types of purchase not readily possible now could also become available. Deferred payment could become a snap; you could purchase an item with a delayed payment, and if you like it, you could then release the payment. The seller would have greater protection as well, since if you didn't release the funds within a certain time, they could be automatically released.

Telecommunication has many possibilities – not only for increasing the amount of data and knowledge, but also for reducing (or eliminating) the number of tiresome chores now undertaken by people. ©

Using *your* computer in an interesting application? Write it up for other **COMPUTE!** readers to use.

www.commodore.ca

COMPUTE!'s Listing Conventions

Many of the programs which are listed in **COMPUTE!** use special keys (cursor control keys, color keys, etc.). To make it easy to tell *exactly* what should be typed in when copying a program into the computer, we have established the following listing conventions.

For The Atari

In order to make special characters, inverse video, and cursor characters easy to type in, **COMPUTE!** magazine's Atari listing conventions are used in all the program listings in this magazine.

Please refer to the following tables and explanations if you come across an unusual symbol in a program listing.

Atari Conventions

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

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, {■} means to enter a reverse-field heart with CTRL-comma, {5□} means to enter five inverse-video CTRL-U's.

For 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.

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*.

For The Apple

Programs listed as "Microsoft" are written for the PET/CBM, Apple, OSI, etc. Although the programs are general in nature, you may need to make a few changes for them to run correctly on your Apple. Microsoft BASIC programs written for the PET/CBM sometimes contain special cursor control characters. The following table shows equivalent Apple words. Notice that these Apple commands are *outside* quotations (and even separate from a PRINT statement). PRINT"[RVS]YOU WON" becomes INVERSE: PRINT"YOU WON":NORMAL

[CLEAR[(Clear Screen) HOME

[DOWN] (Cursor down)
Apple II +: Call -922
POKE 37,PEEK(37)+(PEEK(37)<23)

[UP] (Cursor up)
POKE 37,PEEK(37)-(PEEK(37)>0))

[LEFT] (Cursor left) PRINT CHR$(8);

[RIGHT] (Cursor right)
PRINT CHR$(21)

[RVS] (Inverse video on. Turns off automatically after a carriage return. To be safe, turn off inverse video after the print statement with NORMAL unless the PRINT statement ends with a semicolon.)
INVERSE

[OFF] (Inverse video off) NORMAL

Shifted characters can represent either graphics characters or uppercase letters. If within text, just use the non-shifted character, otherwise substitute a space. Some "generalized" programs contain a POKE such as POKE 59468,14. Omit these from the program when typing it in. One final note: you will probably want to insert a question mark or colon within an INPUT prompt. PET/CBM and many other BASICs automatically print a question mark:

```
INPUT "WHAT IS YOUR NAME";N$
   becomes
INPUT "WHAT IS YOUR NAME?";N$
```

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 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}		

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}		

©
www.commodore.ca

COMPUTE! Back Issues

Here are some of the applications, tutorials, and games from available back issues of **COMPUTE!**. Each issue contains much, much more than there's space here to list, but here are some highlights:

February 1981: Simulating PRINT USING, Using the Atari as a Terminal for Telecommunications, Attach a Printer to the Atari, Double Density Graphing on C1P, Commodore Disk Systems, PET Crash Prevention, A 25¢ Apple II Clock.

May 1981: Named GOSUB/GOTO in Applesoft, Generating Lower Case Text on Apple II, Copy Atari Screens to the Printer, Disk Directory Printer for Atari, Realtime Clock on Atari, PET BASIC Delete Utility, PET Calculated Bar Graphs, Running 40 Column Programs on a CBM 8032.

June 1981: Computer Using Educators (CUE) on Software Pricing, Apple II Hires Character Generator, Ever- expanding Apple Power, Color Burst for Atari, Mixing Atari Graphics Modes 0 and 8, Relocating PET BASIC Programs, An Assembler In BASIC for PET, QuadraPET: Multitasking?

July 1981: Home Heating and Cooling, Animating Integer BASIC Lores Graphics, The Apple Hires Shape Writer, Adding a Voice Track to Atari Programs, Machine Language Atari Joystick Driver, Four Screen Utilities for the PET, Saving Machine Language Programs on PET Tape Headers, Commodore ROM Systems, The Voracious Butterfly on OSI.

August 1981: Minimize Code and Maximize Speed, Apple Disk Motor Control, A Cassette Tape Monitor for the Apple, Easy Reading of the Atari Joystick, Blockade Game for the Atari, Atari Sound Utility, The CBM "Fat 40," Keyword for PET, CBM/PET Loading, Chaining, and Overlaying.

October 1981: Automatic DATA Statements for CBM and Atari, VIC News, Undeletable Lines on Apple, PET, VIC, Budgeting on the Apple, Switching Cleanly from Text to Graphics on Apple, Atari Cassette Boot-tapes, Atari Variable Name Utility, Atari Program Library, Train your PET to Run VIC Programs, Interface a BSR Remote Control System to PET, A General Purpose BCD to Binary Routine, Converting to Fat-40 PET.

December 1981: Saving Fuel $$ (Multiple Computers: versions for Apple, PET, and Atari), Unscramble Game (multiple computers), Maze Generator (multiple computers), Animating Applesoft Graphics, A Simple Printer Interface for the Apple II, A Simple Atari Wordprocessor, Adding High Speed Vertical Positioning to Atari P/M Graphics, OSI Supercursor, A Look At SuperPET, Supermon for PET/CBM, PET Mine Maze Game.

January 1982: Invest (multiple computers), Developing a Business Algorithm (multiple computers), Apple Addresses, Lowercase with Unmodified Apple, Cryptogram Game for Atari, Superfont: Design Special Character Sets on Atari, PET Repairs for the Amateur, Micromon for PET, Self-modifying Programs in PET BASIC, Tinymon: a VIC Monitor, Vic Color Tips, VIC Memory Map, ZAP: A VIC Game.

February 1982: Insurance Inventory (multiple computers), Musical Transposition (multiple computers), Multitasking Emulator (multiple computers), Disassemble Apple Programs from BASIC, Plotting Polar Graphs on Apple, Atari P/M Graphics Made Easy, Atari PILOT, Put A Rainbow in your Atari, Marquee for PET, PET Disk Disassembler, VIC Paddles and Keyboard, VIC Timekeeping.

March 1982: Word Hunt Game (multiple computers), Infinite Precision Multiply (multiple computers), Atari Concentration Game, VIC Starfight Game, CBM BASIC 4.0 To Upgrade Conversion Kit, Apple Addresses, VIC Maps, EPROM Reliability, Atari Ghost Programming, Atari Machine Language Sort, Random Music Composition on PET, Comment Your Apple II Catalog.

April 1982: Track Down Those Memory Bugs (multiple computers), Shooting Stars Game (multiple computers), Intelligent Input Subroutines (multiple computers), Ultracube for Atari, Customizing Apple's Copy Program, Using PET/CBM In The High School Physics Lab, Grading Exams on a Microcomputer (multiple computers), Atari Mailing List, Renumber VIC Programs The Easy Way, Browsing the VIC Chip, Disk Checkout for PET/CBM.

May 1982: VIC Meteor Maze Game, Atari Disk Drive Speed Check, Modifying Apple's Floating Point BASIC, Fast Sort For PET/CBM, Extra Atari Colors Through Artifacting, Life Insurance Estimator (multiple computers), PET Screen Input, Getting The Most Out Of VIC's 5000 Bytes.

Home and Educational COMPUTING! (Fall 1981 and Summer 1981 – count as one back issue): Exploring The Rainbow Machine, VIC As Super Calculator, Custom Characters, Alternate Screens, Automatic Line Numbers, Using The Joystick (Spacewar Game), Fast Tape Locater, Window, VIC Memory Map.

Back issues are $3.00 each or six for $15.00. Price includes freight in the US. Outside the US add $1.00 per magazine ordered for surface postage. $3.00 per magazine for air mail postage. All back issues subject to availability.

In the Continental US call
TOLL FREE 800-334-0868
(In NC Call 919-275-9809)

Or write to **COMPUTE!** Back Issues, P.O. Box 5406, Greensboro, NC 27403 USA. Prepayment required in US funds. MasterCard, Visa and American Express accepted. North Carolina Residents add 4% sales tax.

www.commodore.ca

The FORTH Page

The words SERT and TRADE allow you to move and mass-move screens around on a disk without fear of accidentally erasing something of value. No matter how you use these commands, no screens are ever overwritten. They simply end up somewhere else.

Disk Management

Michael Riley
Philadelphia

SERT (N1 N2 N3 —)
Deletes the group of screens numbered N1 through N2 and reinserts them between the screens numbered N3 and N3 + 1.

TRADE (N1 N2 N3 —)
Swaps a group of screens numbered N1 through N2 with a group of screens starting at N3. The two groups are assumed to be the same size.

The algorithm for SERT is a bit tricky, but it is an effective solution to a common problem. The problem with most block-move algorithms is that they need a large buffer area to store the block while moving the text that lies between the block and the destination point. Other algorithms move the block one small piece at a time, and the entire text in between must be repositioned once for each move.

The algorithm in SERT does a little more calculating in order to save space and time. SERT picks up the first screen that needs to be moved and calculates its destination position. Next, it picks up a second screen at that position before setting down the first screen. The destination of the second screen is then calculated, and so on.

The following words were used to implement SERT and TRADE and would not normally be used for editing:

(SERT) (N1 N2 N3 —)
Swaps two adjacent groups of screens. The two groups need not be the same size. Screens N1 through N2-1 are swapped with N2 through N3-1.

FX (N1 N2 — N1 N2 or N2 N1)
Two numbers are swapped if N1 is larger. "fix"

PAD-SWAP (N1 —)
Swaps the contents of block # N1 with 1024 bytes at pad.

B-DIST (variable)
The total number of screens to be moved. "big distance"

LIM (variable)
The highest screen to be moved plus one.

CNT (variable)
The number of screens moved. "count"

S-DIST (variable)
The number of screens in the highest numbered group. "small distance"

STRT (variable)
The first screen to be moved. "start"

Program 1.

```
SCR # 122
 0 ( PAD-SWAP B-DST CNT S-DEST STRT )
 1 : PAD-SWAP ( N1 --- / SWAP SCR W/ PAD )
 2    DUP BLOCK PAD 1024 + 1024 CMOVE
 3    PAD SWAP BLOCK 1024 CMOVE UPDATE
 4    PAD 1024 + PAD 1024 CMOVE ;
 5 0 VARIABLE B-DST 0 VARIABLE LIM 0 VARIABLE CNT
 6 0 VARIABLE S-DST 0 VARIABLE STRT
 7 : (SERT) ( N1 N2 N3 --- )
 8    DUP LIM !  SWAP - S-DST !  STRT !
 9    LIM @ STRT @ - B-DST !  0 CNT ! STRT @
10    BEGIN DUP PAD-SWAP
11      BEGIN S-DST @ +  DUP LIM @ < 0=
12       IF B-DST @ - THEN
13       DUP PAD-SWAP 1 CNT +! DUP STRT @ =
14      UNTIL CNT @ B-DST @ <
15    WHILE 1 STRT +! 1+ REPEAT DROP ; -->
```

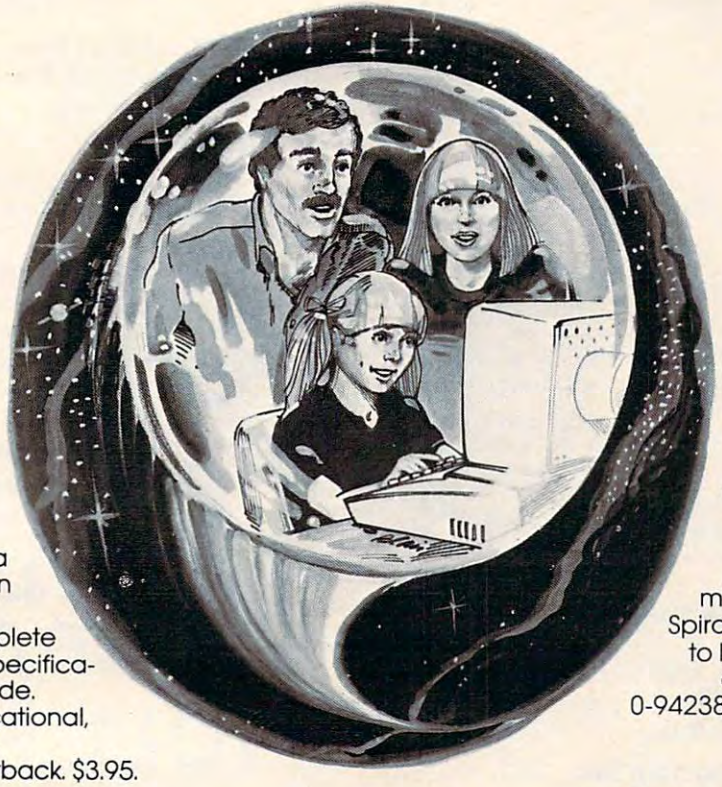
Program 2.

```
SCR # 123
 0 ( FX SERT TRADE RANGE? ROOM? )
 1 : ROOM? ( / IF ERROR, PRINT 'NO ROOM IN DICT' )
 2    PAD 2048 + FIRST > 14 ?ERROR ;
 3 ( ' FIRST > ' IS INSTALATION DEPENDENT  )
 4 : RANGE? ( N1 --- N1 / LEGAL SCREEN NUMBER? )
 5     1 OVER > OVER 300 ( 4040 PET ) > OR 6 ?ERROR ;
 6 : FX  ( N1 N2 --- N2 N1 [OR] N1 N2 )
 7    OVER OVER > IF SWAP THEN ;
 8 : SERT  ( 1ST LAST DEST --- / REINSERT SCRS AT DEST )
 9    ROOM?  1+ RANGE? SWAP 1+ RANGE? ROT RANGE?
10    FX >R FX R> FX (SERT) ;
11 : TRADE ( 1ST LAST DEST --- / TRADE WITH SCRS AT DEST )
12    ROOM? ROT >R R SWAP - B-DST ! ( LAST )
13    1+  R>  ( LAST+1 1ST )
14    DO  I RANGE?  I B-DST @ - RANGE? ( I I+DST )
15  OVER    PAD-SWAP PAD-SWAP PAD-SWAP   LOOP DROP ;
```

©

www.commodore.ca

Turn To The Future With COMPUTE! Publications



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 authors 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.

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 Second Book Of Atari

With over 200 pages of unpublished Atari information specially selected by the editors of **COMPUTE!** Magazine, this new release is an excellent resource for Atari owners and users. Spiral bound. ISBN 0-942386-06-X. Paperback. $12.95.

COMPUTE! Books invites dealer inquiries. Call the Toll Free Number below for Dealer Information.

ATARI is a registered trademark of Atari, Inc.
PET and CBM are trademarks of Commodore Business Machines, Inc.

To Order COMPUTE! Books

Send coupon to
COMPUTE! Books. P.O. Box 5406. Greensboro, NC 27403 USA

For fastest service, in the US call
Toll Free 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. (Outside the US add $4.00 shipping and handling for air mail, $2.00 for surface mail.) NC residents add 4% sales tax.

☐ Payment Enclosed
Please charge my ☐ VISA ☐ MasterCard ☐ American Express

Account No. _____ Expires ____/____

Please send me:

Quan.		Price		Shipping/Handling	
____	Beginner's Guide	$ 3.95 ea.	+	$1.00 ea.	_____
____	First Book of Atari	12.95 ea.	+	2.00 ea.	_____
____	Inside Atari DOS	19.95 ea.	+	2.00 ea.	_____
____	Second Book of Atari	12.95 ea.	+	2.00 ea.	_____
				Total	_____

Name _____

Address _____

City _____ State _____ Zip _____

Country _____

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

www.commodore.ca

Peripherals Unlimited...

FANTASTIC PRICES!

OUR FAST SERVICE, PRODUCT SELECTION AND OUR CUSTOMERS' SATISFACTION MAKE US #1.

Microsoft Z-80 Softcard	$214
Microsoft RAMCARD	$129
Z-90-64K DO	$2588
Z-19 Terminal	$777
Z-121 Monitor 12"	$149

ATARI COMPUTERS

Atari 800 16K	$649
Atari 400	$318
Atari Interface Module	$174
Atari 810 Single Disk	$444
Atari 830 Modem	$166
Programmer	$59
Entertainer	$84
Star Raiders	$34
16K Mem. Exp. for Atari	$74
32K Mem. Exp. for Atari	$114

NEC PRINTERS

7710/30 Spinwriter R/O	$2295
7720 Spinwriter KSR	$2649
3510/30 Spinwriter R/O	$1689

NEC DOT MATRIX

PC-8023	$474

Call for prices on ribbons, etc.

OKIDATA & MORE

Okidata Microline 82A	$459
Okidata Microline 83A	$699
Okidata Microline 84 (P)	$1069
Okidata Microline 84 (S)	$1099
Tractor (OKI 80 & 82 only)	$60
Diablo 620	$1349
Diablo 630	$1999

AMDEK & NEC MONITORS

Amdek 12" 300 GRN Phosphor	$149
Amdek 13" Color I	$319
Amdek 13" Color II	$739
Amdek 13" Color III	$429
NEC JB1201 GRN Phosphor	$149
NEC JC1201 Color	$339

EPSON PRINTERS

MX-80 w/Graphtrax Plus	$469
MX-80FT (Friction & Tractor)	$529
MX-100 (15" Carriage)	$699
Grappler Interface	$129

Call for prices on Ribbons, Cables & Interfaces

NEC-PC 8000 Series Microcomputer

PC-8001A Computer w/32K	$888
PC-8012A w/32K + Exp. Slots	$588
PC-8031A Dual Mini Disk	$888
PC-8032A Add-on Mini Disk	$777

Call for Software Prices

FOR THE LOWEST PRICE CALL TOLL FREE

1-800-343-4114

ORDERING INFORMATION

Our order lines are open 9AM to 6PM EST Monday thru Friday. Phone orders are welcome; same day shipment on orders placed before 10AM. Free use of Mastercard and VISA. Personal checks require 2 weeks clearance. Manufacturer's warranty included on all equipment. Prices subject to revision. C.O.D.'s accepted.

For service, quality and delivery call:

PERIPHERALS UNLIMITED
(617) 655-7400
62 N. Main St. • Natick, MA 01760

www.commodore.ca

New Products

Spinnaker Software Corp. Markets Home Learning And Strategy Games For Atari And Apple

Two software design companies, DesignWare and Computer Learning Connection, are finalizing the initial Spinnaker product line, aimed at providing both education and entertainment for children in a home setting.

Working closely with Spinnaker, DesignWare and Computer Learning Connection have prepared four game products which will be published by the new company via retail microcomputer stores throughout the country.

The two Spinnaker learning games authored by DesignWare, a San Francisco-based courseware development company, are designed for children ages four to nine and will foster understanding and enjoyment of the uses of a personal computer. The games attempt to balance amusement and learning and require a minimal amount of text material.

The Spinnaker learning games developed by DesignWare include *Face Maker* and *The Story Machine*. *Face Maker*, intended for children four to eight years of age, provides an animated format to familiarize a child with the graphics capabilities of a computer. By choosing from a varied menu of eyes, ears, noses, mouths, etc., the child composes a face which he can then animate with a series of expressions, including smiling, winking, and wiggling of ears.

The Story Machine provides an opportunity for children ages five to nine to develop and strengthen their sentence and paragraph skills.

Sentences and paragraphs, composed by the child from a substantial list of nouns, verbs, prepositions, and other parts of speech, are animated with full color graphics and sound. *The Story Machine* will also provide keyboard practice and introduce the child to the editing capabilities of the computer.

Computer Learning Connection, located in Cambridge, Massachusetts, is producing the first two entries of a strategy game series for Spinnaker. The Snooper Troops Series will be composed of mystery games in which the player (ages ten to adult) becomes a private detective. In trying to determine which of eight suspects committed the crime, the player strengthens his skills in reasoning and developing hypotheses as he drives around town, questions witnesses, searches houses for clues, and accumulates information via the Snoopnet computer.

Spinnaker's holiday software

www.commodore.ca

The Spinnaker games will be marketed nationally on a major scale by the publishing company. Its marketing efforts will include the design and production of a distinctive array of packaging for the new games, which will provide maximum protection for the discs over a long time period.

The company has also introduced a holiday package. A Christmas Sampler brings to the entire family a variety of holiday classics with full-color graphics and sound. Interspersed with animation, the graphic depictions of *A Christmas Story*, *The Night Before Christmas*, and a selection of Christmas carols are accompanied by screen texts for easy follow-along by younger family members. Christmas music adds a third dimension for holiday gatherings.

This software is available for the Apple II and Atari 800 (48K) or IBM PC (48K) with disk drive. A color monitor is recommended.

Spinnaker Software
26 Brighton St.
Belmont, MA 02178
(617)484-8444

Interfaces For Commodore 64 And VIC

XITEL announces two interfaces, both for the new Commodore 64 and VIC-20.

Its Model CX-6401 interface allows the new Commodore 64 or VIC-20 to use *any* type of standard, commercially available parallel interface printer. The interface connects to the Serial Port/Bus on the computer, *not* the user port, allowing the user port to remain open for use by a modem or RS-232C peripheral device.

Some key features of the CX-6401 are:

– Eliminates handshaking problem of RS-232C cartridge.
– Mode switch to correct ASCII problem.
– No RS-232C cable necessary.
– Allows use of lower cost parallel type printers.
– No external power required.
– Allows use of multiple printers.
– Leaves user port lines available for other use.

The CX-6401 comes with a six foot serial bus cable and connector for direct connection to the Commodore 64 or VIC-20. In addition, the CX-6401 has a one foot parallel cable for connection to the printer. Installation is simple. $89.95.

The new CX-6402 full RS-232C interface, for the new Commodore 64 and VIC-20, allows the use of any type of RS-232C peripherals, such as modems, printers, etc. The interface connects to the computer's user port. The CX-6402 is a complete RS-232C Interface, for *all* RS-232C devices.

Some key features of the CX-6402 are:

– Allows full use of all eight active "handshaking" RS-232C signal lines on the VIC-20 and Commodore 64.
– Full RS-232C logic levels.
– Requires no external RS-232C cable.
– Operates at all VIC-20/ Commodore 64 baud rates.
– Requires no external power.

The CX-6402 comes ready to install. In addition, the CX-6402 comes with a six foot parallel cable for connection to the printer. $59.95.

continued on p. 238

Commodore Computer owners:
Are you tired of long waits to load and save on Cassette? Like to have a disk but cannot afford it. Then try the next best thing to disk - announcing

The Rom Rabbit

Cassette version for VIC now available $19.95

"Your Wish.... ...Is My Command"

Easy to install ROM!

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

Pet Owners Granted Wishes:
1. Much faster cassette load
2. Auto-repeat on all keys
3. Memory test
4. 12 commands
5. Works with or without toolkit

Reduced to $39.95
ROM and Manual
~~$49.95~~

Visa and M.C.

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

Eastern House
3239 Linda Dr
Winston-Salem N.C. 27106
(919) 924 2889 (919) 748 8136

VIC-BACKGAMMON-VIC
Plays a great game by the rules and won't let you cheat. Our best seller.
5K version $12.95
Advanced 8K version $19.95

BLACKJACK TUTOR
Learn when to HIT, STAY, SPLIT PAIRS and DOUBLE. You can beat Vegas for just $12.95

GRAPHICS GENERATOR
Create, edit, reverse, save special characters. Unique DEMO feature included. $9.95

MAZE-MAN
Arcade game with fast munching action. Key or joystick. $9.95

All programs fit into 5K VIC-20. Send for free catalog.

Send check or money order to:
(Add 50c for postage)

RAR-TECH
Box 761, Rochester, MI 48063
VIC-Trademark of Commodore

VIC-20
Discounted Software

THE ACCOUNTANT $28.95
(G/L, B/S, P & L)
BUSINESS INVENTORY $17.95
(Specify TV or Vic Printer)
TAPEWORM $11.95
(Keep track of your records and tapes)
TICKERTAPE $15.95
(Maintain profile of investments)
SNAKMAN $18.95
(Just like your favorite arcade game)

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

www.commodore.ca

the SOFTWARE connection

FOR THE MOST EXCITING VIDEO GAMES AT THE LOWEST PRICES

We have one of the largest selections of software available for your home computer at the lowest prices. You will find all of the top games and office management software in our catalog at from 20% to 30% below retail. We also have special offers for user groups.

TRY THESE GET-ACQUAINTED SPECIALS

DISKETTE SPECIAL

FREE PLASTIC LIBRARY CASE WITH PURCHASE OF EVERY BOX OF 10

$24.95

Personally labeled for THE SOFTWARE CONNECTION by one of the most respected producers of magnetic media. Each diskette is single-sided and certified double density at 40 tracks. To insure extended media life, each diskette is manufactured with a reinforced hub-hole.

10 Boxes or more: $22.50/box

FOR YOUR ATARI®

	Retail	Our Price
RASTER BLASTER	$29.95	**$20.00**
DR. GOODCODE'S CAVERN	$29.95	**$21.00**
APPLE PANIC (Disk or Cassette)	$29.95	**$18.00**
MATCH RACER (Disk or Cassette)	$29.95	**$18.00**
CRUSH, CRUMBLE & CHOMP (Disk or Cassette)	$29.95	**$20.00**
GAMMA SOCKER (Disk or Cassette)	$29.95	**$18.00**
GAMMA HOCKEY (Disk or Cassette)	$29.95	**$18.00**
STAR BLAZER	$31.95	**$21.00**

FOR YOUR APPLE®

	Retail	Our Price
FIREBIRD	$29.95	**$18.00**
RASTER BLASTER	$29.95	**$20.00**
NEPTUNE	$29.95	**$18.00**
LAZER SILK	$29.95	**$18.00**
STAR BLAZER	$31.95	**$21.00**
PHASER FIRE	$29.95	**$18.00**
HIGH ORBIT	$29.95	**$18.00**
ZENITH	$34.95	**$23.00**

ANY 3 FOR JUST $50.00

CARTRIDGE SPECIALS FOR YOUR ATARI 400/800

	Retail	Our Price
PAC MAN	$44.95	**$34.95**
EMBARGO	$49.95	**$34.95**
FIREBIRD	$49.95	**$34.95**

HARDWARE FOR YOUR APPLE® FROM T.G. PRODUCTS

	Retail	Our Price
JOYSTICK	$59.95	**$46.00**
SELECT-A-PORT	$59.95	**$46.00**
BOTH	$119.90	**$85.00**

WE CARRY COMPLETE LINES FROM THE FOLLOWING COMPANIES:

ADVENTURE INTERNATIONAL • ARCADE PLUS • ARTSCI • AUTOMATED SIMULATIONS • ATARI • AVALON HILL GAME COMPANY • BRODERBUND SOFTWARE BUDGECO • CALIFORNIA PACIFIC • COMPUTER MAGIC, LTD. • CONTINENTAL SOFTWARE • DATAMOST • DATASOFT • DELTA SOFTWARE • EDU-WARE GEBELLI SOFTWARE • HAYDEN SOFTWARE • HIGHLANDS COMPUTER SERVICES • HOWARD SOFTWARE • INNOVATIVE DESIGN • IUS • K BYTE • LJK • MICRO LAB MICRO PRO INTERNATIONAL • MICROSOFT • MUSE • ON-LINE SYSTEMS • QUALITY SOFTWARE • SIRIUS SOFTWARE • SOFTAPE • SPECTRUM COMPUTERS STRATEGIC SIMULATIONS • SYNERGISTIC • UNITED SOFTWARE OF AMERICA • VERSA COMPUTING • VOYAGER SOFTWARE

MAIL ORDERS: For fast delivery, send certified check, money orders, or Visa or MasterCard number and expiration date, for total purchase price plus 1% or $2 minimum for postage and handling. Add $5 for shipment outside the continental U.S. California Residents add 6% sales tax.

COD: and Chargecard order call **800-555-1212** to obtain our new toll-free number.
Subject to stock on hand. Prices subject to change.
IN CALIFORNIA call **(916) 925-2666**

Catalog free with any order or send $2 postage and handling and your computer type to:

the SOFTWARE connection

5133 Vista Del Oro Way Fair Oaks, CA 95628

www.commodore.ca

XITEL Inc.
2678 North Main St. #1
Walnut Creek, CA
(415)944-9277

Faster Format Speed For Atari

Owners of Atari 810 disk drives purchased prior to Atari's fast formatting engineering change can now increase the formatting speed of their machines by more than 30%.

Atari 810 disk drives with the new fast formatting change can be enhanced by up to 10%.

This faster format speed will decrease program loading time and improve the throughput of programs that require frequent disk access.

Fast-Chip is a kit which requires only one lead to be wired to the disk's main electronics board. With a knowledge of soldering, a person can complete the task in about 15 minutes. The tools required are a screw driver and a low wattage solder iron.

Fast-Chip is available from Atari dealers worldwide for $39.95 and carries a one year guarantee. Installation is available from most local dealers for a slight extra fee, or users can send their drive postpaid with payment of $39.95 plus $15 for shipping, handling, and installation to:

Binary Corporation
3237 Woodward Avenue
Berkley, MI 48072

SOFT 8 For Apple II

Legend Industries' new SOFT 8 for the Apple II computer ends the restriction of the Apple to eight slots.

SOFT 8 provides an extra slot on the Apple motherboard. The SOFT 8 card plugs into slot 7 and provides slots 7 and 8. Switching between the slots is software driven (unlike its sister SLOT 8, which is hardware driven) and allows you to switch between one card and another with simple software commands. With SOFT 8 you can PR#8, IN#8 and catalog slot 8 like you would any other slot in the Apple II. You can now put nine cards in your Apple and have them all software accessible.

The disk supplied with the SOFT 8 allows you to modify standard Apple DOS so that it will recognize the added slot.

An example of SOFT 8's use would be to access between a Z-80 card and a 6809 card. However, there are other possibilities.

For more information and

THE MOST POWERFUL PROGRAMMING AID AVAILABLE FOR ATARI BASIC
Wish your ATARI BASIC had some of the features of the big computers? NOW YOU'VE GOT IT!!
Introducing
BASIC COMMANDER

BASIC COMMANDER is an all machine language program that is co-resident with both the ATARI BASIC cartridge and your program, occupying only 4K of RAM. Perform all of the following additional functions at machine language speeds!

RENUMBER - All line numbers and references. Extensive error trapping. Renumber a 500 line program in less than 3 seconds.

BLOCK DELETE - Imagine! Delete from 1 to 32,000 lines of code in 1 second, and not have your computer lock-up!

AUTONUMBER - Automatically generates line numbers and places the cursor in typing position. Speeds program entry 30 to 50%.

PROGRAMMABLE KEYS - 3 keys you can program so that with a single keystroke you can enter any line you can legally type in ATARI BASIC!! Use up to 108 characters.

BASIC COMMANDS - Single keys allow LOADing, RUNning, ENTERing, LISTing, and much more!

DOS FUNCTIONS - Single key access to DO functions, directly from your BASIC program. There is no reason to go to DOS!

VARIABLES - A single key produces a list of all variable names used in your program, and the total number of variables used.

$34.95 from your local computer store or

Send a check or money order to:
MMG MICRO SOFTWARE
P.O. BOX 131 • MARLBORO, NJ 07746
or call (201) 431-3472
for MasterCard, Visa or COD deliveries

Dealers and Distributors Contact:
CLASSIC SOFTWARE, INC.
RD1 - 3D • HIGHWAY 34 • MATAWAN, NJ 07747
(201) 566-5007
ATARI is a registered trademark of ATARI, INC. N.J. Residents add 5% sales tax

Software for your ATARI™

1. Decision Maker
2. Stack Attack! game
3. Three Base Calculator
4. Audible Disassembler
5. Automobile Analyzer
6. Checkbook Balancer

All six programs on one disk for only $29.95

Programs written in ATARI BASIC™

Color Computer Concepts
1275 Terry Drive
Idaho Falls, ID 83401
(208)529-9738

DYNABYTE SOFTWARE™
By TSASA, INC.
IS
EXPLODING!!
WITH
BUSINESS AND
HOME SOFTWARE
For The

- COMMODORE 64
- VIC 20
- TRS-80 CC
- ATARI 400/800

Over 65 Cassettes Avail.
$8.95-$29.95

FREE CATALOG

DYNABYTE SOFTWARE
2 Chipley Run
West Berlin, N.J. 08091

www.commodore.ca

ATARI* SOFTWARE & HARDWARE

EVERY ITEM at DISCOUNT PRICES from

COMPUTER HOUSE

		LIST RETAIL	OUR PRICE
ATARI	800 COMPUTER, 16k	899.00	639.00
ATARI	810 DISK DRIVE	599.00	439.00
ATARI	CENTIPEDE, CARTRIDGE (C)	44.95	35.95
ATARI	TECHNICAL REFERENCE NOTES	29.95	25.45
BRODERBUND	CHOPLIFTER, 48k (D)	34.95	27.95
BRODERBUND	APPLE PANIC (D/T)	29.95	23.95
DATASOFT	CANYON CLIMBER, 16k (T/D)	29.95	23.95
DATASOFT	CLOWNS&BALLOONS,16k (T/D)	29.95	23.95
JV SOFTWARE	ACTION QUEST, 16k (T/D)	29.95	23.95
JV SOFTWARE	GHOST ENCOUNTER, 16k (T/D)	29.95	23.95
K-BYTE	K-RAZY KRITTERS (C)	49.95	39.95
K-BYTE	K-RAZY ANTIKS (C)	49.95	39.95
LIGHTNING	MASTER TYPE, 48k (D)	39.95	31.95
ON-LINE	FROGGER, 16k (D/T)	34.95	27.95
ROKLAN	GORF, 16k (D)	39.95	31.95
ROKLAN	GORF (C)	49.95	39.95
ROKLAN	WIZARD OF WOR, 16k (D)	39.95	31.95
VALPAR INT'L.	VALFORTH (6 DISKS)	240.00	162.40

(C) ROM CARTRIDGE (D) DISKETTE (T) CASSETTE TAPE

WRITE FOR A FREE CATALOG (1500 ATARI ITEMS) TO:

COMPUTER HOUSE

P.O. Box 369, Dept. 10, Mammoth Lakes, CA 93546

(714) 934-6538

Term: FOR FAST DELIVERY, send certified checks, money orders or Visa or MasterCard number and expiration date. Personal checks required 3 weeks to clear. ADD $2.00 for postage. Orders over $100 00 we pay shipping. All foreign orders add $10.00/20.00, CALIFORNIA residents add 6 % tax. Prices subject to change.

*ATARI is the trademark of Atari, Inc.

ATARI * 400 MEMORY 48K+4

- 52 K BYTES 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 ILLUSRATED "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 PERSONNEL CHECKS.
* ATARI 400 IS A TRADEMARK OF ATARI, INC.

ATARI®

We Have The LOWEST PRICE on 800 (48K) — CALL!

★ 800 COMPUTER (48K) . LOWEST ★

★ PERCOM D/D DISK DRIVE ..... $588.00 ★

810 DISK DRIVE	$428.00	32K RAM (Mosaic)	$104.95
410 RECORDER	$74.00	32K RAM (Intec)	$74.95
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	$24.95
BOOKKEEPER KIT	$179.95	WICO TRACKBALL	$54.95

SUPER DISCOUNT SOFTWARE

ADVENTURE INTERNATIONAL		**INFOCOM**	
Rear Guard (D)	$17.95	Zork I (D)	$28.95
Adventures (per set) (D)	$28.95	Zork II (D)	$28.95
Adventures 1-12 Each (C)	$17.95	Deadline (D)	$35.95
Preppie (C/D)	$20.95	**JV SOFTWARE**	
War (D)	$18.95	Action Quest (C/D)	$20.95
Commbat (D)	$18.95	Ghost Encounters (C/D)	$20.95
APX		**K-BYTE**	
Eastern Front 1941 (C/D)	$22.95	K-Razy Shootout (R)	$34.95
Fam. Cash Flow (D)	$16.95	K-Star Patrol (R)	$34.95
747 Landing Sim. (C/D)	$16.95	K-Razy Kritters (R)	$34.95
ATARI INCORPORATED		K-Razy Antics (R)	$34.95
Microsoft Basic (D)	$65.95	K-Dos (D)	$64.95
Macro Assem. & Editor (D)	$65.95	**ON-LINE**	
Assembler Editor (R)	$44.95	HI RES Wiz & Princess (D)	$23.95
Basic Cartridge (R)	$44.95	Crossfire (C/D)	$20.95
Pac Man (R)	$32.95	Frogger (C/D)	$24.95
Centipede (R)	$32.95	Threshold (D)	$28.95
Caverns of Mars (D)	$28.95	Ultima I (D)	$28.95
Missile Command (R)	$26.95	Ultima II (D)	$43.95
Star Raiders (R)	$32.95	The Next Step (D)	$28.95
Asteroids (R)	$26.95	**OPTIMIZED SYSTEMS**	
Conversational Lang.Ea.(C)	$43.95	Basic A + (D)	$58.95
Music Composer (R)	$30.95	OS/A + (D)	$58.95
Super Breakout (R)	$26.95	Speed Read Plus (D)	$42.95
Computer Chess (R)	$26.95	**ROKLAN**	
My First Alphabet (D)	$25.50	Deluxe Invaders (D)	$24.95
Programming 2 & 3 (ea.) (C)	$21.00	Deluxe Invaders (R)	$28.95
Word Processor (D)	$107.00	Gorf (D)	$29.95
Pilot (Educ)	$98.00	Gort (R)	$32.95
Touch Typing (C)	$19.00	Wizard of Wor (D)	$29.95
Home File Manager (D)	$36.95	Wizard of Wor (R)	$32.95
AUTOMATED SIMULATIONS		**SIRIUS**	
Invasion Orion (C/D)	$17.95	Space Eggs (D)	$20.95
Rescue at Rigel (C/D)	$20.95	Sneakers (D)	$20.95
Temple of Apshai (C/D)	$28.95	Way Out (D)	$28.95
Star Warrior (C/D)	$28.95	**STRATEGIC SIMULATIONS**	
Datestones of Ryn (C/D)	$14.95	The Shattered Alliance (D)	$28.95
Dragon's Eye (D)	$20.95	Tigers In The Snow (C/D)	$28.95
AVALON HILL		Battle of Shiloh (C/D)	$28.95
Empire of Overmind (D)	$24.95	**SYNAPSE SOFTWARE**	
Voyager (D)	$17.95	File Manager 800 + (D)	$72.95
B-1 Nuclear Bomber (C)	$12.50	Protector (C/D)	$24.95
Lords of Karma (C)	$14.95	Shamus (C/D)	$24.95
Tanktics (D)	$20.95	Nautilus (C/D)	$24.95
BRODERBUND SOFTWARE		**MISCELLANEOUS SOFTWARE**	
Apple Panic (C/D)	$20.95	Ali Baba & 40 Thieves (D)	$23.95
Star Blazer	$22.95	Crypts of Terror (D)	$24.95
Choplifter (D)	$25.95	Dr. Goodcodes Cavern (D)	$20.95
Davids Midnight Magic (D)	$24.95	Master Type (D)	$28.95
HI RES Deadly Secrets (D)	$24.95	Pool 1.5 (D)	$24.95
Steller Shuttle (C/D)	$20.95	Raster Blaster (D)	$20.95
DATA SOFT		Sam (D)	$42.95
Text Wizard II (D)	$72.95	Sammy the Sea Serpent (C)	$12.95
Canyon Climber (D)	$20.95	Warlocks Revenge (D)	$24.95
Pacific Coast Hwy (D)	$20.95	Visicalc (D)	$176.95
Clowns & Balloons (D)	$20.95	3-D Supergraphics (C/D)	$28.95
EDU-WARE			
Compu-Read (D)	$20.95		
Compu-Math Frac. (D)	$28.95		
Compu-Math Dec. (D)	$28.95		
Compu-Read (C)	$14.95		

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

COMMODORE

VIC-20	$182.95
1530 RECORDER	$63.95
1525 DISK DRIVE	$314.95
1540 DISK DRIVE	$314.95
VIC 16K RAM	$87.95

— MUCH SOFTWARE —

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

COSMIC COMPUTERS UNLIMITED

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

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 6½% 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.

(714) 861-1265

ATARI IS A TRADEMARK OF ATARI, INC

www.commodore.ca

pricing contact:

Legend Industries, Ltd.
2220 Scott Lake Rd.
Pontiac, MI 48054
(313)674-0953
or (313)674-1340 on modem

ComputerTown Test Site: A Call For Proposals

ComputerTown, USA!, a microcomputer literacy project funded by the National Science Foundation, is accepting proposals from individuals and organizations interested in becoming an official test site for the project's Implementation Package.

Proposals will be accepted until December 1, 1982. The new site will be announced January 15, 1983.

Project coordinators are looking for a test site within the United States, east of the Mississippi River. The chosen site will assist the project in testing and evaluating the prototype ComputerTown Implementation Package, which provides resource information and materials for starting a community-based microcomputer literacy project.

ComputerTown representatives will make site visits and assist test site personnel with planning and organizing its activities. There are no provisions for the direct funding of the test site's activities, since that is one of the parameters being tested – how local resources can be used to create a community computer literacy project.

Everyone who submits a proposal will receive a draft copy of the Implementation Package, regardless of which location is chosen as the official test site.

ComputerTown offers teaching, consulting, and information services to a network of over 80 affiliates throughout the United States and overseas. These affiliates exist in public libraries, boys' clubs, children's museums, senior citizens' centers, and other community facilities. The selection of a test site in no way precludes regular support and information services provided by ComputerTown to anyone interested in computer literacy.

For proposal guidelines or further information about ComputerTown services and activities, contact:

ComputerTown
P.O. Box E
Menlo Park, CA 94025

Job Costing And General Accounting Program

The Management Accountability Group has just released *The Contractor*, a job costing system and a general accounting program. It is fully integrated and interactive, requiring only one data disk and one program disk. The program will handle up to 200 jobs at one time as well as handling general ledger, accounts receivable, payroll, and inventory transactions. The system is designed to run on Commodore Business Machines' 8032 CPU and 8050 disk drive.

The Management Accountability Group, Inc.
493 East Clayton Street
P.O. Box 346
Athens, GA 30603
(404)353-8090

Six New Products For The Atari

MMG Micro Software has introduced six new programs for the Atari:

Asteroid Miner, a 32K BASIC game tutorial that uses over 25 players, player-missile graphics, machine language subroutines, a redefined character set, multiprocessing with the vertical blank interrupt interval, and more. The program comes with a book that explains each part and a fully documented source code for both the BASIC and assembly language parts of the program. $34.95.

Chomper, an arcade game

VIC-20 OWNERS

The Ultimate Expansion Board Has Arrived!

- 5 slot—switch selectable (not an inconvenient DIP switch) allows control between computer mode and game mode
- Fully buffered
- Fuse protection
- Reset button
- 90 day guarantee
- Auxiliary power supply jack
- Write protection on one slot
- Superior quality and convenience

ORDER YOUR DATASPAN-20 TODAY!

Kit $49.95 **Assembled $79.95**

Plus $3.00 for shipping & handling

Digital Interface Systems Co.
P.O. Box 8715
Portland, Oregon 97207
(503) 295-5890

Dealer Inquiries Invited
VIC-20 is a trademark of Commodore Business Machines.

VIC 20 serious software

FLASHCARD II
Math drill - always different

VIC BOSS 1.3
Machine language programmer aid - load, run m.l. programs and dump memory in formatted display

UNICALC
Turns your VIC into a scientific calculator

FINANCE MASTER
Get a grip on financial calculations

$7.95 each

We carry Commodore and other manufacturer's products. Please write for free list.

Programs in this ad are for standard 5k VIC, cassette. Please add .75/program for shipping; MN residents add 5% sales tax.

ALLEGIANCE ENTERPRISES

868 96th ave NE
Blaine, MN 55434

www.commodore.ca

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

We carry close to $5,000,000 inventory at all times. Corp. accts. invited.
Good subject to availability; this ad supercedes all previous ads; fob our warehouse; prices subject to change without notice; not responsible for typographical errors; all orders subject to verification; minimum shpg & hndlg $5.95. Send $2 (or $5 foreign) for our famous catalog.

HEWLETT PACKARD LCD

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

HP-10C

Up to 79 lines of program storage RE:$80.00 $80.00 Your Cost: **$69.95**

TP-I TEXT PRINTER

(Specify serial or parallel)

RE:$995.00 Daisy wheel printer **$669.95**

Smith-Corona

BMC 12" Green Monitor

Model BM-12A **$99.95**

Texas Instruments TI-5010 Handheld Calculator

Plain paper printer **$39.95**

PRICE BREAK-THROUGH! Cordless Telephone

KP-6100 **$99.95**

KEYPHONE™
Range of 700 feet
Trimline styling
Last number redial
Instant on/off
Automatic security lock
Built-in charger

Model 6100D with automatic dialing 10 memories Y/C:$119.95

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

olivetti "PRAXIS 35"

Your Cost $429.95

ELECTRONIC TYPEWRITER
Interchangeable 'Daisy Wheel' type element, 3 sizes-Pica, Elite & Micro plus cartridge ribbon & more!
Retail: $750.00

LEX-21 Portable Terminal $995

8½" X 11" X 2¾"
LEXICON

ATARI® COMPUTERS

ATARI 800-16K	647.95
ATARI 800-48K (Axlon 32K chip)	779.95
Atari 810 Disk Drive	459.95
Atari Interface Module	177.95
Atari Educator Kit	117.95

ATARI 400-16K **$199.95***

* You pay OSC $259.95 & receive a coupon worth up to $60 in rebates from Atari on the purchase of add'l software or accessories for the Atari 400.

OKIDATA PRINTERS

82A	Bi-directional	444.95
83A	Bi-dir;serial/parallel	694.95
84	Parallel, 200 CPS	1144.95
84	Serial, 200 CPS	1274.95

EXTEND-A-PHONE

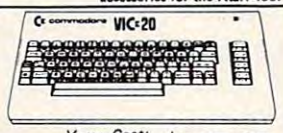
EX-4000 Cordless Speaker Phone
Re:$229.95 Y/C:$163.95

SHARP HAND-HELD COMPUTERS

PC 1500	Pocket Computer	213.95
CE 150	Color graphic printer w/cass. interface	173.95
4K	Expansion module	53.95
8K	Expansion module	103.95

commodore VIC-20

FREE RF Modulator with purchase of VIC-20
Works with any TV!
5K Personal Computer (Expands to 32K)
We are authorized FULL-LINE Commodore dealers.



Your Cost: Retail:$300.00 **$197.95**

Model 1540 Single 5¼" Drive	334.95
Model 1515 Graphics Printer	329.95
Model 1530 Datasette Recorder	59.95

SANYO MONITORS

High resolution, number one seller!

		Retail	Your Cost
VM4509	9" B & W	190.00	159.95
VM4215	15" B & W (below our cost)	349.00	189.95
DM5109	9" Green	200.00	169.95
DM8012	12" B & W	250.00	199.95
DM8112	12" Green	260.00	209.95
DMC6013	13" Color, hi quality	470.00	399.95
DMC6113	13" Color RGB hi res	995.00	799.95
DM2012	(NEW) 12" B & W	179.00	139.95
DM2112	(NEW) 12" Green	199.00	159.95

Texas Instruments Home Computer

TI-99/4A Now Only 16K

$199.95 AFTER MFG'S REBATE—you pay OSC $299.95, TI rebates you $100.

Plus FREE $50 RF Modulator with purchase of TI-99/4A

Call & ask about FREE Speech Synthisizer OFFER!

10" color monitor high res	339.95
32K memory module	314.95
Extended Basic	75.00
Speech synthesizer	129.95
Disk memory drive	394.95
Telephone coupler (modem)	189.95
Printer (solid state)	319.95
TI-LOGO	99.95

TI EXPANSION BOX SYSTEM

PHP 1200 Expansion Box	209.95
PHP 1220 RS232	136.00
PHP 1240 Disk Controller	194.00
PHP 1250 Disk Drive	299.00
PHP 1260 32K Mem. expansion	234.00
PHP 1270 Pascal Card	194.00

Programmable TI-59
Your Cost:$169.95 plus—
$20.00 rebate from TI plus Free Library
TI LCD Programmer 59.95
WE ARE AUTHORIZED FULL LINE TI DEALERS

APPLE COMPUTER

48K Plus	1069.95
Disk dr w/controller	494.95
Disk dr - no controller	419.95
Apple 2 System package	1695.00

the PROGRAM CENTER

CENTIPEDE

From Atari

If you're fast and nimble fingered, you'll like CENTIPEDE. The green centipede is streaking across the screen, moving from the top to the bottom trying to attack you. You can shoot it, if you are fast and can gain extra points by killing the spiders and mushrooms. Requires joystick.

ROM Cartridge, ~~$42.95~~ Just $32.95

CANYON CLIMBER

From DataSoft by Tim Ferris

You're at the bottom of a canyon, trying to climb to the top. Along the way goats try to knock you down, Indians shoot at you, and birds attack you. An action-packed and extremely challenging arcade game.

16K Tape or Disk, ~~$29.95~~ Just $22.95

PILOT (Home Package)

From Atari

Pilot was designed for teachers to create interactive educational programs. PILOT's simple syntax and text orientation make it an ideal language for introducing computer programming to children and adults. It also features a powerful set of simple graphics commands ("turtle" graphics) for drawing color designs and pictures on the television screen, musical sound generation for up to four simultaneous voices, and commands for accessing files on diskette and cassette.

ROM Cartridge, ~~$79.95~~ Just $70.95

ATARI SPECIALS

Alien Swarm	D, T	26.95
Chop Lifter	D	26.95
Andromeda	D, T	26.95
Frogger	D, T	26.95
Eastern Front	D, T	23.95
Space Eggs	D	23.95
Sneakers	D	23.95
Bandits	D	27.95
Shamus	D, T	26.95
Apocalypse	D, T	26.95
O'Riley's Mine	D, T	26.95
Speedway Blast	C	30.95
Track Attack	D	23.95
Jawbreaker	D, T	23.95
Apple Panic	D, T	22.45
David's Midnight Magic	D	26.00
Asteroids	C	27.95
Caverns of Mars	D	31.95
Clowns & Balloons	D, T	22.45
Pac Man	C	35.95
Deadline	D	38.95
Missile Command	C	28.95
Raster Blaster	D	23.95
Rear Guard	D, T	17.95
Shattered Alliance	D	31.95
Pacific Coast Highway	D, T	27.95
Space Invader	C	27.95
Shooting Arcade	D, T	23.95
Zork I	D	31.95
Zork II	D	31.95
Ghost Encounters	D, T	23.95
Threshold	D	31.95
Tankdics	D	23.95
Preppie	D, T	23.95
My First Alphabet	D	27.95
Word Processor	D	125.95
Micro Painter	D	26.95
Microsoft Basic	D	74.95
Graphic Master	D	31.95
Visicalc	D	195.00

D - Disk T - Cassette C - Cartridge

OVER 1,000 PROGRAMS FOR ATARI, APPLE, IBM & TRS-80

To Order Call Toll-Free
1-800-334-5562
We take MASTERCARD or VISA
Please add $1.50 for postage and handling.

the PROGRAM CENTER
3400A W. Wendover Ave.
Greensboro, NC 27407
(919) 855-8667

www.commodore.ca

with intelligent monsters, requires 16K and is available on cassette or disk. $29.95.

Disk Commander is a BASIC program that reads the file on your disks automatically when you boot up and allows you to run any program just by typing a number. Since it eliminates the need to type in RUN "D: GAMENAME .001", this program can be especially useful with children and people unfamiliar with DOS. $24.95.

RAM Test is an all machine language memory test. It is capable of testing 48K in four minutes, and it does test the cartridge area of memory. Also, it makes repair easier by pinpointing bad memory locations. $24.95.

BASIC Commander is an all machine language program which occupies 4K of RAM and is co-resident with your BASIC program. The program allows single keys to access DOS functions, BASIC file manipulation commands, and more. Also, the program allows you to renumber all BASIC lines and all references automatically and to delete any range of lines. Extensive error trapping is included. Available on disk only. $34.95.

Mail List, a BASIC and machine language program, has six fields for data entry and permits sorting of those fields at machine language speed. Each data disk holds up to 700 files. The program may be easily modified. $39.95.

MMG Micro Software
P.O. Box 131
Marlboro, NJ 07746
(201)583-4362

Computer Learning Center

Queue, Inc., of Fairfield, Connecticut, opened (September) its first Computer Learning Center at 161 Kings Highway, Fairfield, Connecticut.

The Learning Center offers computer-assisted tutoring in a variety of academic subjects, including mathematics, English, reading, spelling, vocabulary, grammar, social studies, science, biology, chemistry, physics, astronomy, psychology, sociology, history, government, philosophy, French, German, Spanish, Russian, and Italian, for students from kindergarten through college and adult. The computers used are Apple II and III, VIC-20, and TRS-80 Model III; PET and Atari are to be added soon.

The Learning Center also offers specialized courses in SAT and GRE preparation, computer literacy, computer programming, speed reading, typing, word processing, and computer applications in business.

The Queue Computer Learning Center offers teachers free orientation courses on microcomputers in education, a large selection of free literature, and an opportunity to review an order from a large library of educational software.

For computer owners, the Learning Center will have a large selection of game, educational, and business software for review and purchase.

Queue is planning to open additional learning centers and is seeking people, particularly teachers, interested in owning or operating a Computer Learning Center.

For more information, call or write:

Queue Computer Learning Center
161 Kings Highway
Fairfield, CT 06430
(203)335-0908

* * * * * * *

Queue has also announced two new, free catalogs of educational software for Apple, PET, TRS-80, and Atari computers. The catalogs are K-9 and high school/college. Each contains several hundred programs from a wide variety of publishers.

Write for a free copy, specifying computer and grade level.

Queue, Inc.
5 Chapel Hill Drive
Fairfield, CT 06432
(203)335-0908

VIC Software From Western New England

Western New England Software Associates has released three new programs. *Bug Off!* is an arcade-style game that challenges the player to destroy advancing bugs with the bug blaster. It offers high speed action, bonus scoring, music, and high score competition. Price is $8.95.

Concentration is the classic game of memory retention. Two players are pitted against each other in a battle to see who can remember more. It features sound and a colorful playing board. Price is $7.95.

Code Cracker is another challenge to the mind. The player must deduce the secret three- to six-digit number in 20 turns or less. The computer evaluates the player's guess by displaying a series of dots that tell the player how close he was to the actual number. Price is $7.95.

ATARI Computers & Accessories

Please call or write for prices

Atari GTIA Chip $24.95
HAYES SmartModem - $239.00
Signalman Modem for Atari - $97.95
32K Ram Card for Atari 400/800 - $94.95
48K Ram Card for Atari 400 - $204.95
EMS 5-¼" Diskettes SS/DS - $25.00/10
EMS 5-¼" Diskettes DS/DS - $32.00/10
Epson MX70/80 Cartridges - $8.95 ea
Black/Blue/Brown/Green/Red - $40.00/5

Telephone Order 1-516-293-5698
Computer Bulletin Board 1-516-293-5519

Mail Order
DBM Enterprises
315 N. Utica Ave.
N. Massapequa, NY 11758

Add $2.50 shipping per order
Add $7.50 shipping per computer system
NYS Residents add sales tax
Master Card/VISA/Checks/Money Orders Accepted

www.commodore.ca

MTG TECHNICAL SALES

ATARI® Special of the Month

800 48k

Now $739. *SAVE $20.*

ATARI 400

$269.

NEW PERCOM Disk Drive for ATARI **IN STOCK**

ATARI 800 16k	$639	AXLON RAM DISK	$395
w 48k	739	VISICALC	189
ATARI 400 16k	269	DATASOFT TEXT WIZARD	88
810 DISK DRIVE	435	FILEMANAGER 800	88
410 PROGRAM RECORDER	79	APX PASCAL	42
850 INTERFACE	179	VOTRAX TYPE 'N TALK	325
820 IMPACT PRINTER	264	JAWBREAKER (disk or tape) 16k	24
222 THERMAL PRINTER	264	ZORK I/II	36
825 80 COL PRINTER	629	DEADLINE (DISK)	44
830 MODEM	148	CENTIPEDE (CART)	35
32k RAM BOARD	89	PAC-MAN (CART)	35
MICROSOFT BASIC	69	CAVERNS OF MARS (DISK)	32
ASSEMBLER/EDITOR	47	STAR RAIDERS (CART)	42

PRINTERS

C. ITOH 8510 PROWRITER	$485
C. ITOH F-10	CALL
EPSON MX-80	CALL
OKIDATA 82A	485

CALL FOR OTHER PRINTERS

CALL TOLL FREE
1-800-343-0854
In MA (617) 969-1790

BMC
COLOR
13" MONITOR **295.**

MAXELL DISKETTES
Box of 10 $29.

commodore VIC-20

OUR LOW PRICE $189

DATASETTE	67
1540 DISK	525
EXPANSION MODULE	145
1515 PRINTER	345
8K MEMORY	52
SUPER EXPANDER	59
PROGRAMMER'S AID	52
VIC AVENGER	25
INTRO TO BASIC	21

CALL FOR VIC-20 SOFTWARE DISCOUNT PRICES

MTG 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 2 weeks to clear. Add 4% for MasterCard and VISA. 20% deposit required for COD. UPS charges added. We cannot ship to P.O. Box. All prices subject to change without notice. Delivery subject to availability. In-store prices may vary. Not responsible for typographical errors.

IN STOCK ITEMS SHIPPED WITHIN 48 HOURS

WE CARRY A COMPLETE LINE OF MICROCOMPUTER AND VIDEO EQUIPMENT AND ACCESSORIES — CALL FOR PRICES

DISCOUNT COMPUTER SOFTWARE ACCESSORIES

APPLE

apple®

	Retail	Discount
Eliminator	$29.95	21.00
War	24.95	18.00
Adventureland	29.95	21.00
Pirates Adventure	29.95	21.00
Golden Voyage	29.95	21.00
Magic Window	99.95	72.00
Temple of Apshai	39.95	29.00
Upper Reaches of Apshai	19.95	15.00
Curse of Ra	19.95	15.00
Midway Campaign	16.00	12.00
Hi-Res Computer Golf	29.95	21.00
DOS Boss	24.00	18.00
The Arcade Machine	44.95	33.00
Star Blazer	31.95	23.00
Choplifter	34.95	25.00
Serpentine	34.95	25.00
Deadly Secrets	34.95	25.00
Raster Blaster	29.95	21.00
Bug Attack	29.95	21.00
The Home Accountant	74.95	54.00
Snack Attack	29.95	21.00
Pig Pen	29.95	21.00
Wordrace	24.95	18.00
Rendevous	39.95	29.00
Russki Duck	34.95	25.00
Horizon V	34.95	25.00
Sargon II	34.95	25.00
Zork I	39.95	29.00
Zork II	39.95	29.00
Deadline	49.95	36.00
Mastertype	39.95	29.00
Castle Wolfenstein	29.95	21.00
Supertext II	150.00	108.00
Softcard Premium System	775.00	600.00
Wizard and the Princess	32.95	24.00
Time Zone	99.95	72.00
Cranston Manor	34.95	25.00
Threshold	39.95	29.00
Softporn Adventure	29.95	21.00
Crossfire	29.95	21.00
Frogger	34.95	25.00
Laff Pak	34.95	25.00
Ultima II	59.95	44.00
Screenwriter II	129.95	94.00
Graphics Magician	59.95	44.00
Pie Man	29.95	21.00
Fastgammon	24.95	18.00
Congo	34.95	25.00
Goldrush	34.95	25.00
Gorgon	39.95	29.00
Beer Run	29.95	21.00
Snake Byte	29.95	21.00
Joyport	74.95	54.00
Bandits	34.95	25.00

T=Cassette
D=Disk
C=Cartridge

ATARI

	Retail	Discount
Threshold (d)	$39.95	29.00
Snake Byte (d)	29.95	21.00
Space Eggs (d)	29.95	21.00
Bandits (d)	34.95	29.00
Color Print (d)	39.95	29.00
Canyon Climber (d)	29.95	21.00
Shooting Arcade (d) (t)	29.95	21.00
Pacific Coast Highway (d) (t)	29.95	21.00
Clowns And Balloons (d) (t)	29.95	21.00
Wordrace (d)	24.95	18.00
Andromeda (d)	34.95	25.00
Deadline (d)	49.95	36.00
Zork I (d)	39.95	29.00
Zork II (d)	39.95	29.00
Alien Swarm (d)	34.95	25.00
Action Quest (d) (t)	29.95	21.00
Ghost Encounters (d) (t)	29.95	21.00
K-Razy Shootout (c)	49.95	36.00
K-Razy Kritters (c)	49.95	36.00
Ultima I (d)	39.95	29.00
Ali Baba and Forty Thieves (d)	32.95	24.00
Deluxe Invaders (c)	39.95	29.00
Gorf (c)	49.95	36.00
Wizard of Wor (c)	49.95	36.00
Preppie (d) (t)	29.95	21.00

ATARI®

	Retail	Discount
Rear Guard (d)	24.95	18.00
Rear Guard (t)	19.95	15.00
Caverns of Mars (d)	39.95	29.00
Atari Basic (c)	59.95	45.00
Star Raiders (c)	44.95	33.00
Centipede (c)	44.95	33.00
Pac Man (c)	44.95	33.00
Pilot (c)	79.95	60.00
Temple of Apshai (d) (t)	39.95	29.00
Upper Reaches of Apshai (t)	19.95	15.00
Curse of Ra (d)	19.95	15.00
Midway Campaign (t)	16.00	12.00
Apple Panic (d)	29.95	21.00
Track Attack (d)	29.95	21.00
Choplifter (d)	34.95	25.00
Star Blazer (d)	31.95	24.00
Wizard and the Princess (d)	32.95	24.00
Jawbreaker (d) (t)	29.95	21.00
Crossfire (d) (t)	29.95	21.00
Frogger (d) (t)	34.95	25.00
The Shattered Alliance (d)	39.95	29.00
Battle of Shiloh (d)	39.95	29.00
Tigers in The Snow (d) (t)	39.95	29.00
Ghostly Manor (d)	24.95	18.00
Raster Blaster (d)	29.95	21.00

SPECIAL OFFERS

Intec 32K Board (Atari) $75.00
ATARI JOYSTICK $8.00
TG JOYSTICK $44.00
VERBATIM/DATALIFE DISKS $26.00

MANY MORE PROGRAMS AVAILABLE — **VISA AND MASTERCARD ACCEPTED**

TERMS: Send check or money order for total purchase price, plus $2.00 for shipping. MI residents add 4% tax. C.O.D. accepted.

® MFGS. TRADEMARK

STRÖM SYSTEMS INC.
P.O. Box 197
Plymouth, Mi. 48170
(313) 455-8022

WRITE OR CALL FOR FREE CATALOG
PHONE ORDER HOURS
4PM - 7PM MON. - FRI.
INCLUDE CARD NUMBER AND EXPIRATION DATE WITH CREDIT CARD ORDERS.
INCLUDE TYPE OF COMPUTER.

www.commodore.ca

All programs are completely documented and run on a VIC-20 with 5K of memory and a tape recorder.

Western New England Software Associates
P.O. Box 31
Wilbraham, MA 01095

Atari Bank Select Memory

Mosaic Electronics, Inc., has announced its new memory board, the Mosaic 64K RAM Select for Atari 400.

The board consists of 48K RAM with four banks of 4K RAM addressed above the 48K limit. This insures that the 48K recognized by the OS is continuous, that 52K RAM is always available, and that a ROM cartridge does not affect the availability of the bank select RAM. The 4K RAM banks allow for a larger hard-wired RAM size, and all Atari software and peripherals are compatible.

Suggested retail price is $249.95.

Customer Service
Mosaic Electronics
P.O. Box 708
Oregon City, OR 97045
(800)547-2708

Retirement Financing Plan For The Atari

Advanced Financial Planning has just released for sale a software program for the Atari 400/800 computers entitled *Retirement Planning*. A unique financial planning program, it allows users to establish a retirement financing plan which takes into account their personal situation relative to inflation, investment returns, retirement income needs, etc. To do this, the program performs the following functions:

1. Calculates a rate of inflation that is unique to each user's budget.
2. Calculates a retirement fund that enables the retiree to keep his income constant in real terms.
3. Calculates the portion of the retirement fund that will be provided by current assets.
4. Calculates the yearly savings needed in order to accumulate the necessary retirement fund.

The program then analyzes the plan to determine if changes must be made and offers suggestions as to what these changes should be.

The program is priced at $29.95 and requires 32K memory, disk drive and the Atari BASIC cartridge.

Advanced Financial Planning
20922 Paseo Olma
El Toro, CA 92630

COMSTAR'S WRITTEN GUARANTEE
AIR*SHIPPING WITHIN 48 HOURS
*CONT. U.S.A. *EXCEPT SOME HARDWARE

ATARI

32K RAM..... $ 85
48K RAM..... 125
NEWPORT PROSTICK....$ 31
VOICE BOX..... 139

	LIST	NOW
STAR CONCENTRATION (T)16K	$ 14.95	$ 10
PREPPIE (D,T)16K	29.95	23
CENTIPEDE (C)	49.95	34
TRACK ATTACK(D)48K	29.95	23
CANYON CLIMBER (D,T)16K	29.95	23
CLOWNS & BALLOONS (D,T)	29.95	23
FROGGER (D,T)16K	34.95	26
BATTLE OF SHILOH (D,T)48K	39.95	29
TIGERS IN THE SNOW(D,T)48K	39.95	29
NAUTILUS (D,T)32K	34.95	26
SLIME (D,T)16K	34.95	26
EASTERN FRONT (D,T)16K	29.95	24
REAR GUARD (T)16K	19.95	17
MICROSOFT BASIC (D)32K	89.95	67
BASIC A+ (D)32K	80.00	62

	LIST	NOW
MACRO ASSEMBLER(D)32K	$ 89.95	$ 67
ASSEMBLER EDITOR (C)	59.95	46
PILOT (C)	79.95	59
LETTER PERFECT (D)24K	149.95	112
TEMPLE OF APSHAI(D,T)32K	39.95	29
INTRUDER (T)16K	29.95	23
ACTION QUEST (D,T)16K	29.95	23
CROSSFIRE (D,T)16K	29.95	23
ALI BABA (D) 32K	32.95	25
RASTER BLASTER (D)32K	29.95	23
CAVERNS OF MARS (D)16K	39.95	29
PAC MAN (C)	44.95	34
PROTECTOR (D,T)32K	34.95	26
CHICKEN (D,T) 16K	34.95	26
VALFORTH (D)16K	45.00	36

HEAR ATARI SOUNDS THROUGH YOUR STEREO SPEAKERS WITH
STEREODAPTER — FOR ATARI 800
• NO ASSEMBLY REQUIRED • CAN USE STEREO HEADPHONES
• SHIELDED CABLE • ADJUST TONE & VOLUME WITH STEREO CONTROLS
STEREODAPTER WITH 16 FT CABLE $8 WITH 26 FT CABLE $10
DEALER INQUIRIES INVITED

(C) = CARTRIDGE (D) = DISK (T) = CASSETTE

apple

	LIST	NOW
DAVID'S MIDNIGHT MAGIC	$ 34.95	$ 26
STAR BLAZER	31.95	25
LABYRINTH	29.95	23
DUELING DIGITS	29.95	23
CHOPLIFTER	34.95	26
ZORK I OR II	39.95	29
WIZARDRY	49.95	38
SWASHBUCKLER	34.95	26
BASIC COMPILER (DATASOFT)	99.95	79
ROACH HOTEL	34.95	26
RENDEZVOUS	39.95	30
PEEPING TOM	34.95	26
HI RES FOOTBALL	39.95	30
CROSS FIRE	29.95	23
THRESHOLD	39.95	30
PEGASUS II	29.95	23
FROGGER	34.95	26
STAR BLASTER	29.95	23
CONGO	34.95	26
GOLDRUSH	34.95	26
TWERPS	29.95	23
CYCLOD	29.95	23
BATTLE OF SHILOH	39.95	30
TIGERS IN THE SNOW	39.95	30
VISICALC 3.3	250.00	199
PINBALL	29.95	23

VIC-20

	LIST	NOW
RS-232 BOARD	$ 49.95	$ 40
3K CARTRIDGE	39.95	33
3K MEMORY EXPANSION	79.95	63
8K RAM/ROM	29.95	26
8K CARTRIDGE	89.95	74
BUTI (one 4K ROM)	34.95	27
BUTI (two 2K ROMS)	34.95	27
KOSMIC KAMIKAZE(T)8K	24.95	20
SUB CHASE (T)13K	24.95	20
OUTWORLD (C)5K	49.95	36
SPIDERS OF MARS(C)5K	49.95	36
METEOR RUN(C)5K	49.95	36
VI TERM A(T)5K	19.95	17
VI CALC (T)5K	14.95	13
VI CAT (T)8K	24.95	20
VI CHECK (T)13K	24.95	20
AMOK (T)5K	24.95	20
AMOK (C)5K	39.95	30
ALIEN BLITZ (T)5K	24.95	20
ALIEN BLITZ (C)5K	39.95	30
SKYMATH (T)8K	14.95	13
SPACE DIVISION (T)8K	14.95	13
SUPER HANGMAN(T)8K	18.95	16
THE ALIEN (T)8K	24.95	20
3D MAZE (T)5K	14.95	13
RENAISSANCE (C)5K	49.95	36

COMSTAR
P.O. BOX 1730
GOLETA, CA 93116
(805) 964-4660

ORDERS ONLY: CALL TOLL FREE 800-558-8803 MON-FRI 11-7
IN CALIF. (805) 964-4660 or send check, money order or credit card number and exp. date. Include $2 shipping for software (call for hardware). Add 3% for Visa or MC (except Calif.). Calif. add 6% tax. There is a $2.50 charge for COD. Please include type of computer.

www.commodore.ca

QUICKSOFT™

THE SOFTWARE HOUSE WITH THE DIFFERENCE: SPEED!

CONGRATULATIONS! You've just taken the First Step in ordering from the Fastest, Lowest Priced Software-House in the Northern Hemisphere!

QUICKSOFT is the Software-House with a difference. **SPEED!!!** When you place an order with **QUICKSOFT**, we Guarantee that it will be shipped from stock within **Twenty-four hours.***

QUICKSOFT HAS THEM ALL, and right now we're having specials on these items from our **"MOST WANTED"** list:

SPACE EGGS	**YOUR CHOICE!**
SHAMUS	**ONLY $20.95 each.**
BUG ATTACK	**30% OFF**
CYCLOD	**LIST**
DISK DETECTIVE	
APPLE MECHANIC	
TRACK ATTACK	
RASTER BLASTER	
CROSS FIRE	

Prices effective through December 31, 1982

FREE DELIVERY: QUICKSOFT offers Free Delivery on **ALL** orders of $50.00 or more. We not only ship within 24 hours but we pay the freight! (For orders of less than $50 add $1.50 for shipping and handling.) Plus **NO SURCHARGE** on **VISA** and **MASTERCARD** orders!

THE NEXT STEP. Pick up the nearest telephone and call us **TOLL FREE** anytime of the day or night. For placing an order or for requesting our **FREE CATALOG** simply dial:

1-800-547-8009
IN OREGON CALL 1-342-1298

Please specify for Apple or Atari computer on your order

*GUARANTEE: **QUICKSOFT** guarantees shipment within 24 hours on each phone order. If the item is not readily available and cannot be shipped on time, you will receive an additional **5% OFF** the regular **QUICKSOFT** price

VISA-MASTERCARD AND C.O.D. WELCOME!

QUICKSOFT™

Department 3, P.O. Box 10854 Eugene, OR 97440

Copyright 1982 Microcomputer Support Group, INC.

www.commodore.ca

****

CLARKSTON SOFTWARE PRESENTS

GAMES FOR THE

APPLE ATARI PET

****

	AP	AT	P
SIRIUS:			
*Cyclod-$26.95	48K	48K	NA
*Space egg-$26.95	48K	48K	NA
*Epoch-$31.95	48K	NA	NA
*Fly wars-$26.95	48K	NA	NA
*Sneakers-$26.95	48K	NA	NA
*Bandits-$31.95	48K	48K	NA
*Wayout-$36.95	48K	**	NA
*Beer run-$25.95	48K	NA	NA
*Twerps-$26.95	48K	NA	NA
*Gorgon-$36.95	48K	NA	NA
CLARKSTON SOFTWARE:			
Rooster race-$19.95	NA	NA	8K
Sub hunt-$19.95	NA	32K	NA
Destroyer-OUT IN DECEMBER			
ON LINE SOFTWARE: (cass. only)			
Millipede-$13.95	NA	NA	16K
Wallbanger-$13.95	NA	NA	16K
MAGIC CARPET: (cass. only)			
Vortex-$17.95	NA	NA	16K
Phantom f.-$17.95	NA	NA	16K
Graphic duo-$14.95	NA	NA	16K
ON LINE SYSTEMS:			
*Mystery h.-$19.95	48K	NA	NA
*Wizard p.-$27.95	48K	40K	NA
*Cran. man.-$27.95	48K	NA	NA
*Gold. fle.-$27.95	48K	40K	NA
*Soft Porn-$24.95	48K	40K	NA
*Frogger-$29.95	48K	40K	NA
*Threshold-$35.95	48K	40K	NA
ADVENTURE INT.			
*Prepie-$28.95	NA	32K	NA
Cass ver.-$21.95	NA	16K	NA

* = DISK ** = Not ready
All Pet games run on 40.col old or new roms
Apple games specify Apple II or Apple II +
All others disk or tape

We accept VISA, Cashier or personal check or money order
Add $2.00 for all orders
All orders sent UPS

Clarkston Software
10001 ELLIS RD
CLARKSTON MICH 48016
Ph. (313)585-0227

For visa phone orders please call between 9:00-4:30 mon-fri

A 40/80 Character Expansion For The VIC-20

An often discussed disadvantage of the VIC-20 was the number of columns of the screen. The length of a screenline was just 22 characters. This could not prevent the VIC computer from being a success in the hobby world, but it made (semi)professional applications impossible.

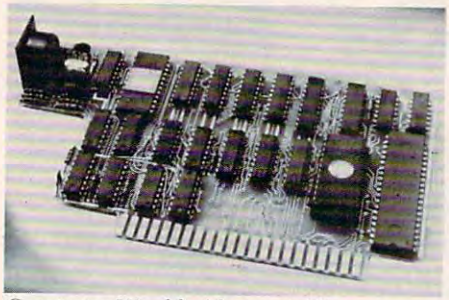
Computer World has designed an expansion to make the VIC suitable for professional applications, e.g., accounting and word processing, especially when using the Brother 8300 daisy wheel printer/typewriter, adapted to operate with the VIC-20.

When using our 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.

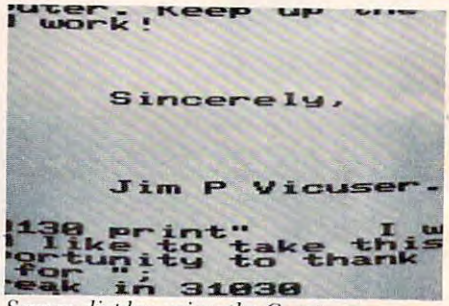
The Computer World video cartridge for the VIC-20 has the following features:

– 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.
– 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.



Computer World video cartridge



Screen display using the Computer World video cartridge

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

Terminal Emulation Package For The SuperPET

Watsoft has introduced a software package that provides enhanced terminal emulation support for the SuperPET. The package includes interrupt-driver buffered input from the host line. This prevents loss of received characters during certain screen operations, such as scrolling, when using data rates of up to 9600 baud.

Additional keys have been defined to enable transmission of the "BREAK" condition and the ASCII control characters. A local/remote echo setting allows optional display of characters transmitted to the host computer. Special character sequences

www.commodore.ca

THE MONKEY WRENCH™ FOR ATARI

$49.95

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, and printer set/clear. Uses screen editing.

CASSETTE BASED MACRO ASSEMBLER/EDITOR

$49.95

"The Compatible Assembler/Editor"

- Macros, Conditional Assembly, String search and/or replace, standard mnemonics, (Ex: LDA (LABLE), Y)
- Long labels, MOVE, COPY, AUTO, DELETE, PUT, GET, etc.

EPROMS – HIGH QUALITY, NOT JUNK

Use with PET, APPLE, ATARI, SYM, AIM, etc. 450 ns. $6.50 for 2716, $12.50 for 2532.

EPROM PROGRAMMER FOR PET AND ATARI COMPUTERS

The BRANDING IRON is an EPROM programmer especially designed for PET and ATARI computers. Programs 2716 and 2532 type EPROMs. The PET version plugs into the cassette and I/O port and comes with software which adds the programmer commands to the PET monitor. The ATARI version plugs into controller jacks and comes with a full fledged machine language monitor which provides 30 commands for interacting with the computer and the BRANDING IRON.

PET – $75.00 ATARI – $119.95

5¼ INCH SOFT SECTORED DISKETTES

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

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

FLASH – We have the VIC Rabbit and ASM/TED ready!

SIGNALMAN MARK I DIRECT CONNECT MODEM – $89.50

Standard 300-baud, full duplex, answer/originate. Powered by long lasting 9-volt battery (not included). Cable and RS-232 connector included.

More than just an Assembler/Editor!

MAE

for
PET
APPLE
ATARI
$169.95

It's a Professionally Designed Software Development System

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!

Eastern House

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

VISA
MasterCard

ATARI
A Warner Communications Company

ATARI 800™

800 48K 649.95

810 Disk Drive	429.95
850 Interface	165.95
*(Cash Discount Price) Add 3% for VISA/MC	
INTEC	
16K RAM 400	49.95
32K RAM 400/800	69.95
48K RAM 400	149.95
PRINTERS	
Epson MX80FT	499
Epson MX100	699
CITOH Prowriter	479
NEC 8023	489
ELEPHANT DISKS	
Box of 10	22.95
RANA Disk Drives For Apple Call For Price	

ATARI & APPLE SOFTWARE SPECIALS 25% SPECIALS

ATARI

		Retail	Your Cost
ATARI, INC.			
Centipede	Cart	44.95	33.70
Pac Man	Cart	44.95	33.70
BRODERBUND			
Choplifter	48KD	34.95	26.20
Stellar Shuttle	16KC/D	29.95	22.45
Genetic Drift	C/D	29.95	22.45
Labyrinth	C/D	29.95	22.45
DATASOFT			
O'Riley's Mine	C/D	34.95	26.20
Rosen's Brigade	C/D	34.95	26.20
SYNAPSE			
Apocalypse	C/D	34.95	26.20
Claim Jumper	C/D	34.95	26.20
Rapitilian	C/D	34.95	26.20

APPLE

	Retail	Your Cost
BRODERBUND		
Choplifter	34.95	26.20
Sea Fox	29.95	22.45
Hard Hat Noah	29.95	22.45
The Arcade Machine	59.95	44.95
DATAMOST		
Snack Attack	29.95	22.45
Mars Cars	29.95	22.45
ONLINE		
Pest Patrol	29.95	22.45
Lunar Leeper	29.95	22.45
Frogger	34.95	26.20
Cannonball Blitz	24.95	26.20
SIRIUS		
Free Fall	29.95	22.45
Way Out	39.95	29.95
The Blade of Blackpool	34.95	29.95

ORDERING INFORMATION: We accept VISA/MASTERCARD, Cashier Check, Money Order, or Personal Check *(Allow 14 days to clear)*. California residents add 6% Sales Tax.

SHIPPING INFORMATION: We ship All Orders UPS. ADD $2.00 for software orders of any amount. Hardware orders add 3%.

CALL or WRITE for FREE CATALOG. Specify Computer Type.

SPORT 'N' SOUND

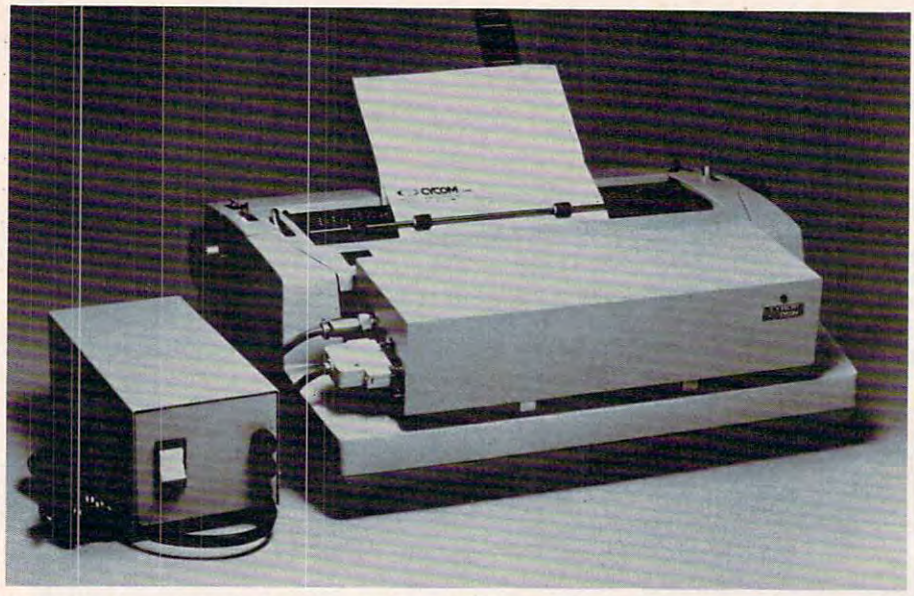
21999 Van Buren Street
Grand Terrace, CA 92324
(714) 783-0556

www.commodore.ca

transmitted from the host computer can be used for terminal control operations such as x-y cursor positioning, screen-clear, etc. Optional XON/XOFF support for both transmission and reception of data avoids data overruns without requiring large buffers. In addition to supporting the ASCII character set, an alternate mode provides APL characters with standard overstrikes.

The software is supplied on a 5¼" diskette and includes implementation and user documentation. The package is distributed on an "as-basis" without maintenance. Available for a one-time fee of $100 (U.S. funds); Ontario residents add 7% provincial sales tax.

Watsoft Products Inc.
158 University Ave. W.
Waterloo, Ontario
Canada N2L 3E9
(519)886-3700



Tyrop II shown installed on top of typewriter's keyboard

Adapter For Electric Typewriters

Hollander Office Products has announced hardware enhancements and a price reduction to the Tyrop, an adapter designed to turn an electric typewriter into a low-cost word processing printer when interfaced with a microcomputer.

Trade-named the Tyrop II, the new adapter has been modified with an external DIP switch to allow easy conversion from serial to parallel interfaces. Also, a new PROM includes a backspacing key for underscoring text. The Tyrop II retails for $695.

The adapter is compatible with IBM Selectric I, II and III, or with other equivalent electric typewriters. The printing speed for typewriters using the Tyrop II is 600 characters per minute.

The Tyrop II is installed on top of the typewriter's keyboard and connects by cable to the microcomputer. A side panel switch at the off-line mode provides self-diagnostic monitoring of all printing and adapter functions.

Hollander Office Products is the exclusive U.S. distributor for the Tyrop II, manufactured by Cycom Corporation, Japan.

Hollander Office Products
41 Dusenberg Drive
Thousand Oaks, CA 91362
(800)235-3524

Stock Market Simulation

Blue Chip Software has announced the release of a program for Apple and IBM computers – *Millionaire.*

Available on a 5 1/4" and 8" disk, *Millionaire* brings the user into the world of Wall Street. Players can manipulate as many as 15 different stocks (such as IBM, Exxon, Bendix, etc.) with a dazzling array of transaction formats. They can buy and sell stocks, put options, call options, buy on margin, borrow against their net worth, etc.

Users familiar with the stock market will quickly recognize the accuracy that author Jim Zuber maintains throughout the game. In fact, players can summon each of the 15 stocks' corporate histories as well as week-by-week industry trends and graphs.

For the player who knows little or nothing about the stock market, playing *Millionaire* will provide a friendly, easily understood atmosphere in which to learn.

Millionaire is available to run on Apple II Plus and III ($79.95); IBM PC, Osborne and other CP/M systems ($99.95).

Blue Chip Software
18653 Ventura Blvd., Suite 215
Tarzana, CA 91356
(213)881-8288

Space Ace For Atari

London Software has announced a new arcade quality action game, Space Ace. Using the full hires graphic potential of the Atari 400/800, Space Ace incorporates attention to detail while providing dynamic action.

A player's ship travels over the entire screen, while constantly scrolling, randomly generated, multicolored asteroids provide continuous challenge. Space bombs pursuing you across the

www.commodore.ca

COMPUTER OUTPOST

[312] 882-2350

GAMES

CHOPLIFTER DK	27.77
ARCADE BASEBALL DK	27.77
SLIME CS/DK	23.77
WIZARD OF WOR CS/DK	31.77
FROGGER DK/CS	27.77
CLOWNS & BALLOONS DK/CS	23.77
GRAPHICS MASTER 40K/DK	31.77
LE STICK (JOG STICK)	31.77
PACIFIC COAST HWY. CS/DK	23.77
HIRES DEADLY SECRETS DK	27.77
ULTIMA II DK	47.77
GORF DK	31.77
CHICKEN CS/DK	23.77
MAZE OF DEATH DK/CS	15.77

— SPECIALS —

BLANK DISKS EMS #1
1 BOX of 10 24.77
2 or more BOXES 23.77
MICROTEK 32K RAM 145.77
PERCOM DISK DRIVE
1ST DISK DRIVE 679.77
ADD ON DRIVE 459.77
ATARI 810 DISK DRIVE 459.77
ATARI COMPUTERS Call
— CALL NOW —
LIMITED QUANTITIES
FREE ATARI CATALOG

Call for FREE ATARI Catalog
24 HOUR PHONE 312-882-2350
WE ACCEPT VISA MASTERCARD

VISA MasterCard

2.00 Shipping
C.O.D. Extra
Ill. Res. 6% Tax on Hardware

GAMES

WARLOCKS REVENGE DK	27.77
PROBE I DK	27.77
747 LANDING SIMULATOR CS/DK	18.77

BUSINESS

VISICALC DK	224.77
FILEMASTER 800 DK	79.77
DISK MANAGER DK	23.77
LETTER PERFECT DK	134.77
MAIL MERGE DK	23.77
DATA PERFECT DK	79.77
TELECOM DK	55.77

ATARI Reg. TM ATARI CORP.

CO

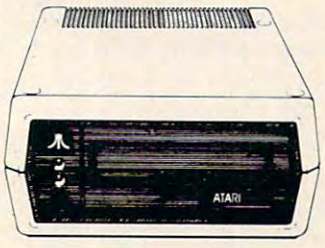
P.O. BOX 67X / STREAMWOOD, IL 60103

COMPUTER OUTPOST

SOFTWARE STREET

STOP BY AND VISIT OUR NEW STORE!

SOFTWARE STREET
14122 CENTRAL, SUITE E
CHINO, CA 91710
(714) 591-3061



Holiday Special

WE NOW CARRY SOFTWARE FOR THE APPLE AND VIC-20 COMPUTERS

800 16K	619.00	BLANK DISKS (10)	24.95	BOOKKEEPER KIT	169.00	CENTIPEDE	32.95
800 48K	724.00	PERCOM DISK DRIVE	549.00	BOOKKEEPER PROGRAM	99.00	CAVERNS OF MARS	27.95
810	429.00	PERCOM SLAVE DRIVE	339.00	VOTRAX TYPE & TALK	299.00	MISSILE COMMAND	25.95
400 16K	265.00	AXCOM GP-100	279.00	MICRO SOFT BASIC	62.00	ASTEROIDS	25.95
410 RECORDER	73.95	AXCOM IMP-4	469.00	ASSEMBLER/EDITOR	44.95	MUSIC COMPOSER	29.95
MICRO TEK 32K BOARDS	99.00	EDUCATOR	110.00	MACRO ASSEMBLER	64.95	MY FIRST ALPHABET	25.95
INTEC 48K BOARDS	175.00	ENTERTAINER	65.00	BASIC CARTRIDGE	44.95	INVITATION TO PROGRAMMING 2 & 3	21.21@
850 INTERFACE	159.00	PROGRAMMER	49.95	PAC-MAN	32.95		

THE ABOVE PRICES ARE FOR PREPAID ORDERS

$ 2.50 MIN. SHIPPING ON SOFTWARE
HARDWARE SHIPPING WILL VARY - PLEASE CALL.

MasterCard VISA

CALL OR WRITE FOR FREE PRICE LIST.

www.commodore.ca

galaxy and space mines eluding visibility keep players on their toes. The space death vortex, a rotating three-dimensional orb, randomly pursues your ship. If you escape all these dangers, you may still be destroyed by the pulsating atomic core of the Silurian warship, unless, of course, you are a true Space Ace.

Each "bogie" is uniquely designed with its own distinctive audio, and all are true attention grabbers.

Space Ace provides constant action with three levels of play, each automatically increasing through nine sub-levels of difficulty. In addition, a user-selectable time limit option adds a new dimension of strategy to the game. As the clock counts down before him, the player must decide whether to take extra risks to maximize his score or to play it safe and survive.

Space Ace requires 16K, joystick, and is offered on both disk and cassette at $29.95. VISA/MC: include all names and numbers on card. Please add $1.50 postage and handling per order; California residents add an additional $1.95 tax or see your dealer/distributor. For more information or to order, call or write:

London Software
374 Wildwood Avenue
Piedmont, CA 94611
(415)893-1090

Fractions Programs For PET, TRS-80, And Apple

Quality Educational Designs has introduced new versions of *Fractions* for the PET and for the TRS-80 Model III as well as a newly revised version for the Apple.

Fractions, a carefully designed sequence of 24 interactive programs, guides students (fifth grade and up) through the concepts and operations of fractions. For each of 11 topics, a concept development and skill building program is followed by an enrichment exploration program. *Fractions* also includes a concept overview program and a placement or review test program.

The new versions take full advantage of graphics capabilities, and they keep the pedagogical soundness of earlier versions of *Fractions*.

$175 (postage and handling included):

ISBN 0-941844-20-X *Fractions* PET 16K tapes
ISBN 0-941844-21-8 *Fractions* PET 16K diskettes
ISBN 0-941844-24-2 *Fractions* TRS-80 Model III 32K diskettes
ISBN 0-941844-06-4 *Fractions* Apple 3.2 32K diskettes
ISBN 0-941844-07-2 *Fractions* Apple 3.3 Vers. 2.0 48K diskettes

Quality Educational Designs
P.O. Box 12486
Portland, OR 97212
(503)287-8137

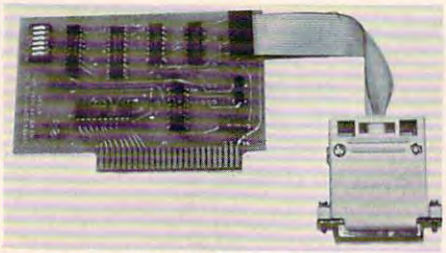
Port Extension And Serial Interface For Apple

Versa Computing has introduced EZ Port-II, a twin-switched zero insertion force (ZIF) socketed extension and cable designed to extend the Apple computer game I/O port. EZ Port-II is a two-socket version of the earlier EZ Port-I. EZ Port-II sells for $34.95.

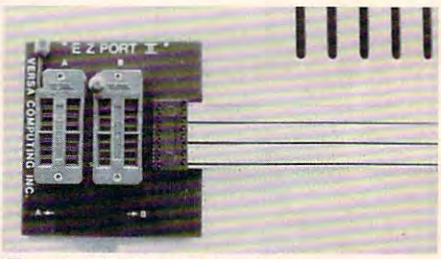
EZ Port-II eliminates the hassle of converting from one I/O device to another (i.e., paddles to joystick to VersaWriter) by extending the I/O games port outside the computer. Changes are convenient, quick, and safe.

Also now available from Versa is a low cost, serial interface for Apple II computers. The Versa serial interface is designed to function only with those features necessary to operate a serial printer. The serial interface operates with the RS 232-C protocol, and other configurations can also be accommodated at installation times. The unit sells for $79.95

The interface operates at switchable baud rates of 300, 600, 1200, 1800, 2400, 4800, 9600 and 19,200. In addition to baud rate, the printer is equipped with switches for automatic line feed, screen display, and line length. The interface package contains a 4.5x2.7" printed circuit board, and a ribbon cable with eight female pins crimped on one end and a 16 pin dip header on the other.



Versa's Serial Interface for Apple



Versa's EZ Port II for Apple

Versa Computing Inc.
3541 Old Conejo Rd., Suite 104
Newbury Park, CA 91320
(805)498-1956

Action Game For Atari

K-Razy Kritters defies personal computer enthusiasts to save the Command Ships through ten increasingly difficult levels of play. This challenging game, in ROM Cartridge form, is for

www.commodore.ca

ATTENTION VIC-20 USERS

Put YOUR BASIC programs on a cartridge!

The **ROMPACKER CARTRIDGE SYSTEM** lets you copy programs onto an EPROM USER Cartridge as easily as copying them onto a tape.

FEATURES

- BASIC or Machine Language Programs
- Up to 24K of Programs per Cartridge
- Automatic Program Menu on Power Up
- Single Keystroke Program Selection
- Uses Popular 2532 EPROMs

***Special* — ROMPACKER STARTER SYSTEM**

Includes: Firmware cartridge, User Cartridge (with two 2532 EPROMs), EPROM programmer and manual.
$149.95 till 11/30/82 (Regular $179.95)

Extra **ROMPACKER** User Cartridges — $39.95
2532 EPROMs $9.50 each / 4 for $36.00

Orders: Prepaid orders shipped free — others add $4.00
Mass. residents add 5% sales tax
Visa and MasterCard accepted

Business Computer Systems of New England
P.O. Box 2285
Springfield, MA 01101
Phone (413) 567-8584

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 recorders, car stereo, home stereo, portable radios and tape recorders, telephone answering machines, video games, tapes, and movies.

Commodore VIC-20 illustrated.

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. (Or ask us to mail you our P.R.I.C.E. list.)

Commodore VIC-20 home computer.... **$189**
Commodore 1530 datasette **$68**
Torpedo game cassette for VIC-20 by CSA **$7.95**
Road Test game cassette for VIC-20 by CSA **$9.95**
Snakman game cassette for VIC-20 by MDI..... **$12.95**

Atari 800 home computer..... **$639**
Atari 410 program recorder **$72**
Preppie game cassette for Atari by ADI **$19.95**
Star Raiders game cartridge for Atari **$38.50**
Ghost Hunter game cassette for Atari by Arcade Plus **$23**

Prices subject to change after 11/30/82

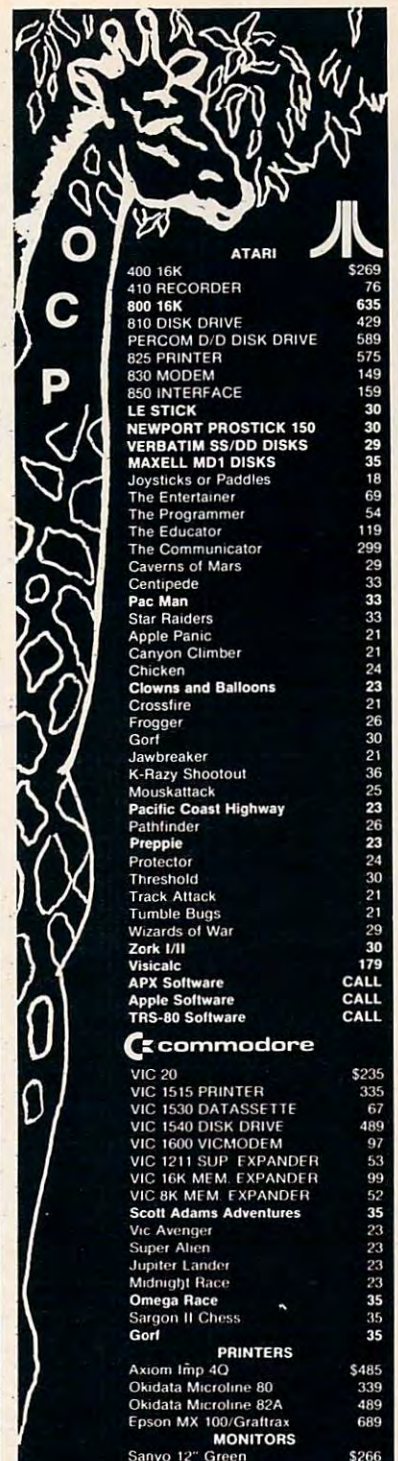
AND JUST SOME OF THE BRANDS WE SELL:

Sony, JVC, Technics, Pioneer, Onkyo, Nikko, Akai, Aiwa, Hitachi, Panasonic, Jensen, Mitsubishi, Concord, Dual, Teac, Atari, Commodore, Mattel, Magnavox, Stanton

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

mastercharge VISA

P.R.I.C.E.™
67 Teed Drive, COM1182, Randolph, MA 02368.



ATARI	
400 16K	$269
410 RECORDER	76
800 16K	**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 MD1 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
Chicken	24
Clowns and Balloons	**23**
Crossfire	21
Frogger	26
Gorf	30
Jawbreaker	21
K-Razy Shootout	36
Mouskattack	25
Pacific Coast Highway	**23**
Pathfinder	26
Preppie	**23**
Protector	24
Threshold	30
Track Attack	21
Tumble Bugs	21
Wizards of War	29
Zork I/II	**30**
Visicalc	**179**
APX Software	**CALL**
Apple Software	**CALL**
TRS-80 Software	**CALL**

commodore	
VIC 20	$235
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
Jupiter Lander	23
Midnight Race	23
Omega Race	**35**
Sargon II Chess	35
Gorf	**35**

PRINTERS	
Axiom Imp 4Q	$485
Okidata Microline 80	339
Okidata Microline 82A	489
Epson MX 100/Graftrax	689

MONITORS	
Sanyo 12" Green	$266
Sanyo 13" Color	399
Amdex Video 300	169
Amdex Color I	339

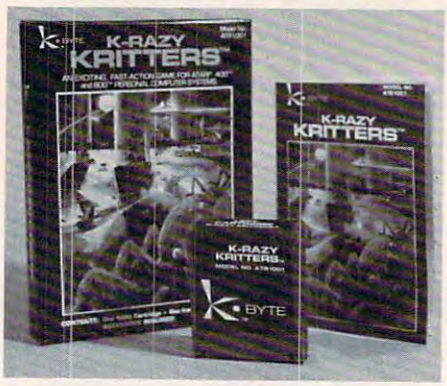
Optomam Consumer Products

P.O. Box 1038
2600 North Ridge Dr.
Placerville, CA 95667 916/621-1090

HOW TO ORDER

Fast delivery, send certified check or money order. Personal check requires 2 weeks to clear. C.O.D. shipping, handling extra. VISA & MASTERCARD add 3%, California res. add 6% sales tax. Include telpehone number with order. Prices and products subject to change.

www.commodore.ca



K-Razy Kritters from K-Byte

Atari 400 and 800 personal computers. Each cartridge is tested to assure product reliability and customer satisfaction.

The full-color, creatively designed package is shrink-wrapped for product protection and consumer appeal to entice sales. Each package contains a 12-page, full-color *Instruction Booklet* with graphics and complete rules of the game.

For additional information on K-Razy Kritters (Model No. ATR1001); contact:

K-Byte
1705 Austin
Troy, MI 48084
(313)524-9878

Atari's New Research Laboratory

Atari has established in New York City a new research laboratory dedicated to the exploration of microprocessor-based products in electronic publishing and transactional services for home computers.

Headed by Steven T. Mayer, vice president of research and product development, the new lab will be responsible for development of advanced products for Atari, a leading manufacturer of coin-operated and home video games and home computers. The lab will also function as a focus for joint research projects with other subsidiaries of Warner Communications Inc., Atari's parent company. The lab staff includes computer programmers and scientists who will build on Atari's expertise in electronic entertainment and computation.

Atari Incorporated
1265 Borregas Avenue
P.O. Box 427
Sunnyvale, CA 94086

The black, low profile, all-aluminum cabinet measures 4 x 1½ x 9½ inches. It is simple to install and operate and is compatible with nearly any standard data terminal or personal computer. It is made in the USA.

An Apple version (MFJ-1231) that plugs into the game port comes complete with software. No serial interface board is needed.

MFJ inductive coupled modem

Originate/Answer Modem

MFJ Enterprises, Inc., has introduced the MFJ-1230 Originate/Answer Modem. It looks and is used like an acoustic coupled modem, but it uses an inductive coupling technique for receiving. This gives more reliable data transfer by eliminating errors caused by room noise, vibration, and a host of other acoustic coupling problems.

This Bell 103 compatible modem operates 0 to 300 baud, features half and full duplex operation, and is crystal controlled for very high stability. It provides TTL and CMOS inputs/outputs as well as RS-232 compatibility. This allows easy interfacing to nearly any computer with proper software. Also, input/output ports for a cassette tape recorder let you save your transmitted data and load it back to your computer or retransmit it later.

The MFJ-1230 and MFJ-1231 Inductive Coupled Modem is available from MFJ Enterprises, Inc., for $129.95 and $139.95, respectively, plus $5 each for shipping and handling.

MFJ provides a 30-day money back trial period. If you are not satisfied, you may return it within 30 days for a full refund (less shipping). MFJ also provides a one year limited warranty.

MFJ Enterprises, Inc.
921 Louisville Road
Starkville, MS 39759
(800)647-1800
(Visa/MasterCharge)

Reference Storage

Now you can place all your computer accessories in a protective, organized, and easily accessible desktop storage center. The Reference Center is designed to eliminate misplacement of often used materials, and to complement any office with its attractive features.

www.commodore.ca

TCE Presents

Holiday SOFTWARE Specials

PROGRAM	COMPUTER	TCE	LIST
WORDSTAR	1	$199	$375
SUPER TEXT II	1	99	150
MICROTEK 16K RAM CARD	1	89	120
TEXT WIZARD	2	69	100
HOME ACCOUNTANT	1	52	75
GRAPHICS MAGICIAN	1	39.99	59.95
DEADLINE	1,2	33.99	49.95
WIZARDRY	1	33.99	49.95
MASTERTYPE	1,2	26.99	39.95
ULTIMA	1,2	26.99	39.95
ZORK I	1,2	26.99	39.95
BANDITS	1,2	22.99	34.95
CHOPLIFTER	1,2	22.99	34.95
FROGGER	1,2	22.99	34.95
KNIGHT OF DIAMONDS	1	22.99	34.95
POOL 1.5	1,2	22.99	34.95
SERPENTINE	1,2	22.99	34.95
STAR BLAZER	1,2	21.99	31.95
APPLE PANIC	1,2	$12.99	29.95
CLOWNS & BALLOONS	2		29.95
CROSSFIRE	1,2		29.95
PACIFIC COAST HWY	2		29.95
RASTER BLASTER	1,2		29.95
SPACE EGGS	1,2		29.95
SNAKE BYTE	1,2		29.95
SNEAKERS	1,2		29.95
TRACK ATTACK	1,2		29.95
UTILITY CITY	1		29.50

APPLE=1 ATARI=2 REGISTERED TRADENAMES Holiday Specials through 12/30/82

ELEPHANT DISKS
SS-SD 19.99/10
SS-DD 23.99/10
DS-DD 29.99/10

SIGNALMAN MODEM
$85.99 LIST 99.95

BMC MONITORS
$89 12" GREEN
$269 13" COLOR

FLIP N FILE $22.99

HEAD CLEANER $22.99

C.ITOH PROWRITER
$489 Parallel List $795
$629 Serial List $845

HOLIDAY SPECIALS
Send for our full list of software & accessories on special through Christmas.

FREE Catalog of APPLE-ATARI-IBM-TRS-80-VIC Software

The Computer Express

M-F 10 AM - 9 PM
Sat 10 AM - 6 PM
313 528-1554

P.O. Box 569, Dept 8
Troy, MI 48099
FREE CATALOG

master charge VISA

Add $2.00 for shipping. MI residents add 4% tax. Money orders, checks (allow 10 days) accepted. MC/VISA accepted with card # & expir. date. Add $1.50 for C.O.D. Prices subject to change.

ATARI
A Warner Communications Company

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.

---

commodore

PUBLICATIONS:

CBM User Guide	7.95
CBM Basic 4.0 Ref Manual	9.95
CBM Disk Manual	7.95
CBM Printer Manual	7.95
MOS Hardware Manual	6.95
MOS Programming Manual	6.95
The PET Revealed	19.95
Library of PET Subroutines	19.95
Commodore Software Encyclopedia	9.95
CBM Programmer's Reference Manual	16.95

CBM EQUIPMENT:

CBM 4032 CPU (40 Col. Screen, 32K RAM)	990.00	
CBM 8032 CPU (80 Col. Screen, 32K RAM)	990.00	
CBM 8096 CPU (80 Col. Screen, 96K RAM)	1425.00	"NEW"
CBM Micro Mainframe (Super PET)	1525.00	"NEW"
CBM 2031 Single Disk Drive (170K per 5¼ Diskette)	525.00	"NEW"
CBM 4040 Dual Disk Drive (170K per 5¼ Diskette)	965.00	"NEW"
CBM 8050 Dual Disk Drive (½ Meg per 5¼ Diskette)	1225.00	"NEW"
CBM 4022 Tractor Feed Printer	590.00	"NEW"
CBM C2N Cassette Deck (New Style)	65.00	"NEW"
CBM CPU/IEEE Cable	35.00	
CBM IEEE/IEEE Cable	40.00	
8023P Dot Matrix Printer (136 Col., 150 CPS)	750.00	
8300P Letter Quality Printer (40 CPS)	1790.00	"NEW"

VIC/64 EQUIPMENT

	VIC 20 (Includes RF Modulator)	229.00
	1541 VIC Single Disk Drive (170K per 5¼ Diskette)	470.00
	VIC Joystick	9.95
	VIC Modem	102.00
	VIC 8K Memory Expander	59.95
	VIC Super Expander	69.95
	VIC 3K Memory Expander	39.95
	VIC 2 Player Game Paddles	19.95
	1525 VIC Printer	325.00
"NEW"	Cardboard (6 Slots)	119.95

VIC SOFTWARE

	VT 106A Recreation Six Pack (Cassette)	43.95
	VT 107A Home Utility Six Pack (Cassette)	43.95
	VIC 1908 Draw Poker (Cartridge)	29.95
	AMOK (Cassette)	18.95
	VIC Avengers (Cartridge)	29.95
	Snakman (Cassette)	18.95
"NEW"	Millipede (Cassette)	15.00
"NEW"	Radar Rat Race (Cartridge)	29.95
"NEW"	Midnight Drive (Cartridge)	29.95
"NEW"	Gorf (Cartridge)	39.95
"NEW"	Omega Race (Cartridge)	39.95
"NEW"	Sargon Chess II (Cartridge)	39.95
"NEW"	Superslot (Cartridge)	29.95

CBM SOFTWARE:

Wordcraft 80 Wordprocessor	295.00
Wordpro 4+ Wordprocessor	325.00
VisiCalc (32-96K)	200.00
Dow Jones Portfolio	115.00
The Manager	250.00

COMING SOON:

More VIC Peripherals and Software
Data Acquisition and Control Devices
The Max
More VIC Software:
Scott Adams Series Games
Wizard of Wor

CALL OR WRITE FOR A CATALOG

All Items Insured
COD - UPS
Prepaid Orders Shipped Free (Cont'l U.S. Only)
In Stock Items Shipped Within 48 Hours
MASTERCHARGE OR VISA ADD 3%
GA RESIDENTS ADD 4% SALES TAX

MART
P.O. Box 77286
Atlanta, Ga. 30357

404-458-0729
Call 9 AM 5 PM EST

"WE ARE ATLANTA'S LARGEST DEALER"
"CALL ABOUT SUPPLIES"
SPECIAL OFFER THROUGH NOV. 30
8032 $990
8050 $1225

www.commodore.ca

Diskettes are placed on movable shelves which secure safely within the center when not in use. Manuals and command charts are placed on top for easy viewing and access. Other accessories like papers and cleaners can also be stored within the cabinet. The Reference Center can be placed next to your computer for frequent use or in a separate location to serve as a library of complete computer information.

The price is $59.50.

Data-Master
443 S. Barrington
Brentwood, CA 90049
(213)472-8127

Computers In Special Education Conference

The Council for Exceptional Children announces a National Topical Conference on the Use of Microcomputers in Special Education, scheduled for March 10-12, 1983 in Hartford, Connecticut.

The Hartford Conference will focus on the use of microcomputers in special education programs and on adaptations and creation of software programs for specific exceptions.

Plenary sessions will alternate with professional sessions, exhibits, and demonstrations. Conducted by recognized educator-trainers in both microcomputers and special education, each plenary session will build on the previous one and will provide sequential training in all aspects of selection, purchase, and programming.

Topics of interest to teachers, administrators, and program planners will include: evaluation of hardware and software, administrative uses, data management, computer-assisted instruction, computer languages, programming, and the use of microcomputers to assist the handicapped.

Program Chairperson is Kathleen M. Hurley, Vice President of Research and Development, Developmental Learning Materials, Inc., of Allen, Texas. A past president of the Association for Special Education Technology, Ms. Hurley has served on the Government Relations Committee of the Association of Media Producers and on the advisory boards of LINC Services, Inc. and the Southern Association for Children Under Six.

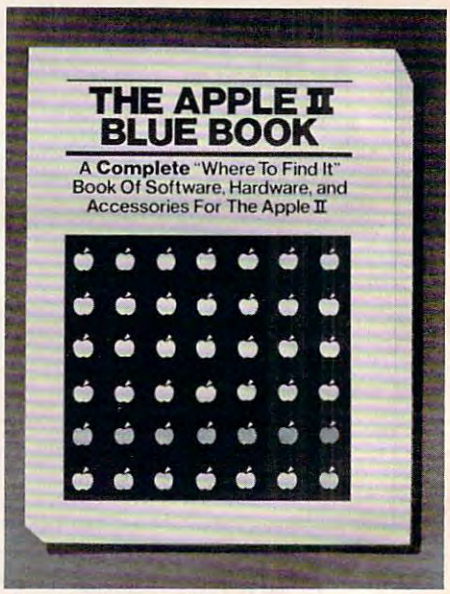
Program information and preregistration and housing forms may be obtained from:

John Grossi, Conference Manager
The Council for Exceptional Children
Department of Field Services
1920 Association Drive
Reston, VA 22091

Apple Software Directory

VMI's Apple Computer Software Directories have been revised to reflect the most current listings of available software and hardware. The new, second edition *Blue Book* describes more than 2,300 listings in 47 subject categories from 450 different producers. At $24.95 plus $2 for shipping and handling, the 400-page *Blue Book* features 32 pages of index for easy cross-reference of all software descriptions and publishing sources. Categories (business, education, games, hard-to-find peripheral equipment, accessories, supplies, etc.) are well organized for quick reference.

Visual Materials Inc.
4170 Grove Ave.
Gurnee, IL 60031



Apple software directory

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. ©

www.commodore.ca

Lyco Computer Marketing & Consultants

TO ORDER CALL US **TOLL FREE 800-233-8760**
In PA 1-717-398-4079

November ATARI SPECIALS

810 Disk Drive	$429.00
32K RAM	$ 79.00
400 16K	$255.00
**800 48K ..... **	**$639.00**

ATARI®
A Warner Communications Company

PERCOM : In Stock

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

PRINTERS : In Stock

Epson Mx 80	$449.00
Epson Mx 80 FT III	$499.00
Okidata 82A	$479.00
Okidata 83A	$719.00
Okidata 84	$1089.00
Citoh	CALL
NEC	CALL
(Interfacing Available)	

JOYSTICKS : In Stock

Atari CX-40	$18.00
LeStick	$34.00
Wico Command Control	$24.00

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 Wizzard	$ 89.00
Datasam/65	$125.00
Interlisp	$125.00
Monkey Wrench	$ 42.00

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

CXL4013 ASTEROIDS	$28.75
CXL4004 BASKETBALL	$26.75
CX4105 BLACKJACK	$12.75
CXL4009 COMPUTER CHESS	$28.75
CXL4012 MISSLE COMMAND	$28.75
CXL4011 STAR RAIDERS	$35.00
CXL4006 SUPER BREAKOUT	$28.75
CXL4010 3-D TIC-TAC-TOE	$26.75
CXL4005 VIDEO EASEL	$26.00
CXL4008 SPACE INVADERS	$28.75
CX8130 CAVERNS OF MARS	$31.75
CXL4020 PAC MAN	$32.75
(NEW) CENTIPEDE	$32.75
CX4121 ENERGY CZAR	$12.75
CX4108 HANGMAN	$12.75
CX4102 KINGDOM	$12.75
CX4112 STATES & CAPITALS	$12.75
CX4114 EUROPEAN COUNTRIES	$12.75
CX4101 PROGRAMMING I	$19.95
CX4106 PROGRAMMING II	$22.75
CX4117 PROGRAMMING III	$22.75
CXL4007 MUSIC COMPOSER	$33.75
CX8102 CALCULATOR	$28.75
CX4109 GRAPH IT	$16.75
CXL4003 Assembler Editor	$45.00
CX8121 Macro Assembler	$69.00
CXL4002 Atari Basic	$45.00
CX8126 Microsoft Basic	$65.00
CXL4018 Pilot Home	$65.00
CX405 PILOT EDUCATOR	$99.00
CXL4015 TELELINK	$21.00
CX4123 SCRAM	$19.75
CX4107 Biorhythm	$13.00
CX4119 French	$45.00
CX4118 German	$45.00
CX4120 Spanish	$45.00
CX4125 Italian	$45.00

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

AUTOMATIED 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.

commodore

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

Pre-paid orders receive free shipping in the continental U.S.
Personal checks require four weeks clearance before shipping
In-Stock items shipped within 24 hours of order
Back-Ordered and Out-of-Stock items shipped as soon as they are available
Cancellation of Back-Order and Out-of-Stock items prior to shipping receive full refund or credit towards another purchase upon request.
All products subject to availability and price change.

TO ORDER
CALL TOLL FREE
800-233-8760
In PA 1-717-398-4079
or send order to
Lyco Computer
P.O. Box 5088
Jersey Shore, PA 17740

www.commodore.ca

Advertisers Index

AB Computers 82,83,149
Aardvark Technical Services 133
A-Bit-Better Software 213
Abacus Software 131
Acorn Software Products, Inc. 71
Advanced Operating Systems 169
Adventure International 47
Albany Typewriter & Computer 32
Aldebaran 106
The Alien Group 87
Allegiance Enterprises 240
American Software Club, Inc. 129
Anthro Digital Software 149
Apple Computer, Inc. 12,13
Apple Country Limited 184
Artworx 45
ATACOMP 220
Atari, Inc. 6,7
B.I.G. Software 213
B.L. & W. 97
Batteries Included 25,116
Bit 3 Computer Corporation 81
Brøderbund Software 26,27
Business Computer Systems of New England 251
C-Mart 253
CE Software 213
C.J. Software Inc. 208
Cardco, Inc. 113
Clarkston Software 246
Color Computer Concepts 238
Commodore Business Machines ... BC
Communications Electronics 135
Compu Sense 173,223,225,227
CompuShack 159
Computability 219
Computer Case Company 134
The Computer Express 253
Computer House 239
Computer House Division of F.L.C., Inc. 116
Computer Mail Order 72,73
Computer Marketing Services, Inc. 99,101
Computer Mat 157
Computer Outlet 108,109
Computer Outpost 249
Computer Place 111
Computer Software Associates 175
Computertime, Inc. 253
Comstar 244
Connecticut microComputer, Inc. 97
Control Data Corporation 16,17
Cosmic Computers Unlimited 239
Creative Software 121
DBM 242
Data 20 Corporation 37
Data Equipment Supply Corp. 103
Datasoft Inc. 21
Digital Interface Systems Co. 240
Don't Ask Computer Software 29,167
Dynacomp 92,93
Dynamic Technologies 215
ECRL, Inc. 239
EPYX/Automated Simulations 69
Eastern House Software ... 144,236,247
Educational Software 165
Ektype Office Systems 226
Elcomp Publishing 153
Electronic Protection Devices 39
Embassy Computer Products 236
English Software Co. 211
Falk-Baker Associates 102
First Star Software 57
Foxfire Systems, Inc. 222
Gator Marketing Enterprizes, Inc. 52
Genesis Software 211
Gloucester Computer Bus Co. 223
Hayden Book Company, Inc. 91
Hayes Microcomputer 35
High Country Microsystems 182
Human Engineered Software 31
ICS Micro Wholesale 175
IDSI 61
In-Home Software 51
Intec Peripherals Corp. 213
Integrated Controls 222
Interesting Software 226
Interlink 205
International Computer Center 220
JMC 105
J.V. Software 49
Jensen Tools Inc. 32
Jini Micro-Systems, Inc. 85
Kilo Corporation 117
Krell Software Corp. 123
Leading Edge ..... IFC,IBC
Lighting Software 22
Little Wizard Distributing 225
London Software 201
Lyco Computer 255
MIS 155
MMG Micro Software 192,238
MSC Software 106,169
MTG Technical Sales 243
Macrotronics, Inc. 111,166
Madison Computer 101
Martif Systems 195
Merlin Enterprises 198
Metron Computer Systems 97
Micro Computer Service Center 111
Micro-Ed, Inc. 141
Micro Magic Software 208
Micro-Systems 11
Micro Systems Exchange 106
Micro World Electronix 173
Microbits 208
Micrograms Incorporated 131
MicroSpec Ltd. 173
Midwest Micro Associates 79
Mooseware Incorporated 157
Mosaic Electronics 63
New England Electronics Company 54,55
NEXA Corp. 89
Nüfekop 197
Olympic Sales Co. 241
On Line Software 169
Optimized Data Systems 195
Optimized Systems Software Inc. 151
Optomam Consumer Products 251
PR Software 60
P.R.I.C.E. 251
Pacific Coast Software 226
Pacific Exchanges 106,114,139,195
Percom Data Co., Inc. 4
Peripherals Unlimited 234
Pixell Software 163
Precision Technology 156
Pretzelland Software 211
Prickly-Pear Software 222
Professional Software 1,9
The Program Center 241
The Program Store 64,65,66,67
The Programmers Workshop 167
The Programmer's Institute .. 119,193,215
Progressive Computer Applications 191
Protecto Enterprizes 127
Quality Software 19
Quantum Data, Inc. 161
Questar International 147
Quicksoft 245
RDE Services 198
Rapidwriter 225
Rar-Tech 236
Reston Publishing Company Inc. 59
Retcom Systems Inc. 114
Royal Software 201
SJB Distributors, Inc. 203
Skyles Electric Works 75,95,114
Small Systems Engineering, Inc. 41
Soft Sectre 88
The Software Connection 237
Software Publishers, Inc. 193
Software Street 249
Solutions 106
Spinnaker Software 2,3
Sport 'N' Sound 247
Star Microtronics 187
Strategic Simulations Inc. 23
Ström Systems Inc. 243
subLogic Communications Corp. 15
Sunshine Peripherals 225
Swifty Software, Inc. 189
T.H.E.S.I.S. 127
TIS 22
TSASA, Inc. 238
Tara Computer Products 59
Tiny Tek 166
Toronto PET Users Group 98
Torrey Engberg Smith Co. 60
Totl Software 156
United Microware Industries, Inc. 77
Universal Software Corporation 53
Victory Software Corp. 225
Voicetek 144
Wunderware 155

COMPUTE! Back Issues 231
COMPUTE! Books 233
COMPUTE! Customer Service .. 169,227
COMPUTE! Magazine 33
COMPUTE!'s First Book of VIC 227
COMPUTE!'s Second Book of Atari .. 217
Programming the PET/CBM 171
Recreational Computing Back Issues 123

www.commodore.ca

COMPUTE!

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

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
☐ MasterCard ☐ American Express
Account No. _____ Expires ____/____

32N101

COMPUTE!

Foreign Readers

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 ____/____

32N101

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: *$4.00 / **$9.00

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 ____/____

Name _____

Address _____

City _____ State _____ Zip _____

Country _____

Allow 4-5 weeks for delivery.

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:

☐More	☐Fewer	Specific applications programs.	☐More	☐Fewer	Games.
☐More	☐Fewer	BASIC programs.	☐More	☐Fewer	Reviews of game software.
☐More	☐Fewer	Machine language programs.	☐More	☐Fewer	Reviews of business software.
☐More	☐Fewer	Tutorials.	☐More	☐Fewer	Reviews of educational software.
☐More	☐Fewer	Educational articles.			
☐More	☐Fewer	Detailed explanations of programs.	☐More	☐Fewer	Reviews of hardware.

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

What do you like least?

www.commodore.ca

Place
Stamp
Here

COMPUTE! Magazine
Post Office Box 5406
Greensboro, NC 27403

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

Place
Stamp
Here

COMPUTE! Magazine
Post Office Box 5406
Greensboro, NC 27403

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! Books
Post Office Box 5406
Greensboro, NC 27403

www.commodore.ca

WIDEN YOUR CHILD'S WORLD WITH THIS INTRODUCTORY OFFERING.

10 DAY MONEY BACK GUARANTEE.

Now, until May 31, 1983, when ordering a lesson at $45.00, you may order additional lessons for just $35.00 each. (Back-up disk is included with each lesson at no additional charge.)

Mail this form, or call toll-free 800/233-3784. (In California, call 800/233-3785.)

BEFORE ORDERING: CHECK TO MAKE SURE YOUR EQUIPMENT MEETS THESE REQUIREMENTS.

	Apple II PLUS	Atari 800	TI 99/4A
Memory:	48K	48K	32K Memory Expansion
No. of drives required:	1 disk and controller	1 disk and controller	1 disk and controller
Operating System:	D.O.S. 3.3	D.O.S. 2	PLATO Interpreter Cartridge*
Will display on any color or b/w monitor or TV compatible with your microcomputer listed above.			

*PLATO Interpreter Cartridge may be ordered directly with the order form below. Only one per TI 99/4A machine is needed.

CONTROL DATA PUBLISHING CO., P.O. Box 261127, San Diego, CA 92126

SHIP TO: (Please Print)

Name _____

Address _____

City _____ State _____ Zip _____

☐ Payment enclosed (Check or money order only. Make payable to Control Data Publishing Co.).

☐ Mastercharge ☐ VISA ☐ American Express ☐ Diners Club

Card Number _____ Expiration Date _____

Your signature _____

Telephone No. ( ) _____

Please complete the following:

Quantity	Title
	Basic Number Facts
	Whole Numbers
	Decimals
	Fractions
	Physics: Elementary Mechanics
	French Vocabulary Builder
	German Vocabulary Builder
	Spanish Vocabulary Builder
	Computer Literacy: Introduction

For use with: (check one)

☐ **Apple II Plus**
Available: Nov. '82

☐ **Atari 800**
Available: Dec. '82

☐ **TI 99/4A**
Available: Jan. '83

Allow 3-5 weeks for delivery.

INTRODUCTORY PRICES:

One lesson $45.00. Each additional lesson $35.00.

☐ Include PLATO Interpreter Cartridge for my TI 99/4A. Price $50.00.

Price for above order: . . . . . $_____

Calif. Residents: add 6% sales tax . . . . . $_____

Add $2 shipping and handling . . . . . $ 2.00

TOTAL PRICE: . . . . . $_____

☐ Please send information on _____ lesson(s).

If not completely satisfied, you may return all lesson material within 10 days of receipt for a refund. All orders subject to acceptance. Offering expires May 31, 1983.

Control Data Publishing Company supplies this software under a personal license agreement rather than for sale. Customers obtain the right to possess and use PLATO software by paying the prices specified and agreeing to the terms and conditions of the license agreement contained in the package.

Apple® is a trademark of Apple Computer, Inc.
Atari® is a registered trademark of Atari, Inc.
TI® is a registered trademark of Texas Instruments, Inc.

Warranty available free from the Control Data Publishing Co., 4455 Eastgate Mall, San Diego, CA 92121.

www.commodore.ca

PLATO WIDENS YOUR CHILD'S WORLD.

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 200108 SAN DIEGO, CA

Postage will be paid by addressee

CONTROL DATA PUBLISHING CO.
P.O. Box 261127
San Diego, CA 92126

www.commodore.ca

Introduce A Friend To COMPUTE! For Christmas
Save $10.00 Off The Newsstand Price

We'll start your friend with the January issue of **COMPUTE!** on cards received by November 15th. One year, 12 issue subscriptions are $20.00 in the U.S., $25.00 (U.S. funds) in Canada.

PLEASE PRINT.

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: _____

62N101

Introduce A Friend To COMPUTE! For Christmas
Save $10.00 Off The Newsstand Price

We'll start your friend with the January issue of **COMPUTE!** on cards received by November 15th. One year, 12 issue subscriptions are $20.00 in the U.S., $25.00 (U.S. funds) in Canada.

PLEASE PRINT.

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: _____

62N101

www.commodore.ca

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

www.commodore.ca

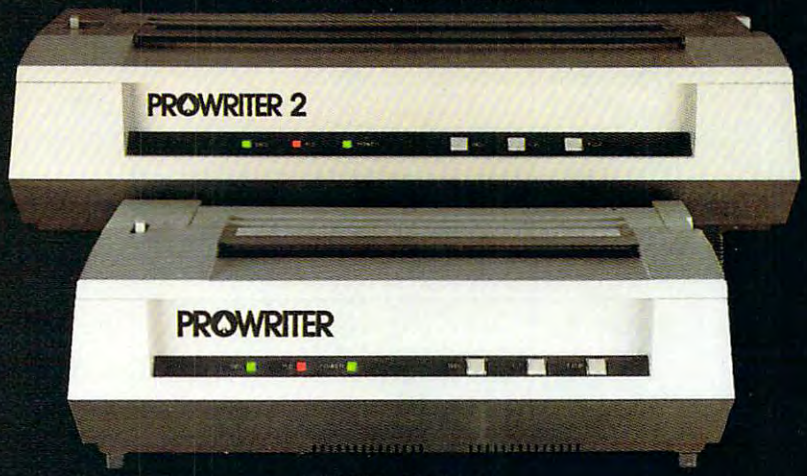
THE LEADING EDGE IN PRINTERS

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.

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.

Lest 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.

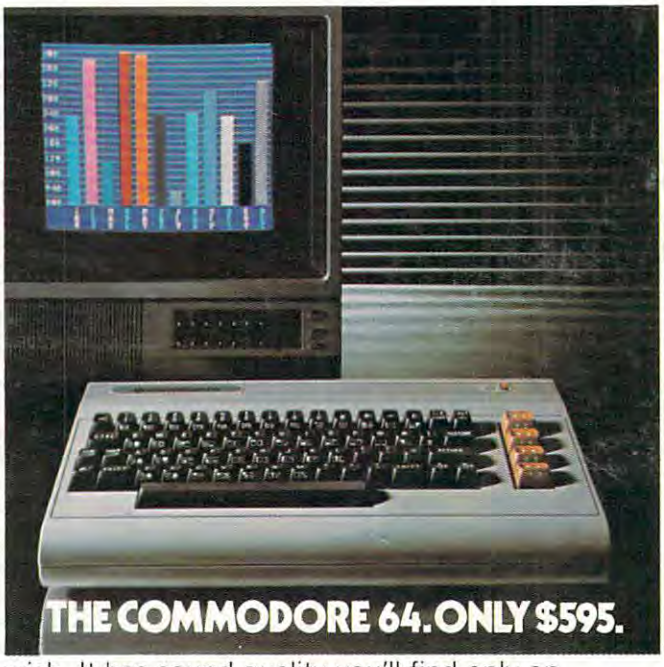
At the end of a business day, the Commodore 64 can go into your briefcase and ride home with you for an evening's fun and games.

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-11

*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.

www.commodore.ca