
The Pied Piper: Will Computer Users Follow?

STM Electronics is hoping its new portable computer will take after its namesake and entice people away from competitors. The Pied Piper features 64K, CP/M and a price tag of \$1299.

By Kenniston Lord

The Pied Piper, from STM Electronics, has come to town with the hope of leading portable computer users away from the Osborne, Kaypro and similar systems.

The Pied Piper has a price of \$1299, making this 64K, Z-80A-based CP/M computer the most powerful available on a dollar-for-dollar basis.

The Pied Piper is a "plain vanilla machine" with one significant advantage over similar systems—disk capacity. A single on-board drive provides more capacity than several machines that have two double-density drives.

The machine's appearance is also plain. It's a functional machine, not a thing of beauty. However, it could be a joy to use, because of extraordinary software bundling (software included in the price of the machine) designed to address the business market from

the user's perspective.

The idea of a portable is, of course, to be able to carry the thing. This one is small enough and light enough (12½ pounds) to make that an easy task. Lacking a second drive and a monitor, this computer may be used in a variety of ways not before considered because of the burdensome weight and size of other portables. After all, others have advertised that their portable computers fit under an airplane seat. This one fits in a briefcase—disk device and all.

At first glance, the natural question is whether you'll be able to function without a second drive or monitor. The on-board drive is a 96-tpi (tracks per inch), double-sided, double-density drive that provides nearly 800K of storage (compared to the standard double-density of 320K). It would take

considerable time to consume that much space.

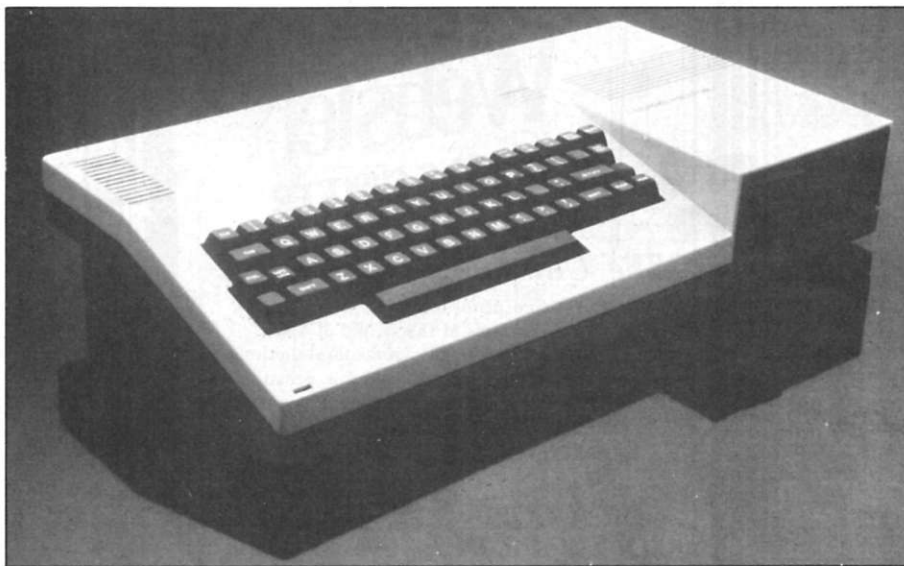
For back-up purposes, Pied Piper provides a single-disk copy program for those who must use it while traveling. While a single-copy backup is time-consuming, the system also provides one-disk single-file copy, permitting backup of only the document with which you are working.

STM has omitted a monitor from the system on the premise that a monitor can be a permanent part of any scene in which the system is used. The unit will connect to a standard monitor using a video cable or, using a radio frequency modulator, to a standard television set.

The monitor's character size may be set by software to 40-character or 80-character mode, depending upon the resolution of the monitor used. The characters produced at 40-character size are double-size and a benefit for the sight-impaired. While 40-column display may be designated, 80-character lines are produced, irrespective of the available output space. Displays are shifted using function key/number key combinations.

A two-line-by-80-character LCD is available. The LCD will provide sufficient visual output capability where no television monitor is available, or where using one would be inconvenient. It will suffice until a larger monitor can be connected. Cost of the optional LCD is \$525, including modem.

The unit was reviewed using an Amdek 300 green-on-black monitor, and the output was easily readable



A novel portable, the Pied Piper features 64K, a single drive and CP/M, but lacks a monitor.

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in both modes.

The unit itself is constructed of molded plastic. There is a dust cover that fits over the keyboard and which must be removed gingerly; to me this is the most vulnerable part of the unit. Because of the popular if-all-else-fails-read-the-directions philosophy, this cover is certain to be broken early, leading to frustration and additional impact exposure to the keyboard. It has been suggested that STM advise the purchaser to read the directions carefully before opening the package. How large this problem will be—if indeed it is a problem at all—cannot be known.

The system is bundled with \$1700 worth of Perfect software: Perfect Writer, Perfect Speller, Perfect Filer and Perfect Calc. Also, the CP/M operating system and an assortment of Pied Piper utilities are a part of the bundle.

STM has devised a *user's* machine, not a programmer's machine. But they do not keep you from programming the machine if you wish to do so. A Basic compiler and an assembler are available for a reasonable price. This, at least, will make some contract programming possible, if required.

The list of software options now in-

cludes Basic, Pascal, Fortran, dBase II, SuperCalc, WordStar and family, Money Maestro, CP+, and Financial Planning Language, all of which are separately priced. These packages, and more, are certain to be available through the Pied Piper dealer network.

The bundled software packages will be sufficient for most purchasers. The availability of other software may create a market different from what the manufacturer expected. Since the price of this unit makes it a likely candidate for placement into word processing environments, it is conceivable that Pied Pipers may populate the typing pools.

The machine is a standard 8-bit CP/M package, and was not designed to be unique. Its on-board disk (assigned to Drive A) can handle the majority of applications. It is a double-sided, double-density Mitsubishi drive capable of 800K. The unit has three jewels above the keyboard to indicate status: a power light (green if on), an activity light (red if on) for the on-board drive (A), and one for an optional second drive (B). The drive light stays lit constantly. This should be changed, as this light is customarily used to indicate that the drive has been selected.

Interfacing connections for a second disk drive or a hard disk is done through a backplate mounted on the unit. All connections may be disconnected easily to facilitate portability. The Pied Piper's power supply is sufficient to support two disk drives, but the hard disk's power supply will be contained within that unit.

The keyboard is qwerty, with a few other standard computer keys—control, escape, delete, function, and so on. The function key works in combination with the other keys, giving 36 programmable keys. CP/M reacted to the control key, as expected. The cursor keys are assigned by a utility relative to the software package being used. The backspace key is a destructive backspace (it removes characters). Users may be surprised to find the British pound money symbol on the keyboard.

STM's literature advises that repair services may be obtained at Xerox Service Centers. Beyond a standard 90-day warranty, a one-year service contract is available for service (from Xerox) for \$199. The dealer network is being established while this article is being written. It is anticipated that the dealer network will assume some software and hardware support services.

STM's documentation package is well-done, one of the better efforts I've seen. It presents system information and CP/M instruction clearly and concisely. The documentation that accompanies the Perfect software is among the best I've seen—made even better by the computer-assisted instruction used to teach it. While this level of documentation is to be applauded for the novice user, it isn't enough. STM advises that another, more technical, level of documentation will be provided. Xerox will be producing service literature.

My early impressions of this unit were extremely negative. It is difficult to evaluate a unit when it has been damaged. Pied Piper arrived damaged. The on-board disk drive simply wouldn't behave as it should. The data received was insufficient for technical reference. Concerns about little things suddenly became large.

Not wishing to operate in a vacuum, I gave STM the opportunity to rectify the situation. They were also concerned that it would not be possible to give the unit a fair assessment if it hadn't arrived intact. Since the vagaries of shipping affect us all, STM's marketing director, Mr. Derek Southern, put forth an extraordinary effort, flying across the country bearing a workable device and amply demonstrating what has proved to be an extremely capable computer. While that level of support cannot be performed for every customer, it is, at least, indicative of the fact that this company cares that its product begin its life correctly. This perspective is maintained by the availability of an 800 number you can call for help.

The price is right, to be certain, and Pied Piper is destined to prove that a micro need not be expensive to be good. Available support is a critical factor, as well, and Pied Piper has that covered. STM has provided a 24-hour help line to locate the nearest sales/service outlet. The number is 800-772-3545, ext. 576 (CA) and 800-227-1617, ext. 576 (elsewhere). Upon purchase, you will also be given another toll-free number where you may obtain technical and/or software assistance.

Pied Piper will make a substantial dent in the portable computer market, given that it aggressively pursues that market. STM has provided the foundation of a line of user-oriented tools with a different perspective. If they are as ambitious with their marketing activities as they appear to be, others are certain to follow. ■

A Capsule Look At the Pied Piper

Manufacturer

STM Electronics Corp., 525 Middle Field Road, Suite 130, Menlo Park, CA 94025.

List Price

\$1299.

Standard Features

Z-80A microprocessor; 64K RAM; 4K ROM; 2K of video display buffer; 2K of ROM for character generation; full-size typewriter-style ASCII keyboard; Centronics-type parallel printer port; 24 lines of 80 characters for video monitor; 24 lines of 40 characters for TV display; upper/lowercase characters with special graphics characters; 5/4-inch slimline disk drive with one megabyte of unformatted storage, 800K formatted; CP/M operating system.

Proportions

4 x 20.2 x 10.8; weighs less than 13 pounds.

Options

RS-232C serial port with one software programmable baud rate up to 19.2K; two-line by 80-column LCD; modem.

Software

Perfect Writer; Perfect Speller; Perfect Calc; Perfect Filer.

Optional Software

SuperCalc; MBasic; dBase II; WordStar; Multiplan.

CONVERSIONS

Each month Microcomputing will publish translations of selected programs published in the magazine. We encourage our readers to submit a hard copy of their conversions along with a cassette or disk of the program. Include a self-addressed, stamped envelope for the return of magnetic media if not selected for publication. Authors whose translations are chosen will receive payment for their efforts.

Check-writing program modified to run on the Heath computer systems. By Sam Kauffman, Route #6, Box 57, Ozark, AL 36360.

```

00010 REM *****
00020 REM *****
00030 REM ***** THIS PROGRAM CONVERTS NUMBERS TO ENGLISH WORDS *****
00040 REM *****
00050 REM ***** WRITTEN BY VAN WOLVERTON *****
00060 REM *****
00070 REM ***** MODIFIED FOR HEATH HDOS/B.H. BASIC BY S. KAUFFMAN *****
00080 REM *****
00090 REM *****
00095 REM *****
00100 PRINT CHR$(27)+"E":REM CLEAR SCREEN AND HOME CURSOR
00110 GOSUB 500:REM INITIALIZE STRINGS
00120 AS="":LINE INPUT "Amount of check: ";AS
00130 GOSUB 1000:REM CONVERT TO WORDS
00140 PRINT C$
00150 PRINT
00160 IF AS<>" " THEN 120
00170 END
00495 REM *****
00500 REM ***** INITIALIZE WORD ARRAYS *****
00510 REM *****
00520 REM *****
00525 REM *****
00530 DIM US(19),T$(9),M$(5)
00540 Z$="0":Z2$="00":S$=" ":P$="."
00550 FOR I=1 TO 19
00560 READ US(I)
00570 NEXT I
00580 FOR I=2 TO 9
00590 READ T$(I)
00600 NEXT I
00610 FOR I=2 TO 5
00620 READ M$(I)
00630 NEXT I
00640 DATA "one","two","three","four","five","six","seven","eight","nine"
00650 DATA "ten","eleven","twelve","thirteen","fourteen","fifteen"
00660 DATA "sixteen","seventeen","eighteen","nineteen"
00670 DATA "twenty","thirty","forty","fifty","sixty","seventy","eighty"
00680 DATA "ninety"
00690 DATA "thousand","million","billion","trillion"
00700 RETURN
00995 REM *****
01000 REM ***** INITIALIZE STRINGS AND VERIFY INPUT *****
01010 REM *****
01020 REM *****
01025 REM *****
01030 C$="":C1$="":D$=""
01040 IF VAL(AS)<.01 THEN C1$="*** VOID ***":RETURN
01995 REM *****
02000 REM ***** SEPERATE INTO DOLLAR AND CENT STRINGS *****
02010 REM *****
02020 REM *****
02025 REM *****
02030 M=MATCH(AS,P$,1)
02040 IF M=0 THEN D$=AS
02050 IF M=0 THEN D$=LEFT$(AS,M-1):C$=MID$(AS,M+1,2)
02060 IF VAL(C$)=0 THEN C$="":AS=D$
02995 REM *****
03000 REM ***** CONDITION INPUT DATA *****
03010 REM *****
03020 REM *****
03025 REM *****
03030 IF LEN(C$)=1 THEN C$=C$+"0"
03040 L=LEN(D$)/3
03050 L=L-INT(L)
03060 IF L>.5 THEN D$=Z1$+D$
03070 IF L<.5 AND L<>0 THEN D$=Z2$+D$
03080 IF D$="" THEN D$="000"
03090 L1=1
03995 REM *****
04000 REM ***** CONVERT DOLLAR STRING TO WORDS *****
04010 REM *****
04020 REM *****
04025 REM *****
04030 FOR I=LEN(D$)/3 TO 1 STEP -1
04040 D1$=MID$(D$,L1,3):L1=L1+3
04050 D1$=VAL(LEFT$(D1$,1))
04060 D2$=VAL(MID$(D1$,2,1))
04070 D3$=VAL(RIGHT$(D1$,1))
04080 IF D1>0 THEN C1$=C1$+US(D1)+" hundred "
04090 IF D2=0 THEN C1$=C1$+US(D3)+"
04100 IF D2=1 THEN C1$=C1$+US(D3)+D3+"
04110 IF D2=1 THEN C1$=C1$+T$(D2):IF D3=0 THEN C1$=C1$+"-"+US(D3)
04120 IF D2=1 AND D3=0 THEN C1$=C1$+"
04130 IF D1>1 THEN IF D1=D2=D3=0 THEN C1$=C1$+M$(L1)+" "
04140 NEXT I
04995 REM *****
05000 REM ***** ADD CENTS AND CLEAN UP *****
05010 REM *****
05020 REM *****
05025 REM *****
05030 IF LEN(C1$)=1 THEN C1$="NONE "
05040 IF C$="" THEN C1$="EXACTLY "+C1$:IF VAL(AS)=1 THEN C1$=C1$+"dollar"
05050 IF VAL(C$)=0 AND VAL(AS)=1 THEN C1$=C1$+" dollars"
05060 IF C$="" THEN C1$=C1$+"and "+C$+" /100 dollars"
05070 T=ASC(C1$):C1$=CHR$(T AND 95)+RIGHT$(C1$,LEN(C1$)-1)
05080 L=LEN(C1$)
05090 M=MATCH(C1$,S$,1):IF M=0 THEN C1$=LEFT$(C1$,M-1)+RIGHT$(C1$,L-M):GOTO 5080
05100 RETURN

```

Program conversion of "Apple Gets Optimal" program published in the April 1983 Microcomputing. Modified for the Heath H89 by Robert Anderson, 2608 Winter Street, St. Albans, WV 25177.

```

10 ***** LINEAR PROGRAMMING BY MARGARET MORRIS *****
20 ---MICROCOMPUTING, APRIL 1983, P.60 MODIFIED BY R. L. ANDERSON
30 *** SAVED AS 'B:MINMAX.BAS'
40 PRINT CHR$(27)+"E":CLEAR:***BLANK SCREEN AND ZERO ALL VARIABLES
50 --- INITIALIZE VARIABLES OPT$, VAR, CNS
60 INPUT "MAXIMIZE OR MINIMIZE? (MAX/MIN): ";OPT$
70 IF OPT$="MAX" OR OPT$="MIN" THEN 100
80 GOSUB 250:***INVALID INPUT ALARM
90 GOTO 60
100 PRINT:PRINT:PRINT
110 INPUT "HOW MANY VARIABLES? ";VAR
120 PRINT:PRINT:PRINT
130 INPUT "HOW MANY CONSTRAINTS? ";CNS
140 DIM MTRX(CNS-2,VAR+CNS-2)
150 GOSUB 310:***BUILD SIMPLEX TABLEAU
160 GOSUB 1130:***FIND OPTIMUM SOLUTION
170 IF SOLN=1 THEN GOSUB 1650:***PRINT SOLUTION IF FOUND
180 PRINT:PRINT:PRINT
190 INPUT "MORE PROBLEMS? (Y/N): ";MRE$
200 IF MRE$="Y" THEN 40
210 IF MRE$="N" THEN 240
220 GOSUB 250:***INVALID INPUT ALARM
230 GOTO 190
240 END:***END OF MAIN PROGRAM
250 ***** ALARM FOR INVALID INPUT SUBROUTINE
260 FOR NDISE=1 TO 100
270 PRINT CHR$(7)
280 NEXT NDISE
290 PRINT CHR$(27)+"E":PRINT:PRINT:PRINT "INPUT ONE OF THE CHOICES IN PARENTHESIS"
300 PRINT:PRINT:PRINT:PRINT "S"
310 ***** BUILD SIMPLEX SUBROUTINE
320 GOSUB 410:***ADD VARIABLE LABELS
330 GOSUB 490:***ADD ID MATRIX
340 GOSUB 570:***ENTER VALUES FOR COEFFICIENTS
350 GOSUB 620:***DISPLAY VALUES, ALLOW CHANGES
360 IF OPT$="MAX" THEN 400
370 FOR COL=0 TO CNS-1
380 MTRX(CNS,COL)=MTRX(CNS,COL)*-1
390 NEXT COL
400 RETURN
410 ***** ADD VARIABLE LABELS
420 FOR ROW=0 TO CNS-1
430 MTRX(ROW,VAR+CNS-1)=ROW+VAR+1
440 NEXT ROW
450 FOR COL=0 TO VAR+CNS-1
460 MTRX(CNS-1,COL)=COL+1
470 NEXT COL
480 RETURN
490 ***** IDENTITY MATRIX
500 FOR ROW=0 TO CNS
510 FOR COL=VAR TO CNS-1+VAR
520 MTRX(ROW,COL)=0
530 NEXT COL
540 MTRX(ROW,ROW+VAR)=1
550 NEXT ROW
560 RETURN
570 ***** ENTER CONSTANTS, COEFFICIENTS
580 PRINT CHR$(27)+"E":PRINT:PRINT
590 PRINT:PRINT "ENTER THE COEFFICIENT OF EACH VARIABLE":PRINT
600 FOR ROW=0 TO CNS-1
610 PRINT "CONSTRAINT ";ROW+1
620 FOR COL=0 TO VAR-1
630 PRINT "VARIABLE ";COL+1
640 INPUT MTRX(ROW,COL)
650 NEXT COL
660 PRINT "CONSTANT ";ROW+1
670 INPUT MTRX(ROW,CNS+VAR)
680 PRINT:PRINT:PRINT
690 INPUT "ANY CHANGES? (Y/N)";CHG$
700 IF CHG$="Y" THEN 610
710 IF CHG$="N" THEN 740
720 GOSUB 250:***INVALID INPUT ALARM
730 GOTO 690
740 PRINT CHR$(27)+"E":NEXT ROW
750 PRINT "OBJECTIVE ROW VALUES "
760 FOR COL=0 TO VAR-1
770 PRINT "VARIABLE ";COL+1
780 INPUT MTRX(CNS,COL)
790 NEXT COL
800 INPUT "VALUE OF OBJECTIVE CONSTANT ";MTRX(CNS,VAR+CNS)
810 RETURN
820 ***** DISPLAY VALUES AND ALLOW CHANGES
830 PRINT CHR$(27)+"E":PRINT:PRINT
840 PRINT TAB(10);
850 FOR I%=1 TO VAR
860 PRINT "VAR";I%;SPACE$(6);
870 NEXT I%
880 PRINT "CONSTANT"
890 FOR ROW=0 TO CNS
900 IF ROW=CNS THEN PRINT "OBJ ";TAB(7);:GOTO 920
910 PRINT "CNS";ROW+1;TAB(7);
920 FOR COL=0 TO VAR-1
930 PRINT USING "###.#####";MTRX(ROW,COL);:PRINT " ";
940 NEXT COL
950 PRINT USING "###.#####";MTRX(ROW,CNS+VAR)
960 NEXT ROW
970 PRINT:PRINT:PRINT
980 INPUT "ANY CHANGES? (Y/N)";CHG$
990 IF CHG$="Y" OR CHG$="N" THEN 1020
1000 GOSUB 250:***INVALID INPUT ALARM
1010 GOTO 980
1020 IF CHG$="N" THEN 1120
1030 PRINT "TYPE ROW NUMBER, THEN COLUMN NUMBER, OF ENTRY TO BE CHANGED"
1040 PRINT "ROW NUMBER (1 TO);CNS;";:INPUT ROW
1050 IF ROW=0 OR ROW=CNS THEN GOSUB 250:GOTO 1040:***INVALID INPUT ALARM
1060 PRINT "COLUMN NUMBER (1 TO);VAR;";:INPUT COL
1070 IF COL=0 OR COL=VAR THEN GOSUB 250:GOTO 1060:***INVALID INPUT ALARM
1080 INPUT "NEW VALUE ";NV
1090 IF VAR<COL THEN COL=COL+CNS
1100 MTRX(ROW-1,COL-1)=NV
1110 PRINT CHR$(27)+"E":GOTO 890
1120 RETURN
1130 ***** SIMPLEX METHOD TO FIND SOLUTION
1140 SOLN=0:FEAS=0:***INIT FLAGS - NO FEASIBLE SOLUTION YET
1150 OP=0:***NO OPTIMUM SOLUTION YET
1160 *** FIND SMALLEST NUMBER IN OBJECTIVE ROW

```

More

Listing continued.

```

1170 SM=MTRX(CNS,0):PCOL=0
1180 FOR COL=1 TO VAR+CNS-1
1190 IF MTRX(CNS,COL) > SM THEN 1210
1200 SM=MTRX(CNS,COL):PCOL=COL
1210 NEXT COL
1220 IF SM > 0 THEN OP=1:GOTO 1360
1230 *** FIND SMALLEST RATIO
1240 FD=0 ***FLAG TO INDICATE IF VALID RATIO FOUND
1250 VLD=0 ***VALUE OF CURRENT VALID RATIO
1260 SAV=0 ***SAVE VALUE OF SMALLEST RATIO
1270 FOR ROW=0 TO CNS-1
1280 IF MTRX(ROW,PCOL) <= 0 THEN 1320 ***INVALID
1290 VLD=MTRX(ROW,CNS+VAR)/MTRX(ROW,PCOL)
1300 IF VLD > SAV AND FD < 0 THEN 1320
1310 SAV=VLD:PCOL=ROW:FD=1
1320 NEXT ROW
1330 IF FD=0 THEN OP=0:GOTO 1360
1340 GOSUB 1800 ***ELEMENTARY ROW OPERATIONS
1350 GOTO 1140 ***REPEAT SIMPLEX PROCESS
1360 GOSUB 1420 ***ASSURE FEASIBILITY
1370 IF FEAS=1 AND OP=1 THEN SOLN=1:GOTO 1410
1380 IF CHG=1 THEN GOTO 1140 ***DUAL SIMPLEX USED
1390 IF FEAS=0 THEN PRINT:PRINT " NO FEASIBLE SOLUTION"
1400 IF FEAS=1 AND OP=0 THEN PRINT:PRINT "INFINITE NUMBER OF SOLUTIONS"
1410 RETURN
1420 ***** DUAL SIMPLEX-ASSURE FEASIBILITY
1430 ***FIND SMALLEST * IN BASIS COL
1440 FROM=0:CHG=0
1450 SM=MTRX(0,VAR+CNS)
1460 FOR ROW=1 TO CNS-1
1470 IF MTRX(ROW,VAR+CNS) > SM THEN 1490
1480 SM=MTRX(ROW,VAR+CNS):FROM=ROW
1490 NEXT ROW
1500 IF SM > 0 THEN FEAS=1:GOTO 1440 ***SOLUTION IS FEASIBLE
1510 SAV=0 ***VALUE OF SMALLEST RATIO
1520 FD=0 *** NO VALID RATIO YET
1530 CHG=0 ***DUAL SIMPLEX NOT USED YET
1540 VLD=0 ***VALUE OF VALID RATIO

```

```

1550 FOR COL=0 TO VAR+CNS-1
1560 IF MTRX(FROW,COL) >= 0 THEN 1600
1570 VLD=MTRX(CNS,COL)/MTRX(FROW,COL)
1580 IF VLD < SAV AND FD < 0 THEN 1600
1590 SAV=VLD:PCOL=COL:FD=1
1600 NEXT COL
1610 IF FD=0 THEN 1640 ***** NO FEASIBLE SOLUTION
1620 CHG=1 ***DUAL SIMPLEX USED
1630 GOSUB 1800 ***ELEMENTARY ROW OPERATION
1640 RETURN
1650 ***** DISPLAY OF RESULTS SUBROUTINE
1660 PRINT CHR$(27)+ "E"
1670 PRINT:PRINT:PRINT " OPTIMUM VALUES"
1680 FOR ROW=0 TO CNS-1
1690 IF VAR > MTRX(ROW,CNS+VAR+1) THEN 1730
1700 MTRX(ROW,VAR+CNS+1)=MTRX(ROW,VAR+CNS+1)-VAR
1710 PRINT:PRINT "SLACK VARIABLE FOR CONSTRAINT # ";MTRX(ROW,VAR+CNS+1); " IS ";M
TRX(ROW,VAR+CNS)
1720 GOTO 1740
1730 PRINT:PRINT "VARIABLE ";MTRX(ROW,VAR+CNS+1); " IS ";MTRX(ROW,VAR+CNS)
1740 NEXT ROW
1750 PRINT:PRINT "ALL OTHER VARIABLES & SLACK VARIABLES"
1760 PRINT " ARE EQUAL TO ZERO"
1770 IF OPT="MIN" THEN MTRX(CNS,VAR+CNS)=MTRX(CNS,VAR+CNS) * -1
1780 PRINT:PRINT "OPTIMUM SOLUTION: ";MTRX(CNS,VAR+CNS)
1790 RETURN
1800 ***** ELEMENTARY ROW OPERATIONS
1810 MTRX(FROW,VAR+CNS+1)=MTRX(CNS+1,PCOL)
1820 PIVOT=MTRX(FROW,PCOL)
1830 FOR COL=0 TO VAR+CNS
1840 MTRX(FROW,COL)=MTRX(FROW,COL)/PIVOT
1850 NEXT COL
1860 FOR ROW=0 TO CNS
1870 IF ROW=FROW THEN 1920
1880 NEG=MTRX(ROW,PCOL) * -1
1890 FOR COL=0 TO VAR+CNS
1900 MTRX(ROW,COL)=MTRX(ROW,COL)+NEG*MTRX(FROW,COL)
1910 NEXT COL
1920 NEXT ROW
1930 RETURN

```

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7400

Table listing 7400 series components with part numbers and prices.

LINEAR

Table listing Linear components including LM301, LM301H, LM307, etc.

RCA

Table listing RCA components including CA 3023, CA 3039, CA 3046, etc.

CMOS

Table listing CMOS components including 4000, 4001, 4002, etc.

TI

Table listing TI components including TL494, TL496, TL497, etc.

BI FET

Table listing BI FET components including TL071, TL072, TL074, etc.

H = TO-5 CAN T = TO-220 K = TO-3

74S00

Table listing 74S00 series components including 74S00, 74S02, 74S03, etc.

IC SOCKETS

Table listing IC sockets including 8 pin ST, 14 pin WW, 16 pin WW, etc.

VOLTAGE REGULATORS

Table listing Voltage Regulators including 7805T, 7808T, 7812T, etc.

DIP SWITCHES

Table listing DIP switches including 4 POSITION, 5 POSITION, 6 POSITION, etc.

INTERFACE

Table listing Interface components including 8T26, 8T28, 8T95, etc.

LED LAMPS

Table listing LED lamps including Red, Green, Yellow.

LED DISPLAYS

Table listing LED displays including HP 5082-7760, MAN 72, MAN 74, etc.

MISC.

Table listing Miscellaneous components including ULN2003, 3242, 3341, etc.

CLOCK CIRCUITS

Table listing Clock Circuits including 314, 369, 375, etc.

INTERSIL

Table listing Intersil components including ICL7103, ICL7106, ICL7107, etc.

9000

Table listing 9000 series components including 9316, 9334, 9368, etc.

EXAR

Table listing Exar components including XR 2206, XR 2207, XR 2208, etc.

DATA ACQUISITION

Table listing Data Acquisition components including ADC0800, ADC0804, ADC0809, etc.

SOUND CHIPS

Table listing Sound Chips including 76477, 76489, AY3-8910, etc.

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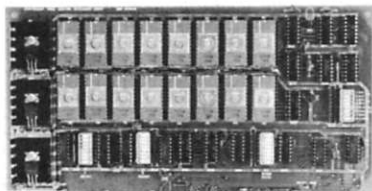


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32K S-100 EPROM CARD PRICE CUT!



\$59.95

USES 2716's
Blank PC Board - \$34
ASSEMBLED & TESTED
ADD \$30

SPECIAL: 2716 EPROM's (450 NS) Are \$4.95 Ea. With Above Kit.

KIT FEATURES:

1. Uses +5V only 2716 (2Kx8) EPROM's
2. Allows up to 32K of software on line!
3. IEEE S-100 Compatible.
4. Addressable as two independent 16K blocks.
5. Cromemco extended or Northstar bank select
6. On board wait state circuitry if needed
7. Any or all EPROM locations can be disabled
8. Double sided PC board, solder-masked, silk-screened
9. Gold plated contact fingers
10. Unselected EPROM's automatically powered down for low power
11. Fully buffered and bypassed
12. Easy and quick to assemble

64K S100 STATIC RAM

\$229⁰⁰
KIT

NEW!

LOW POWER!
RAM OR EPROM!

BLANK PC BOARD
WITH DOCUMENTATION
\$55

SUPPORT ICs + CAPS
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NEW IEEE 696 S100
STANDARD
(AS PROPOSED)

FOR 56K KIT \$199

ASSEMBLED AND
TESTED ADD \$50



FEATURES:

- * Uses new 2K x 8 (TMM 2016 or HM 6116) RAMs.
- * Fully supports IEEE 696 24 BIT Extended Addressing.
- * 64K draws only approximately 500 MA.
- * 200 NS RAMs are standard. (TOSHIBA makes TMM 2016s as fast as 100 NS. FOR YOUR HIGH SPEED APPLICATIONS.)
- * SUPPORTS PHANTOM (BOTH LOWER 32K AND ENTIRE BOARD).
- * 2716 EPROMs may be installed in any of top 48K.
- * Any of the top 8K (E000 H AND ABOVE) may be disabled to provide windows to eliminate any possible conflicts with your system monitor, disk controller, etc.
- * Perfect for small systems since BOTH RAM and EPROM may co-exist on the same board.
- * BOARD may be partially populated as 56K.

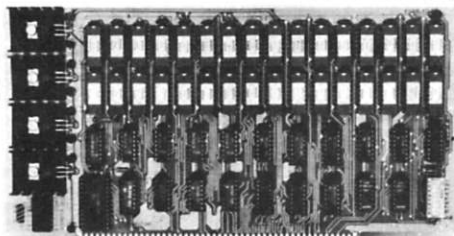
16K STATIC RAM KIT-S 100 BUSS

PRICE CUT!

\$99⁹⁵
KIT

FOR 4MHZ
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PRICE CUT



KIT FEATURES:

1. Addressable as four separate 4K Blocks
2. ON BOARD BANK SELECT circuitry (Cromemco Standard!) Allows up to 512K on line!
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\$179⁰⁰
(48K KIT)

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LOW POWER!
RAM OR EPROM!

BLANK PC BOARD
WITH
DOCUMENTATION
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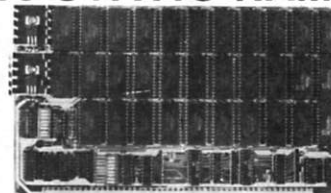
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56K Kit \$219

64K Kit \$249

ASSEMBLED AND
TESTED ADD \$50



FEATURES:

- * Uses new 2K x 8 (TMM 2016 or HM 6116) RAMs.
- * Fully supports Extended Addressing.
- * 64K draws only approximately 500 MA.
- * 200 NS RAMs are standard. (TOSHIBA makes TMM 2016s as fast as 100 NS. FOR YOUR HIGH SPEED APPLICATIONS.)
- * Board is configured as 3-16K blocks and 8-2K blocks (within any 64K block) for maximum flexibility.
- * 2716 EPROMs may be installed anywhere on Board.
- * Top 16K may be disabled in 2K blocks to avoid any I/O conflicts.
- * On Board supports both RAM and EPROM.
- * RAM supports 2MHZ operation at no extra charge!
- * Board may be partially populated in 16K increments.

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NEW!

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KIT FEATURES:

- * TWO GI SOUND COMPUTER IC'S
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COMPLETE KIT!

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(WITH DATA MANUAL)

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BOARD W/DATA
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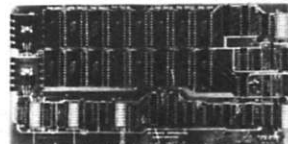
32K S100 EPROM/STATIC RAM

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NEW!

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EPROM KIT
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A&T EPROM
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WITH DATA
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IC'S
PLUS CAPS
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SOCKET SET
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We took our very popular 32K S100 EPROM Card and added additional logic to create a more versatile EPROM/RAM Board.

FEATURES:

- * This one board can be used in any one of four ways:
 - A. As a 32K 2716 EPROM Board
 - B. As a 32K 2732 EPROM Board (Using Every Other Socket)
 - C. As a mixed 32K 2716 EPROM/2K x 8 RAM Board
 - D. As a 32K Static RAM Board
- * Uses New 2K x 8 (TMM2016 or HM6116) RAM's
- * Fully Supports IEEE 696 Buss Standard (As Proposed)
- * Supports 24 Bit Extended Addressing
- * 200 NS (FAST!) RAM'S are standard on the RAM Kit
- * Supports both Cromemco and North Star Bank Select
- * Supports Phantom
- * On Board wait State Generator
- * Every 2K Block may be disabled
- * Addressed as two separate 16K Blocks on any 64K Boundary
- * Perfect for MP/M* Systems
- * RAM Kit is very low power (300 MA typical)

32K STATIC RAM KIT — \$139.95

For RAM Kit A&T - Add \$40

TERMS: Add \$2.00 postage. We pay balance. Orders under \$15 add 75¢ handling. No C.O.D. We accept Visa and MasterCard. Tex. Res. add 5% Tax. Foreign orders (except Canada) add 20% P & H. Orders over \$50, add 85¢ for insurance.

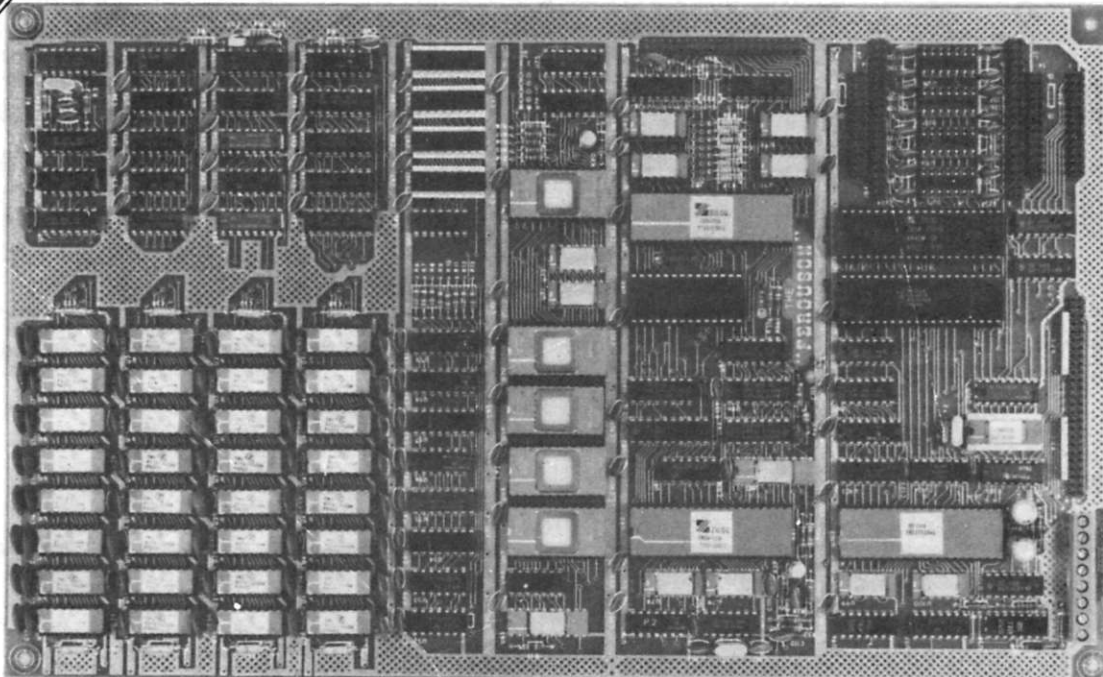
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The Big Board gives you the right mix of most needed computing features all on one board. The Big Board was designed from scratch to run the latest version of CP/M*. Just imagine all the off-the-shelf software that can be run on the Big Board without any modifications needed.

\$319⁰⁰** (64K KIT
BASIC I/O)

SIZE: 8 1/2 x 13 3/4 IN.
SAME AS AN 8 IN. DRIVE.
REQUIRES: +5V @ 3 AMPS
+ - 12V @ .5 AMPS.

FULLY SOCKETED!

FEATURES: (Remember, all this on one board!)

64K RAM

Uses industry standard 4116 RAM's. All 64K is available to the user, our VIDEO and EPROM sections do not make holes in system RAM. Also, very special care was taken in the RAM array PC layout to eliminate potential noise and glitches.

Z-80 CPU

Running at 2.5 MHZ. Handles all 4116 RAM refresh and supports Mode 2 INTERRUPTS. Fully buffered and runs 8080 software.

SERIAL I/O (OPTIONAL)

Full 2 channels using the Z80 SIO and the SMC 8116 Baud Rate Generator. FULL RS232! For synchronous or asynchronous communication. In synchronous mode, the clocks can be transmitted or received by a modem. Both channels can be set up for either data-communication or data-terminals. Supports mode 2 Int. Price for all parts and connectors: \$39.95

BASIC I/O

Consists of separate parallel port (Z80 PIO) for use with an ASCII encoded keyboard for input. Output would be on the 80 x 24 Video Display.

BLANK PC BOARD — \$119

The blank Big Board PC Board comes complete with full documentation (including schematics), the character ROM, the PFM 3.3 MONITOR ROM, and a diskette with the source of our BIOS, BOOT, and PFM 3.3 MONITOR.

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With a crisp, flicker-free display that looks extremely sharp even on small monitors. Hardware scroll and full cursor control. Composite video or split video and sync. Character set is supplied on a 2716 style ROM, making customized fonts easy. Sync pulses can be any desired length or polarity. Video may be inverted or true. 5 x 7 Matrix - Upper & Lower Case.

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Uses WD1771 controller chip with a TTL Data Separator for enhanced reliability. IBM 3740 compatible. Supports up to four 8 inch disc drives. Directly compatible with standard Shugart drives such as the SA800 or SA801. Drives can be configured for remote AC off-on. Runs CP/M* 2.2.

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The popular CP/M* D.O.S. to run on Big Board is available for \$139.00.

BIG BOARD SOFTWARE SPECIAL — \$149

Through special arrangement with CDL we offer a powerful package of TDL Z-80 software that has a suggested retail of almost \$600. Includes: Extended Disk Business Basic, ZEDIT text editor, MACRO II Macro Assembler, LINKER, DEBUG I and DEBUG II. Supplied on 8 in. diskette with extensive manual.

PFM 3.3 2K SYSTEM MONITOR

The real power of the Big Board lies in its PFM 3.3 on board monitor. PFM commands include: Dump Memory, Boot CP/M*, Copy, Examine, Fill Memory, Test Memory, Go To, Read and Write I/O Ports, Disc Read (Drive, Track, Sector), and Search PFM occupies one of the four 2716 EPROM locations provided. Z-80 is a Trademark of Zilog.

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7400	18	7430	17	7482	65	74126	45	74176	75	LM300H	35	LM300H	35	LM301N	30	LM301H	45	LM307H	45	LM308AN	2.25	LM317K	3.85	LM310	1.45	LM311	50	LM317K	3.85	LM318H	1.45	LM322	1.55	LM323K	4.95	LM324	5.55	LM339	99	LM348	1.25	LM358	65	LM380	1.10	LM381	1.85	LM386	1.40	LM531	1.95	LM555	27	LM556	1.10	LM558	2.45	LM565	95	LM566	1.45	LM703	75	LM709	40	LM710	75	LM711	49	LM712	1.75	LM723	55	LM733	95	LM741-8	35	LM741H-14	35	LM741H	35	LM775	25	LM776	1.75	1349	1.75	1350	1.15	1356	1.30	1372	4.95	1458	55	1486	85	1489	85	1496	85	1889	1.55	4501	1.50	4558	75

VOLTAGE REGULATORS

7805
7808
7812
7818
7824
7827
7812
7818

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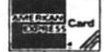
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LS11	.24	LS191	.90
LS12	.30	LS192	.80
LS14	.50	LS193	.80
LS20	.24	LS195	.65
LS21	.25	LS221	.80
LS27	.24	LS240	.75
LS30	.24	LS241	.80
LS32	.36	LS242	.90
LS42	.49	LS243	.90
LS51	.24	LS244	.90
LS74	.30	LS245	1.50
LS85	.60	LS251	.50
LS86	.39	LS257	.45
LS90	.50	LS258	.45
LS93	.55	LS266	.50
LS109	.39	LS273	1.25
LS112	.39	LS279	.45
LS123	.75	LS283	.60
LS124	2.75	LS290	.85
LS125	.45	LS293	.85
LS132	.50	LS298	.89
LS133	.49	LS299	1.60
LS138	.50	LS366	.45
LS139	.50	LS367	.40
LS151	.50	LS368	.40
LS153	.50	LS373	.99
LS154	1.75	LS374	.75
LS155	.50	LS375	1.19
LS156	.55	LS377	1.49
LS157	.60	LS378	.85
LS161	.60	LS390	1.19
LS162	.65	LS393	1.19
LS163	.50	LS399	.99

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7400	.19
7402	.19
7404	.19
7406	.19
7408	.19
7410	.19
7438	.22
7440	.19
7474	.29
7486	.29
74109	.45
74125	.49
74154	1.19
74175	.79
74367	.59

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4KX1	8/3.95
4027-4KX1-250 n.s.	1.00
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80C35C	4.50
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8214	2.00
8216	1.50
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8275	19.95
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Z80 2.5 MHZ CPU	3.50
Z80CTC	3.75
Z80DMA-DMA	9.95
Z80PIO	3.95
Z80SIO/O	16.95
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262.144 KHz	.75
300.000	1.00
1.5432 Mhz	1.25
2.000000	2.49
3.000	1.15
3.579545	.75
3.579545 - HC18	1.19
4.000	2.49
4.433618	.75
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4.9152	1.00
4.916 Bd. Rate	1.99
5.000000	1.50
5.0688	2.49
5.616	1.59
8.000	1.99
9.90000	1.25
10.69425	2.49
10.695000	1.59
10.8864	1.49
11.088	1.59
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91.000	1.00

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F.D. CONTROLLERS

1771 Single Density	15.00
1791 Double Density	20.00
1793	22.00
1797	20.95

CRT CONTROLLERS

5027 Programmable - 24x80	10.95
5037	6.95 10/6.00
68B45 - Motorola (HD46505SP) CRT Controller - 2MHZ	17.50
8275	19.95

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TR1602-UART same as AY5-1013	1.99
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IM6402-+5v High speed UART-AY5-1013 pin out	1.65
INS 8250B	9.95

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S-100 MEMORY BOARDS

64K STATIC RAM - Jade

Uses new 2K x 8 static RAMs, fully supports IEEE 696 24 bit extended addressing, 200ns RAMs, lower 32K or entire board phantomable, 2716 EPROMs may be subbed for RAMs, any 2K segment of upper 8K may be disabled, low power typically less than 500ma.

- MEM-99152B Bare board \$49.95
- MEM-99152K Kit less RAM \$99.95
- MEM-32152K 32K kit \$199.95
- MEM-56152K 56K kit \$289.95
- MEM-64152K 64K kit \$299.95
- Assembled & Tested add \$50.00

EXPANDORAM III

ExpandoRAM III expandable from 64K to 256K using 64Kx1 RAM chips, compatible with CP/M, MP/M, Oasis, & most other Z-80 based systems, functions as ultra-high speed disk drive when used with optional RAMDISK software.

- MEM-65064A 64K A & T \$474.95
- MEM-65128A 128K A & T \$574.95
- MEM-65192A 192K A & T \$674.95
- MEM-65256A 256K A & T \$774.95
- SFC-55009000F RAMDISK software CP/M 2.2 \$44.95
- SFC-55009000F RAMDISK with EXRAM III \$24.95

LETTER QUALITY PRINTERS

Letter Quality Printer - BMC

Wordstar compatible, Diablo protocols, proportional and incremental spacing, 16 CPS bi-directional printing, 10, 12, or 15 CPI, up to 17-inch wide paper. Available in parallel or serial versions

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- PRD-52002 Serial \$829.00
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380Z by Data Terminals & Communications

Based on the same quality mechanism as the Comrex printer the 380Z contains electronic enhancements that allow it to print at speeds up to 32 CPS. Other features include a 48K buffer, proportional spacing, and Diablo 1640/1650/630 compatible protocol. Comes with printwheel, ribbon and users manual. Serial, parallel, and IEEE 488 interfaces standard

- PRD-11300 380Z printer \$1295.00
- PRA-11000 Tractor option \$169.95
- PRA-12000 Cut Sheet Feeder \$699.95

Printers From JADE

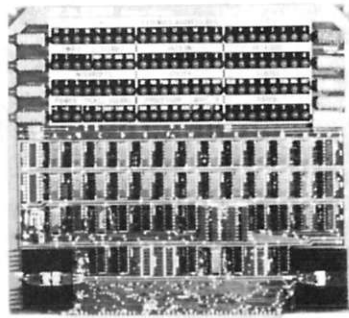
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- OKIDATA 93 15" 160 CPS CALL
- OKIDATA 83 15" 120 CPS CALL
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- DAISYWRITER 2000 48K Daisywheel \$1395.00
- GEMINI 10 100 CPS with Graphics \$349.95
- GEMINI 15 15" with Graphics \$499.95
- COMREX CR1 \$849.95

EPROM ERASERS

ULTRA-VIOLET EPROM ERASERS

Inexpensive erasers for industry or home.

- XME-3100A Spectronics w/o timer \$69.50
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- XME-3200A Logical Devices \$49.95



S-100 I/O BOARDS

THE BUS PROBE - Jade

Inexpensive S-100 Diagnostic Analyzer

- TSX-200B Bare board \$59.95
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- TSX-200A A & T \$159.95

I/O-4 - SSM Microcomputer

2 serial I/O ports plus 2 parallel I/O ports.

- IOI-1010A A & T \$249.95

I/O-5 - SSM Microcomputer

Two serial & 3 parallel ports, 110-19.2K Baud

- IOI-1015A A & T \$289.95

INTERFACER 4 - CompuPro

3 serial, 1 parallel, 1 Centronics parallel.

- IOI-1840A A & T \$314.95
- IOI-1830C CSC \$414.95

S-100 EPROM BOARDS

PB-1 - SSM Microcomputer

2708, 2716 EPROM board with on-board programmer.

- MEM-99510K Kit with manual \$154.95
- MEM-99510A A & T with manual \$219.95

PROM-100 - SD Systems

2708, 2716, 2732 EPROM programmer with software.

- MEM-99520K Kit with software \$189.95
- MEM-99520A A & T with software \$249.95

32K PROM/RAM Board

The 32K S-100 PROM/RAM board can hold up to 16 each 2716 style EPROMs, 6116 style RAMs, or 8 each style EPROMs. This board was designed to fit into holder S-100 systems as well as the newer IEEE-696 machines. Uses 5 volt only EPROM/RAMs, allows operation as a 2K to 32K board, meets IEEE-696 S-100 proposed standard, addressable as two 16K blocks on any 64K page, supports Cromemco as well as Northstar bank select, perfect for MP/M systems

- MEM-99153B Bare board & manual \$49.95
- MEM-99153K Kit with No RAM \$89.95
- MEM-99153A A & T with No RAM \$139.95
- MEM-16153K Kit with 16K RAM \$129.95
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DUAL DISK SUB-SYSTEMS

Disk Sub-Systems - Jade

Handsome metal cabinet with proportionally balanced air flow system, rugged dual drive power supply, power cable kit, power switch, line cord, fuse holder, cooling fan, never mar rubber feet, all necessary hardware to mount 2-8" disk drives, power supply, and fan, does not include signal cable

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Handsome vertical cabinet with scratch resistant baked enamel finish, proportionally balanced air flow system, quiet cooling fan, rugged dual drive power supply, power cable power switch, line cord, fuse holder, cooling fan, & necessary hardware to mount 2-8" slimline disk drives, does not include signal cable.

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- END-000822 A & T w/o drives \$179.9

Dual 8" Slimline Sub-Systems

- END-000823 Kit w/2 SS DD \$919.9
- END-000824 A & T w/2 SS DD \$949.9
- END-000833 Kit w/2 DS DD \$1149.9
- END-000834 A & T w/2 DS DD \$1179.9

S-100 CPU BOARDS

SBC-200 - SD Systems

4 MHz Z-80A CPU with serial & parallel I/O, 1K RAM, I ROM space, monitor PROM included.

- CPC-30200A A & T \$329.

THE BIG Z - Jade

2 or 4 MHz switchable Z-80 CPU board with serial I/O accommodates 2708, 2716, or 2732 EPROM, baud rates frc 75 to 9600.

- CPU 30201B Bare board w/manual \$35.
- CPU-30201K Kit with Manual \$149.
- CPU-30201A A & T with Manual \$199.

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- CPU-30400A A & T with PROM \$289.

CPU-Z CompuPro

2 or 4 MHz Z80A CPU, 24 bit addressing.

- CPU-30500A 2/4 MHz A & T \$279.
- CPU-30500C 3/6 MHz CSC \$374.

8085/8088 - CompuPro

Both 8 & 16 bit CPUs, standard 8 bit S-100 bus, up to 8 Mf accesses 16 Megabytes of memory.

- CPU-20510A 6 MHz A & T \$398.
- CPU-20510C 6.8 MHz CSC \$497.

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1/4 DISK DRIVES

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art **SA400L** single-sided double-density 40 track
104000 \$234.95 ea 2 for **\$224.95** ea

on **TM100-2** double-sided double-density 48 TPI
551002 \$294.95 ea 2 for **\$269.95** ea

FD55A single-sided double-density 40 track
660551 \$299.95 ea 2 for **\$239.95**

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000216 Single cab w power supply \$69.95
000226 Dual cab w power supply \$94.95

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ilent, simple and on sale - a better motherboard.
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061B Bare board \$22.95
061K Kit \$39.95
061A A & T \$69.95

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121B Bare board \$34.95
121K Kit \$69.95
121A A & T \$109.95

18 Slot (14 1/2" x 8 3/4")

181B Bare board \$54.95
181K Kit \$99.95
181A A & T \$149.95

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ins **FDD 100-8** single-sided double-density
201120 \$274.95 ea 2 for **\$249.95** ea

art **SA801R** single-sided double-density
10801R \$394.95 ea 2 for **\$389.95** ea

art **SA851R** double-sided double-density
10851R \$554.95 ea 2 for **\$529.95** ea

e **DT-8** double-sided double-density
750080 \$524.95 ea 2 for **\$498.95** ea

on **TM848-1** Single-sided double-den thin-line
558481 \$379.95 ea 2 for **\$369.95** ea

on **TM848-2** double-sided double-den thin-line
558482 \$494.95 ea 2 for **\$484.95**

FD1165 double-sided double-density 1/2 high
851165 \$485 ea 2 for **\$449.95**

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M 3.0 is Digital Research's latest version of the industry
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A TREMENDOUS INCREASE IN SPEED!!!, it is fully
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55009057F CP/M 3.0 8" with manual \$200.00
55009057M CP/M 3.0 Manual \$40.00

CP/M Plus On EPROM:

55009059E Unbanked RS232 \$400.00
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MODEMS

SMART BUY in MODEMS - Signalman

1200 and/or 300 baud, direct connect, automatic answer
or originate selection, auto-answer/auto-dial on deluxe
models. 9v battery allows total portability, full one
year warranty.

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IOM-5610A 300 baud Deluxe \$149.95
IOM-5620A 1200/300 baud Deluxe \$369.95
IOM-5650A 300 baud for Osborne \$119.95
IOM-5630A 300 baud card for IBM \$269.95

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Sophisticated direct-connect auto-answer/auto-dial
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IOM-5500A Smartmodem 1200 \$599.95
IOM-5400A Smartmodem 300 \$224.95
IOK-1500A Hayes Chronograph \$218.95
IOM-1100A Micromodem 100 \$368.95
IOM-2010A Micromodem II w/ Term prgm \$329.95
IOM-2012A Terminal program for MMII \$89.95

1200 BAUD SMART CAT - Novation

103 212 Smart Cat & 103 Smart Cat, 1200 & 300 baud, built-in
dialer, auto re-dial if busy, auto answer disconnect, direct
connect, LED readout displays mode, analog digital loop-
back self tests, usable with multi-line phones.

IOM-5241A 300 baud 103 Smart Cat \$229.95
IOM-5251A 1200 baud 212 103 Smart Cat \$549.95

J-CAT™ MODEM - Novation

1/5 the size of ordinary modems, Bell 103, manual or
auto-answer, automatic answer/originate, direct connect,
built-in self-test, two LEDs and audio beeps provide
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IOM-5261A Novation \$149.95

S-100 DISK CONTROLLERS

DISK 1- CompuPro

8" or 5 1/4" DMA disk controller, single or double density,
single or double sided, 10MHz.

IOD-1810A A & T \$449.95
IOD-1810C CSC \$554.95

VERSAFLOPPY II - SD Systems

Double density disk controller for any combination of 5 1/4"
and 8" single or double sided, analog phase-locked loop
data separator, vectored interrupts. CP/M 2.2 & Oasis
compatible, control/diagnostic software PROM included.

IOD-1160A A & T with PROM \$359.95
SFC-55009047F CP/M 3.0 with VF-II \$139.95

2422 DISK CONTROLLER - C.C.S.

5 1/4" or 8" double density disk controller with on-board boot
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IOD-1300A A&T with CP/M 2.2 \$399.95

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Z-80A, auxiliary printer port, IEEE S-100 can function in
multi-user interrupt driven bus.

IOD-1200B Bare board & hwdw man \$59.95
IOD-1200K Kit w/hwdw & sftwr man \$299.95
IOD-1200A A & T w/hwdw & sftwr man \$325.95
SFC-59002001F CP/M 2.2 with Double D \$99.95

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Single board, standard size S-100 computer system, 4 MHz
Z-80A single or double density disk controller for 5 1/4" or 8"
drives, 64K RAM, extended addressing, up to 4K of EPROM,
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VDM-741210 12" Amber \$139.95

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Totally Apple compatible, 143,360 bytes per drive on DOS
3.3, full one year factory warranty, half-track capability
reads all Apple software, plugs right into Apple controller as
second drive, DOS 3.3, 3.2.1, Pascal, & CP/M compatible.

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MSM-431040 Controller w/software \$94.95

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Expand your Apple II to 64K, use as language card, full 1 year
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MEX-16700A Save over \$115.00 \$49.95

Z-CARD for Apple II - A.L.S.

Two computers in one, Z-80 & 6502, more than doubles the
power and potential of your Apple, includes Z-80 CPU card
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Full feature serial card for modems & printers, baud rates
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6 MHz, Z-80B, additional 64K of RAM, CP/M plus 3.0, 100%
CP/M 2.2 compatibility, C basic, CP/M Graphics, 300% faster
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CPX-62810A A.L.S. CP/M Card \$349.95

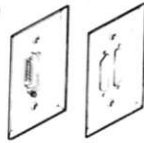
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EIA/RS232 WALL PLATES

(Does not include connectors)

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KS CN00851212	1 Pc. Grey Hood	\$1.05	\$1.40	\$1.25	\$1.15
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KS CN00851226	2 Pc. Black Hood	\$1.75	\$1.50	\$1.35	\$1.20
KS CN00820418	Hardware set 2/Pr	\$1.00	\$.80	\$.70	\$.60

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(Sh. Wt. 4 lbs.)
(Sh. Wt. 15 lbs.)

Tandon



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Exactly one-half the height of any other model
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2 or More: \$270.00 each
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- All supplies regulated

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KSEPDLIME	6 outlet 4 1/2" cord w/power switch	\$89.50	\$69.95

(Shipping Weight 4 lbs each)

EMI-RFI FILTERED AC SURGE PROTECTOR

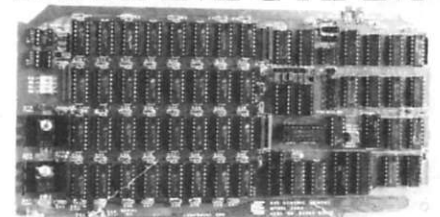
KSEPDORANGE	6 outlet 4 1/2" cord w/power switch	\$139.95	\$104.95
KSEPDPEACH	6 outlet wall mount	\$ 97.50	\$ 74.95

(Shipping Weight 4 lbs each)

64K IEEE/S-100 DYNAMIC RAM

2 or 4MHz BANK SELECTABLE

- 2 or 4 MHz operation
- Designed to IEEE proposed S-100 bus standards
- Supports IMSAI-type front panels
- Operates with either an 8080 or Z-80 based S-100 system providing processor transparent refreshes with both
- Bank-select system allows system memory expansion
- Bank-select port's address is jumper selectable
- Any 16K block can be made bank-independent
- All 64K can be made bank-enabled on power-on and reset
- Fully buffered address and data lines
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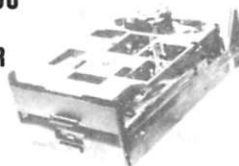
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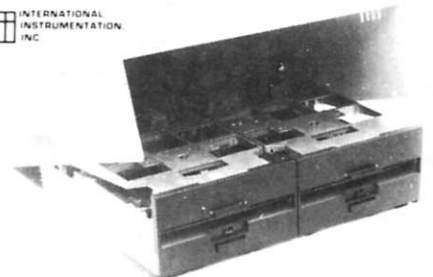


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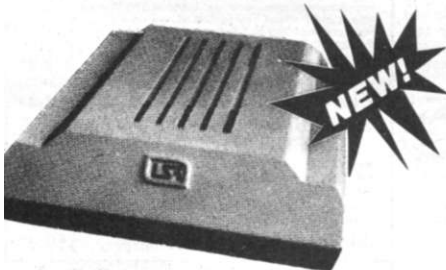
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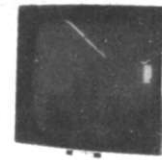
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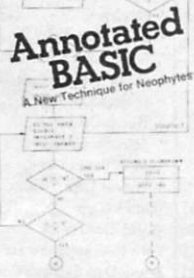
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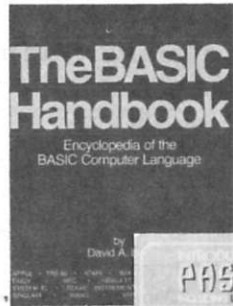
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MICROBOOK: DATA BASE MANAGEMENT FOR THE APPLE II—by Ted Lewis. This book provides you with an affordable data base management system for your Apple II. These programs turn your Apple II into a combination filing cabinet, information gathering/retrieval system and data processing engine. Written in Pascal, the program simulate a library. Information is maintained and broken down into books, chapters and pages and index to pages. Photographs of the Apple II screen are abundant, and they show you step-by-step the effect of each of your entries. Microbook can be used for almost any application involving the storage and retrieval of information. BK1261 \$19.95

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THE APPLE CONNECTION—by James W. Coffron. Connect your Apple to household appliances for greater control. With this book you will learn about elementary interfacing and about BASIC programming, including input/output techniques and devices, building real systems, and even analog to digital and digital to analog conversion. All programs are written in BASIC and no prior electronic knowledge is required. BK1262 \$12.95

Z-80

INSIDE LEVEL II—For machine language programmers. This is a comprehensive reference guide to the Level II ROMs, allowing easy utilization of the sophisticated routines they contain. It concisely explains set-ups, calling sequences, variable passage and I/O routines. Part II presents an entirely new composite program structure which unloads under the SYSTEM command and executes in both BASIC and machine code with the speed and efficiency of a compiler. Special consideration is given to disk systems. BK1183 \$15.95.*

PROGRAMMING THE Z-80—by Rodnay Zaks. Here is assembly language programming for the Z-80 presented as a progressive, step-by-step course. This book is both an educational text and a self-contained reference book, useful to both the beginning and the experienced programmer who wish to learn about the Z-80. Exercises to test the reader are included. BK1122 \$15.95.*

Z-80 ASSEMBLY LANGUAGE PROGRAMMING—by Lance A. Leventhal. This book thoroughly covers the Z-80 instruction set, abounding in simple programming examples illustrating software development concepts and actual assembly language usage. Features include Z-80 I/O devices and interfacing methods, assembler conventions, and comparisons with 8080A/8085 instruction sets and interrupt structure. BK1177 \$16.99.*

68000/6809

68000 MICROPROCESSOR HANDBOOK—By Gerry Kane. Whether you're currently using the 68000, planning to use it, or simply curious about one of the newest and most powerful microprocessors, this handbook has all the answers. A clear presentation of signal conversions, timing diagram conventions, functional logic, three different instruction set tables, exception processing, and family support devices provides more information about the 68000 than the manufacturer's data sheets. A stand alone reference book which can also be used as a supplement to *An Introduction to Microcomputers: Vol. 2—Some Real Microprocessors*. BK1216 \$9.95

68000 ASSEMBLY LANGUAGE PROGRAMMING—by Gerry Kane, et al. A straightforward self teaching text book on assembly language programming for the 68000 microprocessor. This book contains the entire instruction set, describes the function of assemblers and assembly instructions and discusses basic software development concepts. A large number of practical programming examples are included. BK1233 \$16.99

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Micro Software Digest

Compiled by Swain Pratt

Micro Software Digest presents capsulized software reviews from various computer-related publications.

CRIS (Cash Register Inventory System)

System Requirements: Atari 400/800; 32K RAM; printer recommended

Manufacturer: Adventure International, PO Box 3435, Longwood, FL 32750

Price: \$249.95

Comments: "CRIS is a disk-based program," says the review, "that turns any Atari computer into a combination cash register (without the cash drawer) and inventory-management system for small retail businesses."

Outside of a limited invoicing capacity, CRIS has many useful features and is easy to use. "For the business that doesn't experience much customer traffic," concludes the review, "CRIS should more than fill the bill." Reader Service number 401

(Reviewed in Popular Computing, April 1983)

Power

System Requirements: 8080, 8085 or Z-80 computer with CP/M
Manufacturer: Computing!, 2519 Greenwich St., San Francisco, CA 94123

Price: \$169

Comments: Power is an auxiliary program designed to work with CP/M and make it easier to use. According to the review, "Power is useful for both experienced programmers and for the beginner. There are about 50 different commands that range from monitor functions to more common housekeeping operations."

The review concludes that "Power is a powerful program that does many things very well. It is relatively inexpensive and requires no complicated installation procedure." Reader Service number 407

(Reviewed in Interface Age, April 1983)

The Forms Designer

System Requirements: IBM PC; PC DOS; 128K RAM minimum

Manufacturer: Business Information Technologies Software, 1048 Nicklaus Ave., Milpitas, CA 95035

Price: \$175

Comments: "The Forms Designer," states the review, "is a programmer's utility. . . . It allows programmers to write data-entry modules, with extensive screen formatting and error-trapping, quickly and effectively."

Although requiring practice to gain proficiency, the package has good documentation, and, concludes the review, "it should prove to be a cost-effective tool for harried application writers." Reader Service number 405

(Reviewed in InfoWorld, March 28, 1983)

Astro-Scope

System Requirements: Apple II, TRS-80 Models I and III, IBM PC, Osborne I and all CP/M-compatible computers with 48K RAM; one disk drive

Manufacturer: Astro-Graphics Services, PO Box 28, Orleans, MA 02653

Price: Screen-only version: \$30

Comments: According to the review, this is an astrological program that "on the basis of birth time, date and place, spews out 1500 to 1800 words of text explaining the birth chart."

Astro-Scope clearly offers entertainment value and precise calculations of celestial configurations, but is inevitably weak, states the review, in that "the generalizations offered are too imprecise to form the basis for decisive action or useful insight." Reader Service number 402

(Reviewed in Popular Computing, April 1983)

Microteach Teacher's Aide

System Requirements: Atari 400/800; 48K RAM; two disk drives; TV

Manufacturer: Compumax, PO Box 1139, Palo Alto, CA 94301

Price: \$195

Comments: According to the review, this program "is a welcome solution to the problem of tailoring computer-assisted education. With this program, a teacher with no knowledge of computer languages can create computer-based lessons that deal specifically with a particular curriculum."

The program simplifies test and grade management, keeps detailed records of student performance, and, states the review, "With a little imagination and creative endeavor, a teacher can use the keyboard graphics characters with pleasing results." Reader Service number 406

(Reviewed in COMPUTE!, May 1983)

CyberLogo Turtle

System Requirements: Apple II Plus (versions available for other computers); DOS 3.3; 48K RAM; one disk drive

Manufacturer: Cybertronics International, Inc., Software Publishing Division, 999 Mount Kemble Ave., Morristown, NJ 07960
Price: \$99.95

Comments: The reviewer states that this program is one of the best turtle graphics programs he has tried. "It carries out all of the normal turtle graphics functions smoothly and quickly," says the review.

The manual is a disappointment, but, concludes the review, "The CyberLogo program provides a very good and affordable implementation of turtle graphics that generally works well and that can be an extremely valuable learning tool for any person." Reader Service number 408

(Reviewed in Classroom Computer News, April 1983)

PowerText

System Requirements: IBM PC; 64K RAM; one or two disk drives; compatible printer

Manufacturer: Beaman Porter, Pleasant Ridge Road, Harrison, NY 10528

Price: \$399 (\$199 version available for users who already have the UCSD p-System)

Comments: "PowerText is a sophisticated, powerful program that invites comparison with the best available word processors," says the review, which then proceeds to match it with WordStar. The review states that in many ways the programs do the same things well, but with different design philosophies: WordStar is screen-oriented (you get what you see), whereas PowerText is not.

The review cautions that PowerText has limited compatibility because it is written in the UCSD p-System, but the disk includes a runtime version of the p-System, so you can run the program from DOS. The review concludes that PowerText "is beautifully tailored for high-volume production of documents that have strict format requirements." Reader Service number 403

(Reviewed in Softalk for the IBM Personal Computer, January 1983)

Bank Street Writer

System Requirements: Apple II, II Plus or IIe; 48K RAM; ROM Applesoft; one or two disk drives; printer

Manufacturer: Broderbund Software, 1938 Fourth St., San Rafael, CA 94901

Price: \$69.95

Comments: "Bank Street Writer," says the review, "provides general word processing capabilities in a simple, uncomplicated program that just about anyone can have up and running in less than ten minutes, and it does it at a very low price."

It doesn't perform sophisticated operations, but it is good, according to the review, for straightforward text or letter writing. Reader Service number 404

(Reviewed in Softalk, February 1983)

Filemanager +

System Requirements: Atari 400/800; 40K RAM; two disk drives

Manufacturer: Synapse Software, 5327 Jacuzzi St., Suite I, Richmond, CA 94804

Price: \$99.95

Comments: "If you keep track of extensive files and data, then this program is definitely for you," says the review. Filemanager is menu-driven, the various options enabling you to create and modify forms, enter data on forms or into files, and copy, delete or rename files.

"A clearly written, step-by-step instruction book," states the review, "puts the beginner at ease. . . . For all of its power, Filemanager + is remarkably easy to use." Reader Service number 419

(Reviewed in SoftSide, #39)

Basic Guitar 1

System Requirements: Apple II or II Plus; DOS with Applesoft in ROM; 48K RAM; one disk drive

Manufacturer: Digital Concept Systems Software, 4826 Bucknell, San Antonio, TX 78249

Price: \$49.95

Comments: "Basic Guitar 1," says the review, "is a tutorial program designed for the humble beginner. . . or someone who wants to improve his or her playing."

According to the review, the program has an excellent manual, and the only thing missing "is talent. That peripheral is one the user must supply. Basic Guitar 1 is an example of a novel tutorial-software program; may its tribe increase." Reader Service number 409

(Reviewed in InfoWorld, January 24, 1983)

Hescount

System Requirements: Any version of Commodore PET/CBM or VIC

Manufacturer: Human Engineered Software, 71 Park Lane, Brisbane, CA 94005

Price: \$23.95 (tape); \$26.95 (disk)

Comments: Hescount is a Basic program profiler, a utility that monitors a program and counts the number of times each statement is executed. "This information," says the review, "can be used in a number of ways to assist in the development of a new program or the modification of an old one."

Simple to use, and with good documentation, "Hescount," concludes the review, "is a good program to add to your software development toolkit." Reader Service number 411

(Reviewed in COMPUTE!, May 1983)

VIC Forth

System Requirements: Commodore VIC-20; any RAM except 3K expansion cartridge

Manufacturer: Human Engineered Software, 71 Park Lane, Brisbane, CA 94005

Price: \$59.95

Comments: "VIC Forth," says the review, "is a cartridge that contains an implementation of FIG-Forth. . . unique extensions allow the system to control color and sound features of the machine." The review states that while Forth expands the VIC-20's programming capacity, a beginner must have an introductory text on FORTH, such as *Starting Forth*, by Leo Brodie.

"With VIC Forth," concludes the review, "you just plug in the cartridge and everything is there. . . this is a good beginner's Forth system with innovative editor features." Reader Service number 412

(Reviewed in InfoWorld, March 28, 1983)

Micro/Courier

System Requirements: Apple II; 48K RAM; Applesoft Basic; one disk drive using DOS 3.3; a monitor or TV; Hayes Micromodem II; (other versions available for Apple III and IBM PC)

Manufacturer: Microcom, Inc., 1400A Providence Highway, Norwood, MA 02062

Price: \$150

Comments: This program is for use between identical microcomputers, states the review; it "automatically transmits any kind of file or program the computer can produce." It also includes a terminal-mode option for communication with commercial timesharing systems.

Micro/Courier has a clear and comprehensive manual, according to the review, and its "operation is very straightforward and easy for a nontechnical person to master." Reader Service number 413

(Reviewed in Popular Computing, February 1983)

Statistics 3.0

System Requirements: Apple II; 48K RAM; Applesoft

Manufacturer: Edu-Ware Services, Inc., 22222 Sherman Way, Canoga Park, CA 91303

Price: \$29.95

Comments: Statistics is a package that can handle a number of standard statistical data-organizing and analyzing procedures. The review states that "this is a fine program for someone who wants something more than a programmable calculator, but something less than an IBM mainframe."

"Despite limited documentation," concludes the review, "Statistics 3.0 is user-friendly. And best of all, the whole package does what it's supposed to do—calculate statistics accurately." Reader Service number 410

(Reviewed in BYTE, October 1982)

Personal PEARL, Version 1.04

System Requirements: Z-80 or 8080-based microprocessor; CP/M 2.2; 48K RAM; two single-sided, single-density, 8-inch disk drives; 80-column printer

Manufacturer: PEARLsoft, Division of Relational Systems Corp., 864 Promontory Place SE, Salem, OR 97303

Price: \$295

Comments: This program is a complete information manager, states the review, which "allows you to organize your information, enter data into your files and generate various reports. The beauty of the program is its unusually easy-to-use design."

With excellent documentation and support, the review concludes, "This program contains features . . . that should make it a joy for any but the most sophisticated, demanding, large-system user to use." Reader Service number 416

(Reviewed in InfoWorld, March 28, 1983)

Wizardry

System Requirements: IBM PC; 64K RAM; two disk drives; color adapter

Manufacturer: Sir-tech Software, 6 Main St., Ogdensburg, NY 13669

Price: \$59.95

Comments: IBM PC users will now have a version of Wizardry, one of the all-time bestselling adventure programs for the Apple. "Don't boot up Wizardry," says the review, "expecting to play an adventure like Zork. It has a lot more in common with role-playing games like Dungeons and Dragons."

The game, according to the review, "runs faster on the IBM (than on the Apple) and the graphics have been improved. This game may seem impossibly complex at first, but you will quickly learn why it has become a favorite." Reader Service number 417

(Reviewed in Softalk for the IBM Personal Computer, January 1983)

Multiplan

(Version 1.04 for the IBM PC)

System Requirements: IBM PC; PC DOS; 64K RAM (minimum); one disk drive (dual 320K drives preferred); black and white or color monitor; IBM-supported printer; (Note: other versions available for other computers)

Manufacturer: Microsoft Corp., 10700 Northup Way, Bellevue, WA 98004

Price: \$275

Comments: Multiplan, according to the review, is a thoroughly capable spreadsheet that can run on CP/M-based machines and on Apple II with DOS, IBM PC and Fortune 16:32. It has the usual features of most spreadsheets, such as built-in commands for mathematical computations, many business-related abilities, an iteration command, and so on.

Multiplan is well designed to handle the tasks of modifying or restructuring your current data, and, concludes the review, it "is a superior product that Microsoft is sure to support well." Reader Service number 415

(Reviewed in InfoWorld, March 28, 1983)

The Learning System

System Requirements: Apple II; 48K RAM; one disk drive

Manufacturer: Micro Lab, 2310 Skokie Valley Road, Highland Park, IL 60035

Price: \$150

Comments: "The Learning System," states the review, "is a test-generating program intended to help instructors provide automated testing for a wide range of learners . . . The program is ingenious, user-friendly and well put together."

The program is not designed to develop sophisticated computer-assisted instruction, but, concludes the review, "If you regularly make use of short-answer tests . . . The Learning System may be right for you." Reader Service number 414

(Reviewed in Popular Computing, April 1983)

Global Program Line Editor

System Requirements: Apple II or II Plus; 48K RAM; DOS 3.3; one disk drive

Manufacturer: Synergistic Software, 830 N. Riverside Drive, Suite 201, Renton, WA 98055

Price: \$65

Comments: "Global Program Line Editor," says the review, "is a more sophisticated version of the extremely popular Program Line Editor . . . the major addition to the program is the global editing capability."

"G.P.L.E. is a must for any serious Applesoft or Integer Basic programmer," concludes the review. "It decreases the amount of time and effort spent debugging and/or modifying your programs significantly." Reader Service number 420

(Reviewed in SoftSide, #39)

CP +

System Requirements: Nearly any microcomputer with CP/M and two disk drives

Manufacturer: Taurus Software, 870 Market St., San Francisco, CA 94102

Price: \$150

Comments: Designed for those with little computer experience, CP + is, according to the review, "a simplified interface between the user and the CP/M operating system. The program allows you to easily select and run CP/M programs, perform a variety of print functions and manage files."

"CP + also fits into an office environment," the review concludes, "where computer users depend on complete applications . . . and would find it difficult to remember a sequence of CP/M commands." Reader Service number 421

(Reviewed in Interface Age, April 1983)

P-Term

System Requirements: Apple II Plus; Apple Pascal; 64K RAM; Disk Drive II; modem required; printer and 80-column card optional

Manufacturer: Southwestern Data Systems, 10761 East Woodside Ave., Santee, CA 92071

Price: \$129.95

Comments: According to the review, P-Term is an Apple Pascal communications program that "turns your Apple into an 'intelligent terminal' that provides you with more flexibility. With the right modem, you can automatically dial and log into a variety of remote computers with a few keystrokes."

The review states that the program supports all 80-column boards compatible with Apple Pascal, and concludes "that P-Term is a well-designed package that meets its intended purpose with speed, accuracy and versatility." Reader Service number 418

(Reviewed in InfoWorld, March 28, 1983)

BYTE Publications, Inc., 70 Main St., Peterborough, NH 03458.

Classroom Computer News, published by Intentional Educations, Inc., 341 Mt. Auburn St., Watertown, MA 02172.

COMPUTE!, published by Small System Services, Inc., PO Box 5406, Greensboro, NC 27403.

InfoWorld, published by Popular Computing, Inc., 375 Cochituate Road, Box 880, Framingham, MA 01701.

Interface Age, published by McPheters, Wolfe and Jones, 16704 Marquardt Ave., Cerritos, CA 90701.

Popular Computing, published by BYTE Publications, Inc., 70 Main St., Peterborough, NH 03458.

Softalk and Softalk for the IBM Personal Computer, 11160 McCormick St., North Hollywood, CA 91601.

Softside, 6 South St., Milford, NH 03055.

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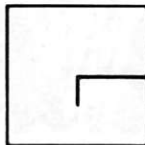
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Antioch, CA

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We are the leading area computer store. We carry Cromemco, Apple, Vector Graphic; printers and terminals. We offer full software support including G/L, A/R, payroll and word processing. **Computer Centre, 909 S. Tamiami Trail, PO Box 130, Nokomis, FL 33555. 484-1028.**

Aurora, IL

Full line of Apple Computer and Fortune Computer, Hewlett-Packard Personal Computers, Calculators and Supplies. IDS Prism, SMC and Daisywriter Printers. **Farnsworth Computer Center, 1891 North Farnsworth Ave., Aurora, IL 60505 (851-3888) and 383 East North Ave., Villa Park, IL 60181 (833-7100).**

Farmington, MI

Specialists in useful software for PET, Commodore 64, and Apple. Grading program, sports packages, test maker, word processor, database, library packages, etc. Write for details. **Midwest Software, Box 214, Farmington, MI 48024. 477-0897.**

Milford, NH

SAGE 68000 microcomputer authorized dealer. Service, custom programming, consultation, terminals, printers, etc. Write for special low prices. You'll be glad you did! **New Castle Electronics, 100 Christian Hill Road, #3, Milford, NH 03055. 673-2806 or 673-9667.**

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Used Heath H-8, S-100 BUS, and Wang Laboratories computer for sale. Memory board, I/O card, terminal, disk drive, software and complete system. Ten to 50 percent off list price. Send for free listing. D. Wong, Box 406, Croton Falls, NY 10519.

For Sale: OSI C24P, 77 vint, Exc. Cond. (500cpu/RS-232,540 vid bd/No gphs, 542 keybd) Plus all Doc & 2yrs AARD. TECH JOURN. \$450 or best offer. Call Roy Milano 914-937-1289.

Heathkit H-8 computer, 16K, H-19 terminal, serial/cassette board, cassette software, 1 year old. \$750. Ron Campbell, 412 Woodley Rd, Savannah, GA 31406 912-925-6524.

Timex/Sinclair users: Write for information concerning the Z-WEST (SDTSUG) newsletter publication. SASE or stamp appreciated. SDTSUG/Z-WEST, PO Box 2411, Vista, CA 92083.

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CLUB NOTES

Portland Computer Society

The Portland (OR) Computer Society ordinarily meets the third Saturday of each month in Room STB-14 in the Sylvania campus of Portland Community College, at 1 p.m.

For more information on membership, meetings or other matters, call Percy Wood, Newsletter Editor, at 503-289-8263 (nights), or 503-255-1841 (days).

Orange County Club—CA

The North Orange County Computer Club (PO Box 3616, Orange, CA 92665) normally holds its general meeting on the first Sunday of the month (second Sunday in July and September, 1983) in Hashinger Auditorium at Chapman College, beginning at 1 p.m.

For information, telephone Bob Dailey, Secretary and Newsletter Editor, at 213-696-0145.

Florida IBM PC User's Group

The Manasota IBM PC User's Group meets on the third Wednesday in Sarasota, FL. For details as to time and place, call the new president of the club, Richard Reynolds, 1102 Mallorca Drive, Bradenton, FL 33529; 813-792-5400.

NAMU

NAMU (National Association of Microcomputer Users, Inc.), chartered in Texas and with offices in Austin, is forming a strong nationwide network of individual members and participating dealers.

Further information about the wide range of membership benefits and Association activities can be obtained by calling 512-474-9836.

American Software Club, Inc.

The American Software Club, with 10,000 members, provides discounted microcomputer software programs to its members. A monthly catalog updates the offerings available.

For more information, contact Lee Konowe, American Software Club, Inc., Millwood, NY 10546; 914-762-5644.

Indiana-Michigan Osborne Group

The Michiana Osborne Users Group (MOUG) meets on the second Tuesday of each month at 7 p.m. in the branch office of the Valley Bank and Trust Company, in the Town and Country Shopping Center on West McKinley Ave., Mishawaka, IN.

For further information, contact Don Porter, 803 West Washington St., South Bend, IN 46601; 219-259-5411.



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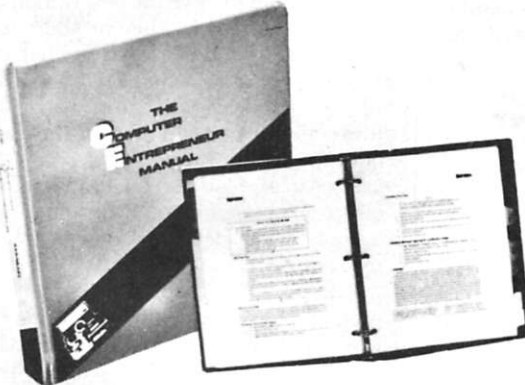
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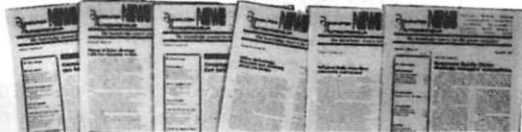
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Shedding Data Communication Ignorance What Goes On Inside Micros? Apple Graphics Made Easy A Venture Into Apple VisiCalc A Model Pascal Publication

Microcomputer Data Communication Systems

Frank J. Derfler, Jr.
Prentice-Hall, 1982
Englewood Cliffs, NJ 07362
Hardcover, 129 pp., \$17.95
Softcover, \$12.95

Since January 1980, Frank Derfler has held forth in the pages of *Microcomputing*, where his monthly column, "Overview" (formerly "Dial-up Directory") has served as a focal point for news on how microcomputerists are staying in touch electronically. And along with news, Frank has shared the basics of data communication and the products that make it tick.

Now, thanks to his latest book, *Microcomputer Data Communication Systems*, there is no need to dig through stacks of *Microcomputing* to reacquire yourself with this information.

Don't get the wrong idea, though; this book is not just a rehash of Derfler's monthly magazine write-ups.

Written with the beginner in mind, *Microcomputer Data Communication Systems* teaches the basics and then gives you a start in applying them. Terms are carefully defined and concepts are illustrated through example. The result is highly readable material.

Weaknesses? With a little more than 100 pages (minus wide margins) and with its tables and figures, *Microcomputer Data Communication Systems* is more of an introduction than a complete treatment of the subject.

A second drawback is the book's lack of timeliness. Examples include the Radio Shack Model I, Apple II and S-100 systems. There is no direct exposure to TRS-80 Model III or IBM PC-compatible products.

If you're a loyal reader of "Dial-up Directory"/"Overview," then you may have outgrown a book like *Microcomputer Data Communication Systems*. On

the other hand, if you still think "asynchronous" refers to a plumbing fixture and that "handshaking" belongs to politicians rather than computers, this book is a quick way to shed your ignorance.

Timothy Daniel
Oxford, OH

Understanding Computer Systems

Harold Lawson
Computer Science Press, 1982
11 Taft Court
Rockville, MD 20850
Paperback, 164 pp., \$11.95

Understanding Computer Systems begins, innocently enough, with an explanation of processes and systems, processors and procedures, and data flow and interrupts—all illustrated by the familiar process of washing dishes (a crying baby is the high-priority interrupting process). Data channels and simplex, half- and full-duplex transmission are illustrated using the same example. System controls, error conditions and flow diagramming are also explained using the same simple example.

All of this shows that the activities going on inside every computer and program can be illustrated by simple, everyday examples we are all familiar with. The first five chapters of *Understanding Computer Systems* are devoted to this, and along the way the reader becomes familiar with all of the technical terms needed to understand computer hardware and software.

These terms are applied to the dishwashing task without detracting from their exact technical meanings, making technical terms easier to understand than in any presentation I have ever run across in any other computer book.

Beginning at chapter 6, the author leaves dishwashing behind and begins the "hard" discussions of processing in

computer systems. With the vocabulary developed in the first part of the book, these topics become much easier to understand.

If there is any fault to be found with this book, it would involve the descriptions of computer hardware; they're short and superficial, and probably not what the average *Microcomputing* reader is looking for in a book with this title. The author's intent was to present the basic concepts and terminology of computer systems in an easy-to-read form aimed at college-level students and business professionals. He certainly has achieved these goals.

While I'm nit-picking, I might as well comment on the logic flow diagrams the author uses. He doesn't use standard symbols, and he has all parallel procedures and subroutines flowing down to a termination. These representations fall apart in examples where these procedures should be shown to return to the main branch of the process. This path is not at all obvious in this new type of flow chart.

Author Harold Lawson is a university professor (and some parts of the text read as though they were written by a professor) who draws on more than 25 years of practical experience in the computer industry. He's able to explain technical topics in a manner understandable to the rankest computer neophyte, providing the beginner with the vocabulary required for advancement into the ranks of computer professionals.

Since not everyone has advancement to professional status as an immediate goal, though, this may not be the best book for someone looking for a simple discussion of what is going on inside micros.

But if you want to get serious, and in particular, if you're about to start learning computer programming, *Understanding Computer Systems* will make your future studies much easier.

Ken Barbier
Borrego Springs, CA

Personal Graphics For Profit and Pleasure on The Apple II Plus Computer

Michael P. Barnett
Graham K. Barnett
Little, Brown and Company, 1982
34 Beacon St.
Boston, MA 02106
Softcover, 192 pp., \$14.50

My work as a corporate planner often requires me to generate graphics presentations to display the results of my department's analyses in a quickly understood manner.

Before my company bought Apples, this work was tedious. Now, with Apples and an HP plotter, we can generate graphs quickly.

Still, there are many times when off-the-shelf software doesn't quite do what we would like. Since I lacked the skills to readily design and write a graphics system, I started to scour the stores for a book to teach me the essentials of Apple II Graphics.

I found several graphics books, but many were too general in scope, and others were targeted at users of other computers. Finally, I found what I was searching for: *Personal Graphics*. Written in an easy-to-read style and laced with sample programs, this book leads the reader gradually from simple basics into an increasingly complex discussion of graphics applications.

By entering the programs listed along with the text, I soon was amazing myself with the Apple's ability to generate geometric images rapidly. (I got so fascinated at this stage that I had to set an alarm to remind me to go to bed!)

One of the strengths of *Personal Graphics* lies in the authors' elucidation of basic mathematical concepts. They explain equations for geometric shapes, along with the technique of breaking equations into expressions that can be evaluated quickly by plotting routines.

Starting first with the equation for circles, the authors then extend the equation to generate a variety of shapes. Even readers with disdain for mathematics soon will be watching cardioids, nephroids and limacons grow on the monitor screen.

Later chapters contain sample programs that permit the plotting of polynomials and that illustrate curve-fitting techniques. (I believe this book could be used in conjunction with a conventional high school text to instill both the excitement and beauty of math into the minds

Personal Graphics is an excellent buy for Apple owners interested in learning the basics of graphics.

of students.)

The chapter titled "A Little Plotting and Scheming" prompted me to acquire *Personal Graphics* in the first place. It contains discussions of the conventional graphics tools for management: line graphs, bar charts and pie charts. The sample programs are useful and would be valuable to anyone not prepared to shell out the price of a commercial business graphics package.

While the intent of this book is to describe the creation of screen graphics, the techniques are applicable to plotting hardware.

If *Personal Graphics* has any faults, they're faults of omission. In several instances, the authors, having discussed basic techniques and having described illustrative programs, tempt the reader by suggesting a variation—without showing the reader how to accomplish the variation.

All in all, though, *Personal Graphics*

is an excellent buy for Apple owners interested in learning the basics of graphics.

(The programs in *Personal Graphics* are available on disk and can be ordered from Tycon Corp., CN 5258, Princeton, NJ 08540, at \$24.95 per disk.)

Justin Crom
Littleton, CO

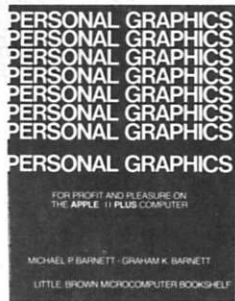
The VisiCalc Book— Apple Edition

Donald H. Beil
Reston Publishing Co., 1982
11480 Sunset Hills Road
Reston, VA 22090
Hardcover, 301 pp., \$21.95
Paperback, \$14.95

Do your replication commands always work like you want them to? Do you ever use @Choose in your work? How about Move? @Max? @Min?

The VisiCalc Book—Apple Edition will help with those parts of a program you may not completely understand, and it adds enough information about some of the rarely used commands to help you incorporate them into your work.

I suspect that there are two types of VisiCalc users: those who take the time and effort to master the program, and those (like me) who read the manual, but



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really could use some extra examples to understand the more difficult parts of the program.

While we expect a book about VisiCalc to give us more information than the program manual, it's important to understand that that's a pretty difficult assignment. The VisiCalc manual has been praised for years as an outstanding example of software instruction, and for a book to improve on it is to ask an awful lot. But in two areas in particular, *The VisiCalc Book* does just that.

The first is in the number and quality of the examples it presents. Yes, when you buy *The VisiCalc Book*, you pay for much of the same information you already have in the VisiCalc manual. But this book takes almost everything a step further than simple instruction; it adds examples, and that's where it helps the reader gain a real understanding.

In fact, author Donald H. Beil opens with a simple budget forecast that's easy to grasp, but one that would take a lot of time to create by hand. Once you start to carry out this example for a few yearly periods, you see the capabilities of VisiCalc.

One unique idea Beil uses is to show an entire worksheet, along with just the sections of it that your screen displays, in larger letters, with lines that head back into the total worksheet, so you can see where your screen display comes from. This makes it easy to understand the total size of the worksheet you have available, as well as how to format it on your screen for the best results.

The book's second major strength lies in its detailed coverage of VisiCalc's commands and functions.

For instance, one truly strong area of this book is in its explanation of the replicate command. This is one of the more difficult parts of VisiCalc to grasp (at least for me), and Beil does an admirable job of getting across exactly what you can and cannot do with it.

He also has an excellent flowchart to show the difference in recalculating by row or by column.

Beil's analogy of a pile of 3x5 cards really helped me understand the move command. His advice to label things *after* you're done entering formulas, and *after* you format all your output, will save a lot of time.

For those with scientific minds, *The VisiCalc Book* explains functions like tangent, cosine, square root, arc cosine, and so on, while the VisiCalc manual merely lists them. @Choose and @Look-up and @Min and @Max are also covered more completely by Beil than they are in VisiCalc's program manual.

Beil's idea of creating templates is perhaps the highlight of his book.

"Templates," Beil writes, "are patterns or models that guide a person in entering data onto the electronic sheet." Once you have it designed, you can use it over and over. The same basic template

would apply, for example, to an analysis of your electricity costs, your gas costs or your phone costs.

Beil gets a bit carried away with advice on how to design a VisiCalc template so anyone can use it without destroying anything. In actual use, I doubt you'd sit a secretary down and ask her to enter information.

On the flip side of this same coin, though, Beil gets a pat on the back for suggesting the use of blank templates to help gather data. These templates consist of printouts of the information you need, along with spaces:

Sales
Overhead Total
Number of Machines in Use
Labor/Hours

You print these up and use them to collect your data (here's where that untrained secretary is helpful) and then it's quick and easy to enter the information.

Of course, *The VisiCalc Book* isn't perfect; it's weak on ways to instruct your printer to do what you want. Beil laments that "Printers vary significantly in . . . the way in which we send information to them," and suggests that your "vendor" can help. (The VisiCalc manual isn't all that great on imparting this type of information, either.)

Another weakness is that, for some anachronistic reason, the book refers to storing data on tape, as well as on disk. My copy of VisiCalc doesn't even mention tape; does yours? A couple of typos and two hand-written additions are the only other faults I could find.

The VisiCalc manual unquestionably will teach you VisiCalc. But if you buy *The VisiCalc Book—Apple Edition*, expect to learn the program a bit faster, a trifle more easily and a shade more comprehensively. Expect to be more confident when you design a worksheet, and to use all of the capabilities of VisiCalc more fully.

VisiCalc is complex and powerful software whose value increases in direct proportion to your capabilities. If you use VisiCalc to any significant degree, Beil's book will more than pay for itself.

**Gregory R. Glau
Prescott, AZ**

Oh! Pascal!

Doug Cooper and Michael Clancy
W.W. Norton and Co., 1982
500 5th Ave.
New York, NY 10110
Paperback, 476 pp., \$17.95

A skilled actor could give the phrase "Oh! Pascal!" many different readings: delight, disgust, surprise, bewilderment, satisfaction . . . And any one of these expressions could be appropriate for the book *Oh! Pascal!*, depending upon the reader. Like most books, *Oh! Pascal!* is

not a book for all reasons.

Specifically, *Oh! Pascal!* is an excellent text for an introductory college course in computer programming, or for a self-teaching aid to users already thoroughly familiar with another programming language. But it is not, and does not intend to be, a manual for individuals learning their first programming language on their own, and it is not a general-purpose reference work on the Pascal language.

Oh! Pascal! assumes that its readers know (or have a teacher who can tell them) about accessing a programming language through an operating system and about such concepts as input and output. In fact, one of the book's weaknesses is that it does not provide real examples of actual computer output (the examples in the text are a combination of typeset and typewritten simulated output).

But for its intended audience, *Oh! Pascal!* is a model publication. The content is sound and is presented in a light-hearted and often humorous way. The authors obviously are not worried about being 20th-century Moseses spreading Solemn Truth from ivy-covered Mount Academe. The writing style is clear and conversational, subliminally reassuring readers that the subject matter is not some nightmarish bogey-demon.

The emphasis is on problem-solving rather than on programming. The need for a concept is shown as the authors immediately present an interesting problem and show how a concept can be applied to that problem. Thus, for example, the need for looping is shown in a program that does long division.

The text is packed with examples, and readers are given intriguing programming problems to work on. (For about half of the problems, solutions are given in an appendix.)

The programming examples are at first difficult to follow because of typography—a combination of boldface, italic and regular typefaces and some highlighting with gray halftoning. But these examples stress solid programming approaches and emphasize structured programming throughout.

In addition, each of the 15 chapters ends with a practical section (often quite long) on "Antibugging and Debugging." (How nice not to have to learn all of this by trial and error!)

While *Oh! Pascal!* is comprehensive, it's technically incomplete. It reserves for an appendix brief discussions of goto, pack, unpack, page and label, as well as some other concepts.

Since the book is primarily a learning text and not a reference work, however, this isn't really a shortcoming. None of these features are essential, especially in structured programming, and the appendix provides an adequate introduction for students who might want to use them.

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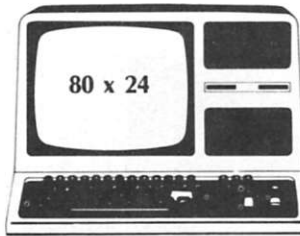
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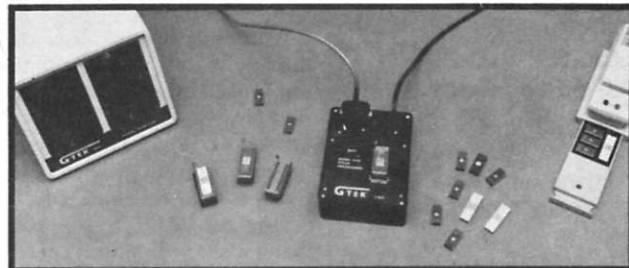
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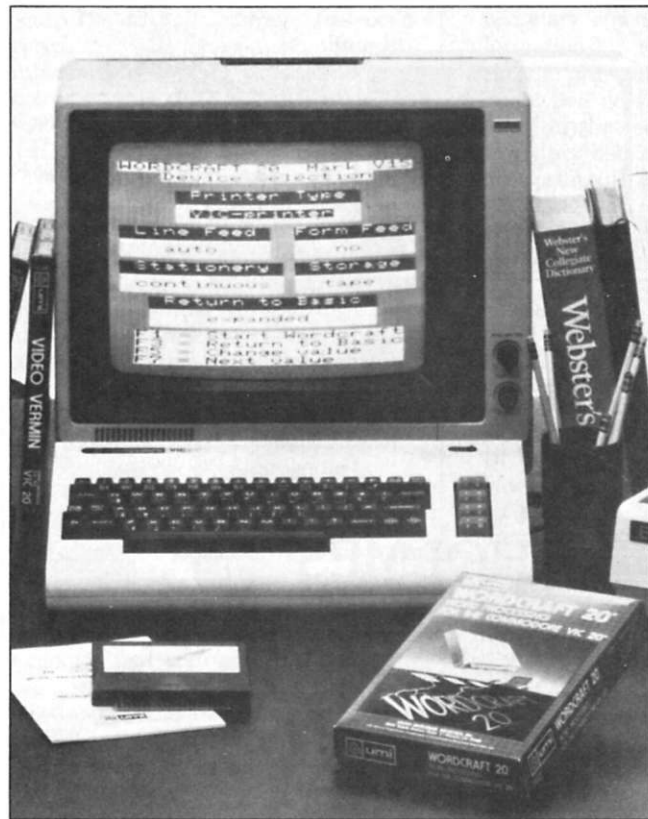
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Wordcraft 20 is a word processing program that plugs into the Commodore VIC-20 just like any game or memory cartridge.

The program is designed to create perfect documents, correspondence and personalized form letters. It can create and print out mailing lists and other special-purpose projects. Wordcraft 20 makes use of the VIC's function keys and other special keys, offering a high degree of flexibility and versatility.

Special features of Wordcraft 20 include a page capacity of 66 lines of 99 characters; page width and length alteration at any time; new-page control, automatic line centering; justified or ragged margins, text highlighting, tab stops, decimal tabs, hard and soft hyphens; and display control. Up to 40 pages of text can be stored by the program on a cassette or disk.

Wordcraft also features automatic word wrap, eliminating broken words; paragraph merging to insert entire blocks of copy into previously typed text; and search and replace—a time- and effort-saving feature that lets you make a single change repeatedly throughout the text.

Wordcraft documents can be encrypted, so they will be unreadable to anyone without a special key code.

Wordcraft 20, which sells for \$149.95, contains 16K of program on ROM chips. An additional 8K of RAM memory is in Wordcraft 20 Plus—priced at \$199.95.

The Wordcraft 20 word processor is compatible with virtually any serial or parallel printer, including Commodore, Epson, NEC, Okidata and others.

Wordcraft 20 is manufactured by United Microware Industries, Inc., 3503-C Temple Ave., Pomona, CA 91768. Reader Service number 472.

Improve Your Punctuation

Punctuation & Style is a program designed to eliminate misused, redundant, faulty, cliché or erroneous phrases, and shows you how to improve them.

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- Improper abbreviations.
- Missing white space.
- Improper or missing capitalization.

Punctuation & Style is available for eight-inch CP/M-80, MP/M-80 and CDOS. Apple II with CP/M Softcard, the Osborne I, the Kaypro II, the NorthStar Horizon and Advantage, and SuperBrain with CP/M 2.2.

The software is manufactured by Oasis Systems, 2765 Reynard Way, San Diego, CA 92103. Reader Service number 467.

The HyperTyper

If you still use the hunt-and-peck technique of typing, HyperTyper may be for you.

HyperTyper is a program designed to help people acquire a skill which is a prerequisite to computer literacy—typing fluency. HyperTyper is designed to be used in the office, school or home.

HyperTyper is available for the IBM Personal Computer, Osborne and CP/M systems, including the Apple II.

The program costs \$49.95 and is manufactured by Digital Marketing Corporation, 2363 Boulevard Circle, Suite 8, Walnut Creek, CA 94595. Reader Service number 466.

Decision-Making Aid

Business Cycle Analysis, from Instant Software (Route 101 & Elm Street, Peterborough, NH 03458), is designed to assist you in making critical planning decisions. The program summarizes cyclical and seasonal indices on an Apple Computer.

Business Cycle Analysis aids management decision-making regarding inventory control, investments, personnel increases and credit extensions.

Business Cycle Analysis is completely documented and fully guaranteed. It costs \$59.95 and requires Apple-soft, 48K and one disk drive. A printer is optional. Reader Service number 465.

Apple Word Processor

Write Away is a full-function word processing system for the Apple IIe or the Apple II with 48K. The program is designed to be used in home or commercial applications. It will utilize the features of any printer.

Included with Write Away is a mailmerge/form letter feature capable of handling conditional text. Also included are utilities that allow you to create mailing lists from popular databases for use with the mail-merge feature.

Write Away supports an array of formatting commands that allows for the creation of almost any document. The call command lets you construct a document of any length or a combination of standard paragraphs from a master control file. Multiple commands can be combined in a single macro command and executed locally or globally. Blocks of text can be moved or replicated quickly and easily.

Write Away requires 48K and one disk drive; however, systems which have 64K are able to take advantage of a feature which permits instant

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1. Standard HERO 1 with arm.
2. Modified HERO 1, including additional RAM or ROM, as well as any mechanical or electrical modifications.

Prizes will be awarded to the top three entrants in each category. Two \$500 gift certificates (one from each category) will be awarded. Each first place winner will select the prizes of his choice, worth up to \$500, from the latest Heath Company catalog. A \$100 gift certificate, good toward any purchase from the Heath catalog, will be awarded to both second place winners. Third place winners from each category will receive a copy of Microcomputing columnist Mark Robillard's new book, "HERO 1 Advanced Programming and Interfacing," plus a one-year paid subscription to Microcomputing magazine.

CONTEST RULES

1. All programs must be submitted both on cassette tape and in hard copy form. A brief, written description of the application must accompany each entry.
2. Entries in the modified category must include a complete description of the alterations performed on the robot.
3. The contest is open to all HERO 1 owners, except



employees of Wayne Green Inc. (publisher of Microcomputing), and the Heath Company and their immediate families.

4. All entries, including programs, become the property of Microcomputing.
5. All entries must be received by Microcomputing by September 1, 1983.

Send submissions to:

**Robotics Contest
Microcomputing
80 Pine Street
Peterborough, N.H. 03458**

7. Contestants may submit more than one entry in one or both categories. Entries will be judged on originality and technical feasibility. The more practical and easily adaptable the application, the better. Winners will be announced in the December 1983 issue of Microcomputing. So rev up your robot, and let's put the Heath's HERO through its paces!

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switching between the editing and formatting of programs. The program also recognizes all popular 80-column cards, without the need for a separate configuration routine.

Write Away costs \$175. It is available from Midwest Software Associates, PO Box 301, St. Louis, MO 63074. Reader Service number 464.

Six Timex-Sinclair Programs

D. Lipinski Software (2737 Susquehanna Road, Roslyn, PA 19001) has released six programs for the Timex-Sinclair 1000 computer. The programs require 16K, but are self-expanding to available memory, or have instructions for modifying them to fit in any memory size.

The six programs are Tutor, List, Check, INEX, Stock and INVEN.

Tutor is a quiz-making program. You can tailor the quiz to your student. You may enter text and questions, or just questions, in multiple, true/false or direct answer formats. A subroutine to organize your inputs so they are readable when displayed is available.

List is a data-entry and retrieval program. You can list up to four categories and view, add, delete, print or mass search any information in any category. A 16K RAM will yield 150 entries with 8000 characters in the field.

Check is a checkbook program for 200-400 transactions. The program lists by item, name, date or check number either to the screen or the printer. Entry errors are correctable.

INEX is an income and expense-sheet style program for purchases, payment, interest, beginning balance and current balance for over 99 user accounts, including standard deductions, net pay and total income. The program also adds/deletes account names, lists to screen or printer, and transfers balances to set a new account period.

Stock is a program that keeps a count of items; adds; deletes; searches; and changes items by description, item number or category. A complete list can be sent to screen or printer.

INVEN is a total inventory program for quantity purchased or sold; balance on hand; cost; replacement costs; and accrued values. You can search or change items by description, category or stock number.

Tutor, List, Check, INEX, Stock and INVEN can be purchased for \$10 each. Reader Service number 463.

TS Editor

PDS Editor is menu-driven software that allows you to create and edit Z-80 machine-language programs for use with the Timex-Sinclair 1000 computer.

PDS Editor contains modules to write, insert, move, store on cassette and list Z-80 machine code. Additional utilities inspect and modify system pointers and convert hex to decimal and decimal to hex. A subroutine, accessible in machine language, prints characters to screen without invoking Basic.

PDS Editor will let you write fast-executing programs that are useful for real-time control applications. The program comes on cassette. Its loading time is about three minutes. It requires 8K.

PDS Editor is manufactured by Industrial Consultant, 62 Montague St. #5A, Brooklyn, NY 11201. It costs \$80. The documentation can be purchased separately for \$20. A short data sheet is available for no charge. Reader Service number 469.

Controlling Your Printer

PRO/PAC's (14925 Memorial Drive, Suite 105, Houston, TX 77079) PCP (Printer Control Program) lets you set up your dot matrix printer to print in boldface type, compressed characters, variable line spacing, slashed zeros, elongated characters and other modes.

The program is designed to eliminate the need to enter long strings of printer control codes in order to change printing modes. PCP is completely menu-driven. The program will send printer control codes

WAYNE GREEN BOOKS

KILOBAUD CLASSROOM

by George Young and Peter Stark

Makes learning electronics fun and easy. First published as a series in *Kilobaud Microcomputing*, the book combines the learning of essential theory with practical, hands-on experience. The course begins with basic electronic projects and culminates in the construction of your own programmable microcomputer. The direct instructional methods of authors Young & Stark make KILBAUD KLASROOM a simple way for you to acquire a solid background in digital electronics.

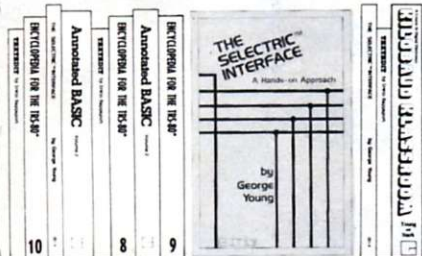
BK7386 (419 pages).....\$14.95



THE SELECTRIC INTERFACE by George Young

You need the quality print that a daisy wheel printer provides but the thought of buying one makes your wallet wilt. The SELECTRIC™ INTERFACE, a step-by-step guide to interfacing an IBM Selectric I/O Writer to your microcomputer, will give you that quality at a fraction of the price. George Young, co-author of *Kilobaud Microcomputing* magazine's popular "Kilobaud Classroom" series, offers a low-cost alternative to buying a daisy wheel printer. The SELECTRIC INTERFACE includes: step-by-step instructions, tips on purchasing a used Selectric, information on various Selectric models, including the 2740, 2980, and Dura 1041, driver software for Z80, 8080, and 6502 chips, tips on interfacing techniques. With The SELECTRIC INTERFACE and some background in electronics, you can have a high-quality, low-cost, letter-quality printer. Petals not included.

BK7388 (125 pages).....\$12.97



TEXTEDIT

A Complete Word Processing System in Kit Form

by Irwin Rappaport

TEXTEDIT is an inexpensive word processor that can be adapted to suit your differing needs—from form letters to lengthy texts. Written in TRS-80 Disk BASIC, the system consists of several modules, permitting the loading and use of only those portions needed. A disk is also available which provides the direct loading of the modules, however, the book is required for documentation. For Model I and III with TRSDOS CONVERT., one disk drive (2 disk drives or copy utility needed to transfer to system disk). Runs under TRSDOS 2.2/2.3. May not function under other systems.

BK7387 (book, 90 pages).....\$9.97

DS7387 (disk).....\$19.97

Disk is manufactured by Instant Software, a division of Wayne Green Inc.

TEXTEDIT

a complete word processing system in kit form.

by Irwin Rappaport

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ANNOTATED BASIC

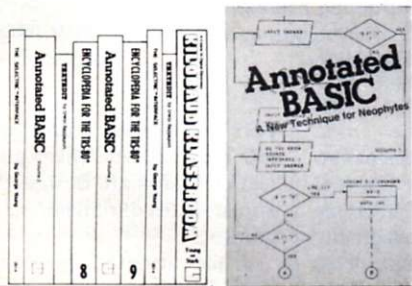
A New Technique for Neophytes

Put your BASIC knowledge to work for you with this 2-volume set of TRS-80 Level II BASIC programs. Gain a better understanding of the elements and techniques involved in programming. ANNOTATED BASIC'S uniquely designed format breaks each program down for you to include: initial documentation and instruction, definitions of New BASIC Concepts, flowchart, annotations of sections, showing how each part fits into the whole, and explaining why certain BASIC commands are chosen over similar ones.

Using the programs as they are or modifying them to sharpen your programming skills, ANNOTATED BASIC is a helpful tool for any BASIC programmer.

BK7384 (Vol. 1, 152 pages).....\$10.95

BK7385 (Vol. 2, 136 pages).....\$10.95



COMPUTER CARNIVAL by Richard Ramella

Your child can become a crackerjack computerist with the sixty TRS-80 Level II programs in COMPUTER CARNIVAL. This large-type, spiral bound book for beginners is a veritable funhouse of games, graphics, quizzes and puzzles. Written by 80 *Micro* columnist Richard Ramella, the programs are challenging enough to ensure continued learning, yet short enough to provide your child with the immediate delight and reward of mastering basic computing skills. And for even greater enjoyment, get the CARNIVAL COMPANION, a 30-minute cassette containing all the programs in the book. Eliminates tiresome typing and lets your child spend more time enjoying the programs.

BK7389 Book (218 pages).....\$16.97

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<input type="checkbox"/> WORD PROCESSING <input type="checkbox"/> ACCOUNTING <input type="checkbox"/> OTHER		



Suspended is an interactive prose adventure game from Infocom, Inc. The science fiction game takes you into the twilight world of cryogenic suspension.

at the touch of a key.

PCP is now available for the new Apple Dot Matrix Printer, the Epson MX 80/100 Printers and the IBM Dot Matrix Printer. Computers supported by the system include the IBM Personal Computer, Apple II Plus, Apple III (in native mode) and the new Apple IIe.

PCP costs \$24.95. Reader Service number 461.

A Nightmarish Game

Suspended is Infocom's (Infocom, Inc., 55 Wheeler St., Cambridge, MA 02138) second science fiction game. This game takes you into the "twilight world of cryogenic suspension and awakens [you] to the nightmarish landscape of a planet in its death throes."

Suspended features a func-

tional game board and movable game pieces. These physical elements are designed to add an extra dimension to the game.

While attempting to save the planet, you are able to strategically manipulate six characters (robots), each having a different perception of the game environments, and each offering specific options. Suspended is designed to continually challenge you to perfect your strategies and develop new ones, as you will spend up to 30 hours solving the game's puzzles.

Suspended costs \$49.95. Reader Service number 470.

Apple Database

The Data Bank is a versatile, multifunction database

management program that is designed to offer all the power and sophistication of high-priced database systems.

The Data Bank is menu-driven with interactive preselection for speed and ease. The program is "unlocked," allowing you to customize the program and providing the dependability of multiple backups. The use of standard files permits compatibility with other programs, such as VisiCalc and most word processors.

Features of The Data Bank include a versatile form generator for printing reports, mailing labels, checks, invoices or forms of your own design; global math functions; multilevel searches and sorts, plus a "fast find" concept that locates records in a matter of seconds; flexibility in changing, relocating and transferring data; the ability to create new files from existing data, and the capacity to handle large files.

The Data Bank costs \$170 and requires an Apple II Plus or Apple IIe with Applesoft, 48K and at least one disk drive. It is manufactured by FlowerSoft, 564 Tara, Manteca, CA 95336. Reader Service number 460.

From One Apple To Another

MicroMover is a program designed to be used both by the novice and experienced computer user, whoever has a need to transfer files from one Apple II to another Apple using a modem.

Any type of file can be transferred without converting to text file first. A data compression algorithm cuts the transfer time. The disk-to-disk file transfer can be completed with a minimum of operator intervention.

The MicroMover program features one simple menu and one-character commands. One, some or all files on a disk may be transferred.

MicroMover works with either DOS 3.2 or 3.3. In fact, one system may be using 3.2 while the other is using 3.3.

The MicroMover works with the Hayes MicroModem II, acoustic modems and others. Only one copy of the program

needs to be purchased, as MicroMover transfers a copy of itself to the distant end, if required.

MicroMover costs \$50 and is manufactured by DAB Systems, 9116 Rockefeller Lane, Springfield, VA 22153. Reader Service number 462.

Shape Up!

DEG Software (11999 Katy Freeway, Suite 150, Houston, TX 77079) has announced the release of a personal diet and exercise program for use on the IBM Personal Computer. The product, called InShape, provides a method for recording detailed information on daily food intake and exercise performance. InShape has a computerized food dictionary and automatically calculates points for aerobic exercises.

Various plotting functions, including 60-day and 52-week summaries, are designed to give you an accurate picture of diet and exercise patterns over a period of time.

InShape's plotting capabilities allow you to plot any of four consumptions (protein, carbohydrate, calorie and fat) against food group, meal or body weight. Possible plots include calories consumed according to food group, protein consumed vs. body weight and so on.

InShape requires an IBM PC, a minimum of one disk drive and an 80-column monitor. A printer is optional. It is compatible with DOS 1.0 or 1.1 with 64K, or DOS 2.0 with 96K. It costs \$95. Reader Service number 471.

C-64 on the Write Track

Computer Marketing Services, Inc. (300 W. Marlton Pike, Cherry Hill, NJ 08002), has released Script 64, a full-function word processing system for the Commodore-64.

The program has a built-in dictionary, which can be expanded to 20,000 words. In addition to all normal text editing functions, Script 64 has enhancements such as the ability to hold 40 screen pages (1000 characters each) in the computer at one time,

which can be linked together for a document capacity of 999 screen pages; storage of deleted text in a buffer for recall in the same or different place; automatic page numbering, book fashion; header and trailers; redefinable keyboard; output to video with horizontal scrolling; and help screens.

Script 64 supports the Commodore 1541 disk drive and Commodore 1525 printer. Other serial or ASCII printers can be supported with an optional RS-232 interface. Script 64 also supports all other CBM disk drives and IEEE printers via an optional C-64 Link (also available from Computer Marketing Services, Inc., for \$169.95). Script 64 costs \$139.95. Reader Service number 473.

Learning Math Basics

The Math Teacher is an educational program designed to drill students on the basics of addition, subtraction, mul-

tiplication and division. It runs on the Commodore-64 system.

The program presents up to 25 problems per each working session. The student selects which of four math operations to perform. He also selects from four skill levels. At the end of the session, the student's score is displayed along with a reminder of the operation and level chosen.

The Math Teacher operates in full color, has graphics and is easy for children to use.

The program costs \$39.95 and is available from Computech, PO Box 7000-309, Redondo Beach, CA 90277. Reader Service number 475.

In Case You Were Wondering . . .

In the May New Software section, we listed a product called PC/InterComm; however, we omitted the name and address of the manufacturer. The manufacturer is Mark of the Unicorn, PO Box 423, Arlington, MA 02174.

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Atari-Compatible Disk Drive

The Rana 1000 is an Atari-compatible floppy disk drive from Rana Systems (20620 South Leapwood Ave., Carson, CA 90746).

The Rana 1000 has single-density capacity and offers 90,000 letters of storage on a single disk. The product line also will include a double-density drive with 180,000 characters of storage.

In addition to the write-protect feature, which keeps stored information safe, the new drive offers an LED read-out which displays the density storage, error status and drive number.

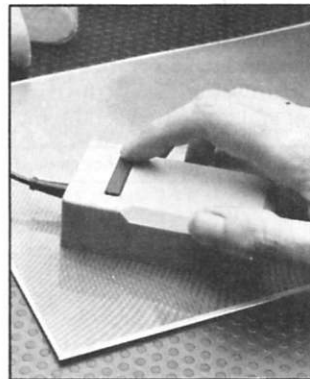
The Rana 1000 is 1/3 the size of the Atari drive. It costs \$399. Reader Service number 488.

An Independent Mouse

OptoMouse, from USI Computer Products (A Division of USI International, 71 Park Lane, Brisbane, CA 94005), is a "smart" mouse, which

comes equipped with an on-board microprocessor to provide accurate cursor positioning and graphics input. It is designed to be used with virtually any microprocessor system.

The OptoMouse is about the size of a cigarette pack. The mouse is moved back and forth over a reflective grid. This motion is then translated into a corresponding computer input and appears on the



USI's OptoMouse 2000 comes with an on-board microprocessor and can be connected to virtually any microcomputer system.

screen. It can be used to initiate action, to aid word processing or to draw graphics.

The OptoMouse has its own on-board power supply and uses a standard RS-232 interface to connect to virtually any microcomputer.

The OptoMouse costs \$179. A WordStar overlay that adapts the mouse to WordStar word processing applications is available for \$49.95. Reader Service number 482.

C-64 Disk Drive

Microtech, Inc. (PO Box 102, Langhorne, PA 19047), has announced the PEDISK CII, a high-performance disk system for the Commodore-64. Available in single- or dual-drive versions, the PEDISK can accommodate three-inch, 5¼-inch or eight-inch disk drives.

The system consists of a controller circuit assembly, a cable and standard disk drives. The controller plugs into the expansion connector of the Commodore-64.

PEDISK CII features high-speed, IBM-CP/M compatibili-

ty, expandability and a simple, reliable design. PEDISK transfers data directly to the computer memory at a rate of 250,000 bits per second. The disk format is 3740. This allows disks to be exchanged with other computer brands, minis and mainframes.

PEDISK is supplied with the PDOS operating system software. It includes a full set of utilities and Basic commands. The single-drive 5¼-inch system is the model C540-1; it costs \$595. The model C877-1 (single eight-inch system) costs \$1095. Reader Service number 487.

Apple Keyboard Controller Card

Soft Stroke is a keyboard controller card for the Apple II. The nine- by three-inch card plugs into one of the Apple's I/O slots.

The Soft Stroke card lets you connect either the standard Apple II keyboard or an external seven- or eight-bit ASCII-encoded, parallel output keyboard.

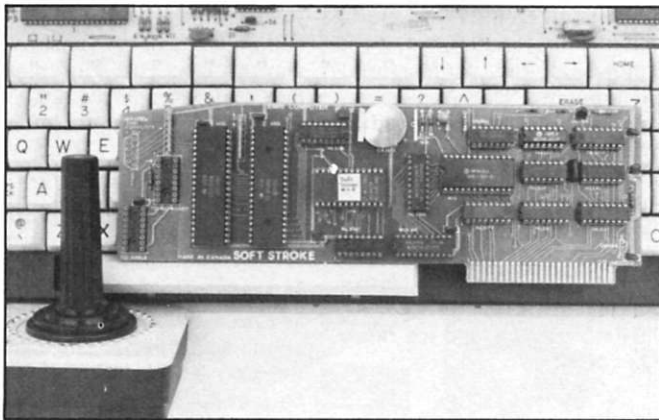
The card is designed to let



The Rana 1000, from Rana Systems, is an Atari-compatible disk drive.



The PEDISK CII is a high-performance disk drive system for the Commodore-64.



The Soft Stroke card, from Emri Computer, lets you connect either the standard Apple II keyboard or an external seven- or eight-bit ASCII-encoded, parallel output keyboard.

you adapt full-sized keyboards for operation with the Apple II computer. It allows redefinition or repositioning of any character-code generating key of the keyboard. Any key may be defined as a macro key. All keyboard translation parameters are stored in battery-packed CMOS RAM (2K).

Soft Stroke's on-board software includes a sophisticated keyswitch editor that allows disk storage and retrieval of keyboard definitions; keyboard definitions may be loaded from disk using three simple Basic commands.

Soft Stroke's operating system provides a 128K type-ahead buffer. The card is compatible with any operating system. There is a built-in real-time clock with 1/10 of a second resolution.

The Soft Stroke card costs \$199, and is available from Emri Computer, PO Box 4878, Station E, Ottawa, Ontario, Canada K1S 5J1. Reader Ser-

vice number 494.

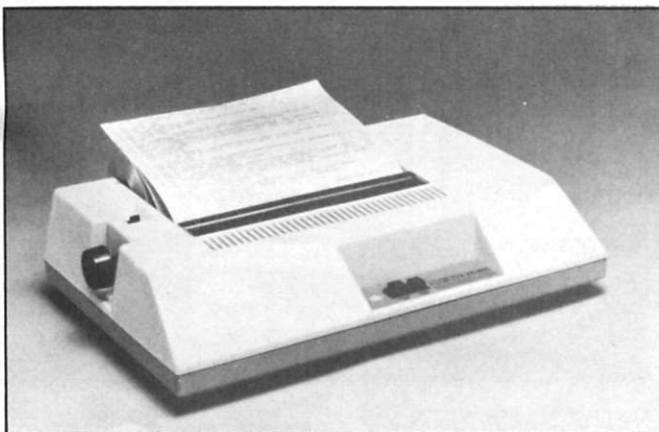
Axiom's Printer

The Model EX1601 is a full-sized, high-speed printer that features permanent archival-quality printouts. It is manufactured by Axiom Corp., 1014 Griswold Ave., San Fernando, CA 91340.

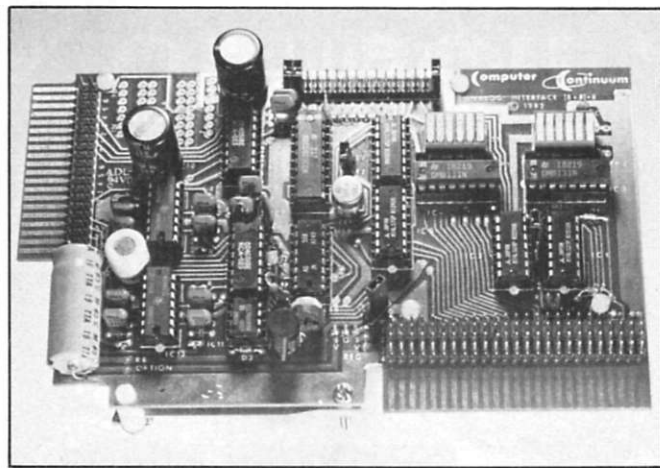
The nonimpact, electrosensitive mechanism prints at three lines per second (up to 240 characters per second), and eliminates the need for ribbons, toners or chemicals.

The Model EX1601 prints the full 96-character ASCII set on standard 8½-inch wide paper with an additional 128 symbols and foreign language characters.

The printout is software-selectable for an 80-, 40- or 27-column format. Print sizes can be mixed on a line and reverse printing can be used for emphasis.



The Model EX1601, from Axiom Corp., is a high-speed printer with permanent archival-quality printouts.



Computer Continuum's high-speed analog board is designed to open the door to the world of analog signal processing and control.

A choice of standard parallel, RS-232C and 20mA serial, or IEEE-488 interfaces is available. The Model EX1601 costs \$695. Reader Service number 490.

A Door-Opening Board

Computer Continuum's (301 16th Ave., San Francisco, CA 94118) high-speed analog interface board is designed to open the door to the world of analog signal processing and control. The board is available for several types of microcomputers.

A special set of pins at the connector to the host computer allows you to rearrange the pin assignment for easy interfacing.

The board works with the Timex-Sinclair 1000, Apple II, TRS-80, Commodore-64 and Z-80-CPU-type computers that have an appropriate user bus.

The board can plug directly into the TS-1000 to form a powerful dedicated system. The board has many on-board jumpers and switches that are designed to allow versatility in the areas of decoding addresses, memory or I/O mapping, control bus standards, power supplies, analog scales and A to D conversion modes.

The user's manual includes sample programs in Basic and machine code. The board costs \$195, assembled and connector parts. Contact the company directly for more information.

Two Monochrome Monitors

Two new compact monochrome video monitors, one with amber display and one with green, have been introduced by Zenith Data Systems Corp. (1000 Milwaukee Ave., Glenview, IL 60025). The 12-inch monitors are intended for use with a wide range of video games and personal computers.

Capable of a 25-line-by-80-character display, each unit is equipped with a 40-80 character switch to increase character size when the computer has a 40-column display. The green-screen model (ZVM-123) is priced at \$149, while the amber-display model (ZVM-122) sells for \$169. Reader Service number 483.

Graphics Plotter

The Strobe 200 is a graphics plotter that features a more efficient paper-loading system and an innovative pen holder that is designed to allow the use of a wide variety of pens. The Strobe 200 costs \$795 and provides a spectrum of options.

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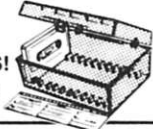
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Hard Box	<input type="checkbox"/> 2.50	<input type="checkbox"/> 4.00	
Storage Caddy @ \$2.95 ea	Quantity _____		
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are parallel interface cards that connect with a variety of personal and professional computers. The Apple-compatible interface is priced at \$85; the Osborne interface costs \$90; and the Commodore and TRS-80 interfaces cost \$110 each.

Strobe Graphics Systems, Inc., 897-5A Independence Ave., Mountain View, CA 94043. Reader Service number 484.

Low-End Printer

Alphacom, Inc. (2323 South Bascom Ave., Campbell, CA 95008), has introduced a low-cost (\$179.95), 40-column printer with graphics capabilities for Commodore, Atari and Texas Instruments systems.

Called the Alphacom 42, the unit prints at two lines a second and combines a single-chip microprocessor and an Olivetti print mechanism.

The Alphacom 42 can be linked to most home computers by plugging the appropriate interface cable into the printer's cartridge-like slot.

The printer features upper- and lowercase and a wrap-around facility that allows printing of text lines longer than 40 characters. The Alphacom 42 also recognizes standard ASCII control, or "action," codes for changing the printing mode. Codes include carriage return, line feed, right justification, form feed, graphics control and multiline feed.

Interface cables for the VIC-20 and Commodore-64 are available immediately.

Cables for the Atari and TI computers will be available shortly. Prices for the interface cables begin at \$29.95. Reader Service number 491.

Three VIC-20 Enhancements

World Electronics (177 27th St., Brooklyn, NY 11232) has announced three products for the Commodore VIC-20: the Universal Parallel Printer Cable (UPA-20), the Universal Cassette Adapter (UCA-20) and the Memory Port Expander.

The UPA-20 is a four-foot-long cable that plugs into the VIC-20's I/O ports. The documentation includes a Basic listing, which allows anything printed to the screen to go to the printer as well, and an assembly listing with four optional modes, including one that adds print and list commands to Basic for parallel output. (The routine is also available on cartridge.) Although it is not designed to fully duplicate Commodore's Serial Graphics Printer, it is intended to fill a neglected spot on the VIC-20 peripheral shelf.

The UCA-20 lets you use any cassette machine with your VIC-20. The UCA-20 plugs into the cassette port of the computer. The other end connects to any cassette machine by use of the MIC and Monitor jacks. Since the standard cassette doesn't have sensors to determine if a button has been pressed, this adapter does not duplicate that function of the Commodore



The Alphacom 42, from Alphacom, Inc., is a low-cost, 40-column printer with graphics capabilities for several popular home computers, including those from Commodore, Atari and Texas Instruments.



The Gavilan, from Gavilan Computer Corp., is a "mobile computer" designed to meet the needs of travellers.

Datassette (the computer will always think one of the buttons has been pressed). The noise filters and amplifiers, however, do allow it to produce a clean signal. In fact, it can successfully load tapes the Datassette never finds. Yet, the output is compatible with the Datassette.

The Memory Port Expander plugs into the memory expansion port of the VIC-20, expanding it to three connectors, each of which has all the address, data and signal lines of the original port. In addition, a row of DIP switches allows the user to disconnect power to any of the connectors, thereby deselecting them.

By limiting the expander to three slots, the need for buffering is eliminated. The board is fused, however, to comply with Commodore's warranty on the VIC-20. The Memory Port Expander board is offered both as a bare board project and as a fully assembled board.

The UPA-20, the UCA-20 and Memory Port Expander cost \$19.95 each. Reader Service number 486.

Going Mobile

The Gavilan computer is a self-contained, battery-powered, nine-pound, 16-bit microcomputer system that is designed to offer a complete mobile office in a briefcase.

The computer is contained in an integrated fold-up package. It features an eight-line by 66-character flat LCD dis-

play; full typewriter keyboard and ten-key pad; flat touch panel for cursor control and item selection; a 16-bit CPU microprocessor (Intel 8088); a built-in 300-baud direct-connect modem; three-inch microfloppy disk drive and I/O bus; internal memory of 80K (32K available), expandable to 336K; an integrated three-inch microfloppy disk drive with a capacity of 320K (formatted); an interface that permits the computer to connect to any standard full-screen video display; an ac adapter and quick recharger (110 or 220 volts), which plugs into a standard ac outlet; and an optional five-pound printer that prints up to 60,000 characters per battery charge on standard 8½ × 11 paper.

The price of the basic system (main unit, integral microfloppy disk drive, modem, internal processor memory, recharger and Gavilan operating system) will be less than \$4000.

Gavilan Computer Corp., 240 Hacienda Ave., Campbell, CA 95008. Reader Service number 481.

Miniature Printer

The SP-400 is a matrix printer from Syntest (169 Millham St., Marlboro, MA 01752) that is priced at \$365. The printer is designed to provide the essential features of more expensive competitors.

The miniature printer provides noiseless 40-column printouts on thermal paper. It

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- Analog Output: ALIS/AO \$841
(2 channels, 0.39% Prec., 10 Volts Full Scale)
- Digital Input/Output: ALIS/DIO \$1600
(32 bi-directional channels, quad timers, interrupts)

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ALIS systems require a 48K APPLE, APPLESOFT, DOS 3.2/3. For detailed specifications and complete price schedule see your Apple dealer, or contact:

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The SP-400 is a 40-column thermal printer from Syntest Corporation.

has switch-selectable baud rates from 50 to 9600 baud. Stop bits and parity are also selectable. Input is standard RS-232C or 20mA loop. A 40-character buffer is also standard.

The SP-400 is 8 x 4.45 x 2.7 inches. The unit can be rack-mounted. The printer's input is 12 V ac or dc. It also comes with a receptacle-mounted UL-approved 115 V ac 60 Hz power module. The SP-400's printing speed is one line per second. Reader Service number 492.

Hard Disk System

The Hard Disk III is VR Data's (777 Henderson Blvd., Folcroft, PA 19032) latest in its line of Winchester disk drives.

The Hard Disk III's subsystem includes case, power supply, cables and mounting hardware—fully assembled, tested and burned-in.

The unit is available as a five-megabyte (formatted) fixed and/or five-megabyte removable disk cartridge. Other available capacities for the disk drive subsystem are ten-megabyte, two times ten-megabyte, 15-megabyte and two times 15-megabyte. Adapters, which include all hardware and software to run the subsystem, are available for the IBM Personal Computer, IBM-XT, Apple II, Apple IIe, Franklin, TRS-80 Models I and III, LNW-80 and LNW-II.

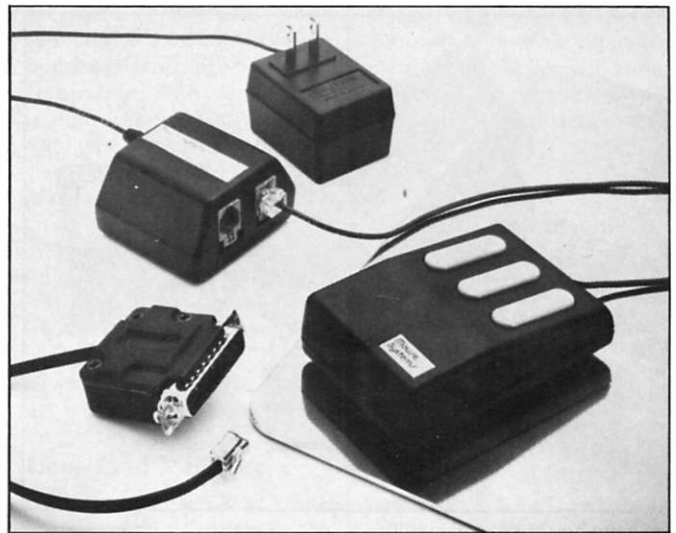
Prices of the Hard Disk III start at \$995. Adapters start at \$150. Reader Service number 493.

The PC Gets a Mouse

The Mouse Systems Corp. (2336 H Walsh Ave., Santa Clara, CA 95051) PC Mouse is designed to let IBM Personal Computer users take advantage of the ease of use provided by a mouse.

PC Mouse combines an optical mouse and special software. Up to nine commands may be issued by clicking one of the mouse's three buttons one to three times. The PC Mouse requires only a single RS-232 port. No hardware or software modifications are needed.

PC Mouse works by translating mouse motion and but-



The PC Mouse, from Mouse Systems Corp., is designed to let IBM Personal Computer users take advantage of the ease of use provided by a mouse.

ton clicks into user-defined key sequences. Up to 15 key sequences can be assigned to each button code. These key sequences perform exactly as if you had typed them in with the keyboard.

The mouse tracks motion without moving parts by optically counting grid lines printed on an aluminum "mouse pad." An internal microprocessor transmits position data at 1200 baud via a three-wire RJ11C connector. An interface box allows direct connection to an RS-232 port. PC Mouse costs \$332. Reader Service number 480.

Commodore Cassette Interface

The VIK-Dubber cassette interface lets VIC-20 and

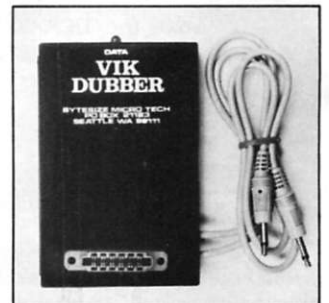
Commodore-64 users save and load data using any standard cassette recorder. The VIK-Dubber circuitry is designed to filter and enhance cassette data, virtually eliminating bad loads.

The VIK-Dubber lets you connect two cassette recorders to make high-quality back-up copies of programs, even machine-language programs. The VIK-Dubber also has an indicator light and quiet audible tone to help you adjust the cassette volume for proper use and monitor the cassette data.

Since it gets its power from the computer, no batteries are needed. The VIK-Dubber costs \$34.95, and is available from Bytesize Micro Technology, PO Box 21123, Dept. AZ, Seattle, WA 98111. Reader Service number 489.



The Hard Disk III is VR Data's newest addition to its line of Winchester disk drives.



The VIK-Dubber cassette interface, from Bytesize Micro Technology, lets VIC-20 and Commodore-64 users save and load data using any standard cassette recorder.

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Toronto Computerfest

Computerfest '83 will be held July 8-10 at Harbourfront in Toronto. The event is sponsored by TRACE (Toronto Region Association of Computer Enthusiasts) and will be the largest non-professional computer show in Canada in 1983.

The show will feature exhibits, a flea market, an auction and numerous talks. For further information, write TRACE, PO Box 6922, Toronto, Ontario, Canada M5W 1X6.

Computers in Music Education—Chicago

On July 10-11, the Chicago Area Music Teachers Association and Triton Community College will host a conference on "The Role of Microcomputers in Music Education."

The show will include an exhibit and many talks and seminars on computer-assisted music education, supporting software, languages and other topics. For more information, call Pearl Anshell, the conference coordinator, at 312-386-7733, or Michael Ferrelli, the director of program development, at Triton College, 312-456-0300.

USENIX Meeting—Toronto

The USENIX Association summer conference, co-sponsored by the Software Tool Users Group, will be held July 12-15 at the Hilton Harbour Castle, Toronto, Ontario. The conference, for academic and business people interested in UNIX, will consist of technical sessions, tutorials and vendor exhibitions.

For more information, call Suzanne McNary at Rogal America, 617-965-1000, or (on technical questions) Mike Tillson, 416-922-1937.

Computers in Education—Oregon

The University of Oregon's College of Education will offer its second annual conference on computers in education on July 20-22 at the Eugene Hilton and Convention Center, Eugene, OR. For details, telephone 503-686-3405.

Business Schools Computer Users Conference

The International Business Schools Computer Users Group (IBSCUG) will hold its 1983 conference July 25-27 at the University of Waterloo, Waterloo, Ontario. The conference is an opportunity for business school people to investigate developments in hardware, software and the application of computers to business and business education.

For information and registration forms, contact Professor Anthony Wensley, Accounting Group, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1; 519-885-1211, Ext. 2755.

Graphics Conference and Show—Detroit

SIGGRAPH '83, the tenth annual Conference on Computer Graphics and Interactive Techniques, will take place July 25-29 in Cobo Hall in Detroit, MI. All aspects of computer graphics technology will be explored.

A public exhibition of artists' computer-generated works will be held in conjunction with the conference. For further information, call Lynn Valastyan or Sheila Hoffmeyer at 312-644-6610.

Music Instruction Workshop—Illinois

The University of Illinois will sponsor its third annual workshop on computer-based music instruction on July 26-29 at the campus in Urbana, IL. The workshop is designed for public school and university music teachers interested in learning about computers.

For registration or other information, write Professor Dale Kimpton, School of Music, University of Illinois, Urbana, IL 61801, or telephone 217-333-2620.

LOGON '83—Montana

LOGON '83, a five-day conference on "Technology, Mythology and Literacy in the New Age" will be held at Montana State University in Bozeman, MT, on August 1-5. The conference will examine the implications of computer technology on human culture and will bring together outstanding people from many fields of work: scientific and technical, educational and artistic, as well as from the media, industry and business.

For more information, contact Michael Sexson, English Department, Montana State University, Bozeman, MT 59717; 406-994-3768.



Microcomputers in Vocational Education—Wisconsin

A conference coordinated by the Vocational Studies Center, University of Wisconsin-Madison, will take place August

10-12 at the Concourse Hotel in Madison. Designed for people concerned with microcomputers and high technology in vocational education, the conference will feature classes, presentations of programs and exhibits.

For more information, contact Judy Rodenstein or Roger Lambert, 964 Educational Sciences Building, 1025 West Johnson St., Madison, WI 53706; 608-263-4367 or 608-263-2704.

IBM PC Faire—San Francisco

Computer Faire announces its first IBM PC Faire, to take place August 26-28 in San Francisco's Civic Auditorium and Brooks Hall. The Faire will focus on hardware, software and applications for the IBM Personal Computer, and will feature a large technical conference, a product exposition and a number of user group meetings.

For more information, contact Jim Warren at 415-851-7077, or write IBM PC Faire, 345 Swett Road, Woodside, CA 94062.

Australian Computer Conference

The tenth Australian Computer Conference is scheduled for September 12-15 in Melbourne, Victoria. The conference will deal in depth with virtually every area of computer application and management.

For details, write Professor A.Y. Montgomery, 10 ACC, PO Box 4063, Mail Exchange Melbourne, Victoria, 3001 Australia; telephone (03) 41 6220.

Peripherals '83—San Francisco

The exhibition Peripherals '83 has been re-scheduled from Boston to San Francisco, and will be held September 13-15 in the Moscone Center.

Information can be obtained from Cahners Exposition Group, Cahners Plaza, 1350 E. Touhy Ave., PO Box 5060, Des Plaines, IL 60018; 312-299-9311.

Federal Computer Conference—DC

The sixth annual Federal Computer Conference will take place September 13-15 in the Washington Convention Center, Washington, DC. In addition to the program of presentations and workshops, there will be a large exposition of ADP equipment, systems and services on the second and third days.

For more information, contact Federal Education Programs, PO Box 368, Wayland, MA 01778; 800-225-5926 from outside Massachusetts; 617-358-5181 from within Massachusetts.

Euromicro 83—Madrid

Euromicro 83, the ninth annual symposium on microprocessing and microprogramming, will take place in Madrid on September 14-16. The purpose is to bring together people from business, industry, government and academia who are interested in the problems and applications of microcomputer systems.

For further details, write Euromicro, T.H. Twente, PO Box 217, 7500 AE Enschede, The Netherlands.

Computer Expo—Indiana

The second annual Indiana Computer Expo will be held at the Indianapolis Convention Center, Indianapolis, Indiana, on September 15th and 16th. The Exposition is particularly designed for business end users of micros and minis, and will deal with software and peripherals as well as basic computer systems.

For more information, call Ernie Kerns & Associates, 317-259-8111.

Deep in the Heart of Texas

The first Heart of Texas Computer Show is scheduled for September 16-18 at the Convention Center in San Antonio. The emphasis of the Show will be on microcomputer-based small business systems.

For further information, contact Robin G. Mann at 512-226-4636, or write Heart of Texas, PO Box 12094, San Antonio, TX 78212.

SICOB—Paris in the Fall

SICOB, the leading French computer exhibition, is scheduled for Sept. 21-30 in the exhibition halls at CNIT, la Defense, Paris. Just preceding this event (Sept. 19-23), the 9th World Computer Congress, IFIP Congress '83, will be held at the Palais de Congrès. The Congress is the annual conference of the International Federation for Information Processing (IFIP), with membership in 42 countries.

For full information on these events, contact Philip H. Dorn, Dorn Computer Consultants, Inc., 25 East 86th St., New York, NY 10028; 212-427-7460.

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REVIEWS

(from p. 146)

While I valiantly struggled to find 15 different word combinations (not all of which were even valid) from the matrix, the computer had the audacity to find 48 of them. It positioned question marks in the proper column and continued to decelerate that terrible, terrible clock.

The game is tough enough, but Insoft adds cruel and unusual punishment to the task. It isn't bad enough that I must take a drubbing at the hands of a computer. Wordtrix shows its arrogance by letting me know it has found "enough" four letter words; any more that it finds won't even be counted. Isn't that wonderful?

I'm not even going to talk about the score. 2700 to 650. Really!

Wordtrix exercises the mind. And if you're faint of heart, don't even consider this game. You're going to get downright angry when you find, as I did, that you have difficulty competing at the beginning level. They add to this insult by giving you five *higher* levels of competency. I figure by 1989. . . . But you know, after a while, your eyes begin to cross and you begin to see things that weren't even there in the last game. The matrix appears to be generated randomly, so even the computer can't cheat. But you don't see it pounding its forehead, do you? It doesn't care that you now have one eye pointing north and the other pointing west.

You are being scored at all times as you work against the clock. As the clock ticks down and the neatly defined rows of question marks begin to appear at the right side of the screen, you resolve that this is the last time you will subject yourself to Jeremy Wilson's (the program's author) perverted sense of humor. You swear if you ever meet this guy you'll subject him to a decreasing clock and a matrix of 64 which must be solved in one minute, while working against the Cray-1 supercomputer.

Wordtrix will add one expression to your repertoire: "Oh yeah!" (*Insoft, Inc., 10175 S.W. Barbur Blvd., Suite 202B, Portland, OR 97219.*)

**Ken Lord
Winchendon, MA**

ZX Disassembler/ Debugger

A versatile
Disassembler for the
TS-1000 and ZX-81

If you ever bought a "grab bag" and got a real bargain, you know how good I felt

when I received Gladstone Electronic's ZX-81 Disassembler/Debugger. It turned out to be much more than I had anticipated. It's not only an excellent disassembler, but is a super hexadecimal machine-code monitor program.

Although it took almost five weeks to receive the cassette, this 4K, all-machine-code program is not only fast, but it's exceptionally accurate.

The versatility of the program is its most impressive feature. The various user commands, as shown in Table 1, give you an idea of the wide range of uses for this program.

Using the Disassembler/Debugger

The program has the automatic run feature, and greets you with an asterisk prompt that tells you it is in the command mode, awaiting your first command. A subsequent equals sign indicates that it is waiting for the input of the appropriate address. All addresses, codes and indicators are handled in hexadecimal. This makes it easier to work with the major manuals on the Z-80 MPU.

An input of the D command and a starting address will result in one disassembled instruction each time the enter key is pressed. The mnemonics are all standard Zilog, with the exception of 16, which are mainly Intel 8080. A reference list is provided as a part of the four-page instruction sheet. I used the disassem-

- A — Displays memory contents as the ZX-81 characters
- B — Sets a breakpoint and starts execution of the machine code program
- C — Compares two designated blocks of memory
- D — Disassembles a specified area of memory
- E — Loads machine code in hexadecimal
- F — Fills a block of memory with specified character
- G — Executes a machine code program
- M — Moves a block of memory to another designated address
- N — Executes next specified instruction in single-step mode
- O — Displays only mnemonic in single step mode
- Q — Returns ZX-DB to command mode
- R — Executes the CALL and returns to single-step mode
- S — Searches memory for a specified string
- V — Displays memory in hexadecimal
- W — Sets aside a portion of the screen for program display
- Z — Presets specified register with desired contents while in single-step

Table 1. Command list for ZX Disassembler/Debugger

bler for a listing of the first page of the 8K ROM, and the instructions and associated addresses matched my printed copy perfectly.

The HL register is always printed as "M" in the mnemonics, and the address in hex precedes each disassembled instruction. The ZX-81 graphics character is added beside the object of each load instruction. This is a nice feature when working with graphics.

The part of the program that will be the most useful in your actual programming is the monitor portion. The monitor contains an excellent hex loader and will, on command, list any area of memory in chunks of eight instructions per line.

Each new line is labeled with its starting address, and the enter key has to be pressed for each new line. It is possible to view memory contents as the ZX-81 character, rather than in hex; however, I've yet to find a good use for this mode.

There are various capabilities, such as block move and block fill, that you will find useful when programming. However, the best capability will, no doubt, be the single-step, machine-code execution mode. In this mode, you set a breakpoint in your code. When this point is reached, the execution will switch to single-step.

All registers, flags, mnemonics and the next instruction are displayed at the bottom of the screen. You then single-step the code, and watch the changing register contents as your program executes. You even can modify your register contents as the program is single-stepped, or even skip sections of the program (such as loops) that you know to be correct. The possibilities of debugging your program are endless.

Disadvantages

There are several complications with the use of ZX-DB. The program was difficult to load. The volume and tone controls had to be set and reset. Loading took several tries before a perfect load was achieved. I adjusted the playback azimuth on my recorder, and the problem cleared up completely. Now, the program records on the first try.

ZX-DB is located in a long REM statement in the first 4K of memory. This makes it susceptible to wipe-out. I experimented a lot, and mine usually crashed. This means reloading the code and the monitor again.

Listings of code and instructions in all modes have to be preceded by pressing the enter key. This is not distracting except when you are trying to use both hands for other things, such as writing. A slow-step feature would have been nice.

ZX Disassembler/Debugger, for the price, is an excellent program. It is written by Bug Byte, and is a companion program to their ZX Assembler, which also is distributed by Gladstone Electronics. The company seems to be having difficulty in keeping these two programs in

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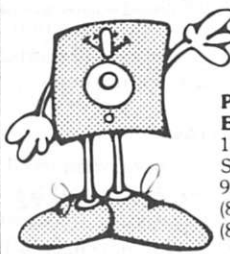
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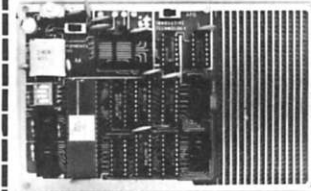
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Jim Stephens
Nashville, TN

HexPrintR

WordStar is a Classic, but HexPrintR Can make it even better

Not many application programs have achieved the reputation of being a classic, but WordStar has. Considered to be the top performer in word processing, it has become the standard to which all the others are compared. Being number one, however, doesn't mean perfection. There's room for improvement in WordStar.

It's no mean feat to tweak the giant and make him more mellow instead of cranky, but HexPrintR has managed to do it.

WordStar's Weakness

Before explaining how HexPrintR enhances WordStar, let me point out a deficiency that it corrects. One of WordStar's weaknesses is that it doesn't utilize all the capabilities of a modern printer. Dot matrix printers provide a varied selection of type fonts, special characters and international character sets. For example, the Epson MX-100 has, in addition to the normal print mode, a condensed mode, an expanded mode, an enhanced mode, a double-strike mode and even combinations of these modes—such as condensed expanded or enhanced double-strike modes. WordStar doesn't give you the ability to combine these modes. This printer also provides access to foreign language characters used in France, Germany, England, Denmark, Sweden, Italy and Spain; none of these can be utilized from within WordStar.

WordStar mimics these modes by allowing you to print in a boldface or double-strike method, whereby the printhead will make two or three passes for each line of print, but this is not quite the same as the double strike Epson offers.

When the Epson printer is directed to double strike, the printhead makes two passes for each letter; in addition, the paper is moved vertically a fraction of an inch between each strike, helping to fill in the spaces between the dots.

For the enhanced mode, the Epson printer will offset the dot pattern horizontally to give each character a fuller appearance, approximating the quality of print produced by a daisy wheel printer. A combination of enhanced and double-strike modes produces a *very* bold type.

There is a way to print out a WordStar file in one of the above modes, but it's awkward. To give the proper commands to the printer, you have to leave Word-

Star and call up Basic or an assembly-language routine. You then must return to WordStar to print the file.

If the disk doesn't have enough room for both of the WordStar programs and the Basic program, you have to remove the WordStar disk, insert the Basic disk and return to the WordStar disk. If you turned the printer off during this procedure or between printing different files, you would have to repeat the process again. This method doesn't allow you to intermix the different modes in the same text, unless you stop to give the printer the proper commands each time you switch modes. HexPrintR eliminates all that.

The Install program, provided with WordStar, lets you make modifications in the printer patch area to support optional printer features, but these are limited and don't always work.

The Purpose of HexPrintR

HexPrintR is a program modification to WordStar which allows you to take advantage of the full capabilities of your printer. With HexPrintR, all the commands to carry out the different print modes or functions are written in the text of the WordStar file itself.

There is no need to exit from WordStar, change disks or call up another program. All you do is enclose the printer codes between a pair of control R's in the text wherever you wish to have that particular print feature turned on.

The manual gives detailed instructions on how to use HexPrintR, and contains examples of practical applications.

Installing HexPrintR

Modifying your WordStar disk to allow full printer control by HexPrintR is simple. A CP/M-based system is necessary, and you will need the CP/M transient files Submit.com, XSub.com and DDT.com, which are supplied with the CP/M operating system. Put the HexPrintR disk, with the previously mentioned CP/M files copied onto it, into drive A. Put the WordStar disk in Drive B.

Step one, type `↑C`. Step two, type `SUBMIT HPR226` if you have WS version 2.26, or if you have WS version 3.0, type `SUBMIT HPR30`. Step three, wait until you see the message `***INSTALLATION COMPLETE***` on the screen.

That's it. The disk in drive B now is "Hexed WordStar" and is ready for use. Each time you call up WordStar from this disk, the printer installation message that appears on the screen as the program is loading will indicate that HexPrintR has been installed.

If you don't care to do it yourself, C.I. Software will install HexPrintR for an additional charge of \$6. You must send them a copy of your WordStar disk for this installation service.

HexPrintR doesn't leave you in the dark if you made a mistake. If you direct

HexPrintR to do something that it does not understand, an error message will appear on your printed document. The message will look like this: `... HPR ERR n ...`. It will appear in your text at the point of the error. The "n" is the error number. It will give you an indication of what to look for in your file.

Designing Your Own Special Characters

Here's where HexPrintR really shines. This feature lets you create characters not provided by the printer, or invent characters and symbols of your own design. The printer must have individually addressable dot graphics capability to accomplish this.

Epson calls this feature "Grafrax," and it's invoked by turning on the Bit Image mode. In this mode, each of eight needles in the printhead can be controlled freely and programmably. By choosing your printer's decimal or hexadecimal code for any of the 32 possible combinations of the eight needles, you may create any design or symbol desired. For instance, the Epson has no copyright symbol, but I was able to design one by choosing the appropriate dot pattern codes and inserting them in the text between a pair of `↑R's`.

This is what the hexadecimal notation for the copyright symbol looks like:

```
↑R1b,4b,08,00,3c,42,99,a5,a5,81,42,3c↑R
```

Choosing the proper codes takes a little time, but once a character or symbol has been designed, the code can be saved in a library file and copied into the text by WordStar's block command, `↑KR`, "Read file".

The design of a new symbol can be more easily carried out if you draw the dot pattern on graph paper first, then convert the drawing into hexadecimal data.

The HexPrintR manual explains this procedure in detail and even provides blank grid forms to generate your own special characters. If your work demands special mathematical or scientific symbols, HexPrintR will provide a way for you to create them.

I've also found it helpful to create small versions of numerical characters to use as notations for superscripted footnotes. The Epson printer cannot roll the carriage up and then down again for superscript, so I created a set of numbers—from zero to nine—that are smaller than the normal characters.

The top of the number does not extend above the top of the printed line, as real superscript does, but the bottom of the number does not reach the bottom of the printed line, giving the number the appearance of superscript.

Graphics

Graphics capability is not limited to creating characters or symbols; it can be used to draw any kind of picture, chart or

graph. Bear in mind, however, that the amount of data necessary to generate an image is directly proportional to the size and complexity of the image.

HexPrintR and WordStar files can accommodate a large amount of data, but the limiting factor becomes the amount of time spent in deriving the hexadecimal code for a large image. The use of graphics in this context should be reserved for designs that will not be used just one time, but repeatedly.

One use that I have found for this function is to print a monogrammed letterhead of my own design. The letterhead also takes advantage of the ability to mix both graphics and text modes on the same line.

If you have the time and inclination, you can create larger and more complex designs.

HexPrintR provides WordStar users with easy access to all the controls and features incorporated into the printer by the manufacturer. HexPrintR eliminates the extra steps that normally would be required to achieve full printer control of text created with WordStar.

A bonus for owners of printers with dot-addressable graphics is that it makes this feature easy to use. Normally, it takes a fair degree of technical knowledge and a lot of repetitive typing on the keys to utilize the printer's bit image mode. A

Basic statement such as the following:

```
LPRINT CHR$(27);"D";CHR$(9);CHR$(17);
CHR$(25);CHR$(33);CHR$(0)
```

can be written in a WordStar text file in a much shorter version:

```
!R27N!RD!R9,17,25,33,0!R
```

Use of the bit image mode can provide a means of creating characters and symbols that the printer just doesn't have. It's certainly much neater than using a pen to fill in the missing characters.

The insertion of created characters into the text is awkward; however, it can be overcome with a little diligence.

WordStar doesn't recognize that the string of hex data between the pair of !R's may take up only one or two spaces when printed. It prints the character formed by the data, but then prints a space for each of the numbers between the commas. Any text that follows will be separated from the formed character by all those spaces, even though no spacing was intended. As explained in the manual, this can be avoided by writing the text and inserting a "dummy" character where you wish the formed character to appear.

After all corrections and formatting of the text are completed, replace the dummy character with the string of data by means of the find and replace commands. The formatting and spacing that

were present before the replacement will be retained.


Custom Installation

If you don't have a printer with dot graphics capability, or if you don't have a need to use this feature, C.I. Software also provides a customization installation of WordStar for particular printers. The cost is less than HexPrintR's.

The custom installation gives you access to almost all your printer control codes from within the WordStar file. This will allow you to select all of the various type styles and combinations, but on some printers all the formatting features cannot be accessed. Bit image graphics is not supported with this package. Custom installation is available for several popular printers. C.I. Software is continually adding printers to their list, so contact them for the latest information.

HexPrintR costs \$39 for 5¼-inch disk and \$42 for eight-inch disk formats. Custom installation costs \$25. If you purchase custom installation and HexPrintR at the same time, there is a combination price of \$55. These modifications give you one of the most refined and powerful sets of printer control codes available today. (C.I. Software, Suite E 149, 1380 Garnet Ave., San Diego, CA 92109.)

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Apple DOS has its faults and its alleged faults. Naturally, several companies have come up with attempts to fix these shortcomings. One of these companies is S & H Software (58 Van Orten Road, Harrington Park, NJ 07640).

S & H Software has produced The DOS Enhancer (TDE), a program designed to cure some of the faults of Apple DOS, and to perform a number of other interesting tricks—all for \$69.95.

First of all, TDE is a "fast" DOS. It can do disk loads and saves in up to 1/5 the time that Apple DOS takes. This means that a disk load that ordinarily takes two minutes could, in some cases, be done in less than 25 seconds.

TDE also can detect the presence or absence of either integer Basic or Applesoft Basic in a particular machine. It then can load the missing Basic, or print "error" messages to alert the user to the missing language.

As part of this ability to detect the presence or absence of specific Basic dialects, TDE can create disks with multiple greeting programs that will boot successfully whatever the dialect—or for that matter, will boot with binary or Exec files.

TDE can create a customized catalog (Supercat/Menu) that also serves as a file selection menu. Files can be loaded or saved, various DOS commands can be executed, free storage space on the disk can be determined, and so on—all of this with single keystrokes.

As an "unadvertised special," TDE includes a number of minimally supported, and possibly not fully debugged, routines. In general, these routines help users work on and repair disks at the individual byte level. Obviously, at this level you better be a serious programmer

and know exactly what you're doing.

There are other features in TDE, but the ones I've mentioned are the major ones. They seem to work as advertised. Disk loads and saves can be done more quickly; Applesoft and integer Basic are properly detected; and the customized Supercat/Menu catalog was a delight to use, even though the numerous options tend to be confusing.

As you study the functions of TDE, you realize that it is a specialized product. Its major users will be commercial vendors preparing disks for sale to Apple owners who have varying configurations on their machines.

Everyday hackers usually don't worry about how fast their homebrew programs are delivered to and from the disk drives. The time is usually less than 60 seconds, two minutes at the most.

Everyday hackers don't need a routine to detect integer and Applesoft Basic in their own machines; they already know, or maybe have a language card with the missing dialect built-in.

Also, most everyday hackers will find Disk Access Utility routines confusing. They require a thorough knowledge of how data is formatted on disks. (I knew my Basic programs as I looked at an ASCII representation of the disk sectors, but I was bewildered by all the peculiar symbols that had been added to them.)

The Supercat/Menu-enhanced-catalog feature is nice for hackers, but \$70 is a lot to pay for this one feature.

Still, all of these features can be attractive to commercial programmers. Many users are irritated by slow disk drive access, even if the delays are only a couple of minutes. They are likely to blame the commercial program, not the disk drive.

And while many users will have both integer and Applesoft Basic available through a language card, TDE's flexibility in dealing with both dialects could give commercial vendors low-cost protection.

Again, naive users with just one dialect

in their machines might blame the program, not the machine—unless they get an error message that explains the problem in English, not Computerese.

So if you're just an everyday hacker who writes an occasional Basic program for your own amusement, TDE is not for you. But if you're a serious commercial programmer looking for wide sales, the package might be worth your inspection.

And while you probably could write most of the routines yourself, you probably would spend more than \$70 worth of your time on the project. And after all, in commerce, it's not DOS enhancement that counts, it's dollar enhancement.

Brownlee Elliot
Bloomfield Hills, MI

Wordtrix

This IBM game will
Exercise your mind and
Increase your blood pressure

Wordtrix is another one of Insoft's invitations to mental madness. Oh, it seems simple enough. A matrix of 16 letters appears on the screen, and all you have to do is assemble three, four, five or six letter words from the matrix.

It's not that easy. The letters must touch. I can move from left or right, from top or bottom, around in a circle, but the computer is going to do so, too, checking its finds against an internal dictionary. And I have only three minutes! Gadzooks!

If there were time to do a leisurely analysis of the graph, it wouldn't be so bad. But Insoft has cruelly placed a clock right at eye level. And every time the computer finds a word in its dictionary, as if to say "nyea, nyea," it positions the word in the form of question marks under the appropriate column.

(Continued on p. 142)

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