

```

HA 90 PRINT "{CLR}{2 DOWN}":PRI
      NNTAB(15)"ML RUNNER"
SK 100 INPUT "{3 DOWN}NAME OF
      {SPACE}PROGRAM";NA$
ME 110 INPUT "STARTING ADDRESS
      {SPACE}OF PROGRAM";A$:G
      OSUB390:SA=A
CH 120 INPUT "ENDING ADDRESS' O
      F PROGRAM";A$:GOSUB390:
      EA=A
PK 130 EE=EA-SA+2093:EH=FN HI(
      EE):EL=FN LO(EE)
DD 140 INPUT "SYS ADDRESS";A$:
      GOSUB390:SY=A
CC 150 INPUT "OBJECT FILE NAME
      ";N$:PRINT:PRINT
CR 160 PRINT "{CLR}{HOME}
      {3 DOWN}BYTES TO BE CON
      VERTED.."
ME 170 OPEN 15,8,15
PE 180 OPEN 1,8,3,"0:"+"N$+",P,
      W"
GB 190 OPEN 2,8,4,"0:"+"N$+",P,
      R"
JX 200 GOSUB280
MQ 210 GET#2,A$,A$
PM 220 FOR X=SA TO EA
KH 230 GET#2,A$:AA=ASC(A$+CHR$(
      0))
DR 240 PRINT#1,CHR$(AA);
FJ 250 PRINT "{UP}"TAB(24)EA-X"
      {LEFT}{3 SPACES}":NEXT
CK 260 CLOSE 1:CLOSE 2:CLOSE 1
      5:END
HG 270 REM PUT FUSE AND ML TOG
      ETHER{7 SPACES}*
FD 280 READ A:IFA<0 THEN ON AB
      S(A) GOSUB320,330,340,3
      50,360,370
FA 290 PRINT#1,CHR$(A);
KH 300 IF E=0 THEN280
PK 310 RETURN
HM 320 A=EL:RETURN
HP 330 A=EH:RETURN
GX 340 A=FN LO(EA+1):RETURN
QC 350 A=FN HI(EA+1):RETURN
QB 360 A=FN LO(SY):RETURN
ER 370 A=FN HI(SY):E=1:RETURN
EK 380 :
DK 390 IF LEFT$(A$,1)="$"ANDLE
      N(A$)=5THEN A$=RIGHT$(A
      $,4):GOSUB410:RETURN
SF 400 A=VAL(A$):RETURN
HB 410 A=0: P=4096:FORX=1TO4:L
      $=MID$(A$,X,1):GOSUB450
      :A=A+P*N
XR 420 P=P/16
XC 430 NEXTX:RETURN
XQ 440 :
XH 450 N=0
KC 460 N=-15*(L$="F")-14*(L$="
      E")-13*(L$="D")-12*(L$=
      "C")-11*(L$="B")-10*(L$
      ="A")
FQ 470 IF N=0 THEN N=VAL(L$)
BE 480 RETURN
QA 490 :
SQ 500 REM STARTING ADDRESS
DH 510 DATA 1,8
SG 520 REM BASIC FUSE
KX 530 DATA 12,8,10,0,158,32,5
      0,48,54,50,0,0,0
MB 540 REM ML PART
HX 550 DATA 169,44,133,95,169,
      8,133,96
JX 560 DATA 169,-1,133,90,169,
      -2,133,91
SB 570 DATA 169,-3,133,88,169,
      -4,133,89
HR 580 DATA 32,191,163,76,-5,-
      6

```

# Car Payments

Brian Flynn

*Planning on borrowing money to buy a car? If so, you'll find this short program for the IBM PC/PCjr and compatibles helpful in estimating your payments. Excerpted from Easy BASIC Programs for the IBM PC and PCjr by Brian Flynn (COMPUTE! Books). Cartridge BASIC is required on the PCjr.*

After many months, you've finally succumbed to your dream of owning that new car. You haggle with the dealer and finally get the price within reason. But can you afford the payments?

It's easy to have that information *before* you walk into the dealership, or into your bank or credit union. All you have to do is run this short program on your IBM PC or PCjr or compatible. By inserting the amount of your loan, its length, and its interest rate, you can quickly see how much your monthly payments will be, as well as the total amount of interest you'll pay over the life of the loan.

## Loan Officer

You can have this information at your fingertips, just as your loan officer does, by typing in and saving "Car Payments." Run it, and you'll cycle through a number of

screen displays, each of which asks for a different piece of data.

**Amount borrowed.** You can enter any amount up to \$999,999. Enter whole numbers, not fractions or decimals. The program automatically places dollar signs, commas, and decimal points.

**Length of loan.** Type in the length of the loan, in years and months. Three years, for instance, can be entered as 3,0 (3 years, 0 months) or as 2,12.

**Interest rate.** Enter the interest rate you expect to pay for your car loan. You'll probably have to call your bank or credit union, or the dealership, to find out some possible interest rates. You can enter decimals in this category. Twelve and a half percent interest would be typed in as 12.5.

The program takes only a moment to compute your loan summary. It summarizes your entries and then tells you the amount of your monthly payment, the total you'll pay, the principal (which should be identical to the amount borrowed), and the total interest paid.

Pressing any key stops the program. If you want to go through it again, to see the results of a different interest rate, for example, type RUN and the program starts over.



## Buy A New Car

How about an example?

We'll borrow \$5,000 for three years. Assume our interest rate will be 12.5 percent. After entering those numbers, the computer pauses a moment and then displays the loan summary.

The monthly payments will be \$167.27. The total amount you'll pay is \$6,021.65, with \$1,021.65 being interest on the loan. What would be the monthly payments if you stretched out the loan to four years? Or if you found a loan for 12 percent instead? All you have to do is run the program again, using the new data. It's that easy.

## Two-Toned

Assuming you have the hardware to display this program in color, it will take only one line to create a two-toned display. Create a new line 90 in this format:

90 COLOR f,b

where *f* is the foreground color and *b* is the background color. For instance, COLOR 14,1 will create a blue background with yellow text.

To enliven the screen display even more, you could place COLOR statements before each LOCATE statement in the routine that starts at line 810. Put COLOR 4,1 at the beginning of line 830, for example, and the text starting with LOAN VALUES changes to red on blue. Experiment until you have combinations you like, then save the modified version of the program to disk.

If you have a PCjr and you're using a color TV or a non-RGB monitor for your display, you'll have to make another change. In line 190, change the SCREEN 0 statement to SCREEN 0,1. Include the colon. If you don't make this change, you'll see the screen in shades of gray, not color.

## Car Payments

For instructions on entering this program, please refer to "COMPUTE!'s Guide To Typing In Programs" elsewhere in this issue.

PH 10 \*Copyright 1987 Compute! Publications, Inc.  
FA 20 \*All Rights Reserved  
EC 30 CLS:PRINT TAB(20)"Copyright 1987 Compute! Publications, Inc.":PRINT TAB(30)"All Rights Reserved"

```
KD 40 FOR X=1 TO 900:NEXT X
FN 100 REM CAR PAYMENTS
GD 110 REM ENTER DATA
GF 120 GOSUB 180
HD 130 REM COMPUTE
GE 140 GOSUB 630
DA 150 REM DISPLAY RESULTS
JD 160 GOSUB 750
MI 170 END
HB 180 REM ENTER DATA
JM 190 KEY OFF: SCREEN 0: WIDTH
      80: LOCATE ,,0
PJ 200 DEFINT M,N,Y: DEFDBL L,P
      ,R,T
IC 210 H$ = STRING$(80,CHR$(205
      ))
IE 220 CLS
IC 230 PRINT H$;
CJ 240 PRINT TAB(34)"CAR PAYMEN
      TS
FM 250 PRINT H$
EB 260 REM AMOUNT OF LOAN
EN 270 GOSUB 330
DJ 280 REM PERIOD OF LOAN
DC 290 GOSUB 410
MG 300 REM INTEREST RATE
BK 310 GOSUB 540
MB 320 RETURN
DB 330 REM LOAN
DB 340 LOCATE 5,42: PRINT SPC(3
      0): BEEP
DK 350 LOCATE 5,1: INPUT "How m
      uch money would you like
      to borrow ";L$
DE 360 LOAN = VAL(L$)
HL 370 LOCATE 23,27: PRINT SPC(
      30)
CA 380 IF LOAN <= 0 THEN LOCATE
      23,28:PRINT "Please borr
      ow something !": GOTO 340
HD 390 IF LOAN > 999999! THEN L
      OCATE 23,27:PRINT "Please
      scale down figure !": GO
      TO 340
MD 400 RETURN
LH 410 REM PERIOD OF LOAN
IG 420 CLS
EP 430 PRINT "Please enter the
      length of your loan in ye
      ars and months.
DL 440 LOCATE 3,11: PRINT SPC(3
      0): BEEP
MM 450 LOCATE 3,2: INPUT "Years
      = ";Y$
DE 460 Y = INT(VAL(Y$))
FI 470 IF Y < 0 THEN 440
QN 480 LOCATE 5,11: PRINT SPC(3
      0): BEEP
CA 490 LOCATE 5,1: INPUT "Month
      s = ";M$
MJ 500 M = INT(VAL(M$))
NK 510 IF M < 0 OR M > 12 THEN
      480
IF 520 N = Y*12 + M
HF 530 RETURN
HC 540 REM INTEREST RATE
JN 550 CLS
OP 560 PRINT "Please enter the
      interest rate on your loa
      n. For example, enter 8
      for 8%,
KE 570 PRINT "11 for 11%, and s
      o on.
HD 580 LOCATE 5,18: PRINT SPC(3
      0): BEEP
KA 590 LOCATE 5,1: INPUT "Inter
      est Rate = ";R$
FK 600 RATE = VAL(R$)
KS 610 IF RATE <= 0 THEN LOCATE
      23,28:PRINT "There's no
      free lunch !":GOTO 580
ME 620 RETURN
HD 630 REM COMPUTE
```

```
FK 640 REM INTEREST RATE PER PE
      RIOD
BH 650 R = (RATE/100)/12
ED 660 REM PAYMENT PER PERIOD
JK 670 REM NUMERATOR
EO 680 P1 = LOAN*R*(1+R)^N
OI 690 REM DENOMINATOR
BK 700 P2 = (1+R)^N - 1
EI 710 PPP = P1/P2
GG 720 REM TOTAL PAYMENT
AG 730 TPAYMENT = N*PPP
NJ 740 RETURN
DE 750 REM DISPLAY
JB 760 CLS
PK 770 F1$ = "="$#,#####.##
DK 780 F2$ = "=" $,#####
GK 790 F3$ = "=" #####.##
      %
IC 800 PRINT H$;
LN 810 PRINT TAB(30)"SUMMARY OF
      THE LOAN
FM 820 PRINT H$
CB 830 LOCATE 5,15:PRINT "LOAN
      VALUES:
BK 840 LOCATE 7,18:PRINT "Amoun
      t";TAB(40) USING F1$;LOAN
KH 850 LOCATE 8,18:PRINT "Numbe
      r of years";TAB(40) USING
      F2$;Y
PF 860 LOCATE 9,18:PRINT "Numbe
      r of months";TAB(40) USIN
      G F2$;M
LN 870 LOCATE 10,18:PRINT "Inte
      rest rate";TAB(40) USING
      F3$;RATE
NH 880 LOCATE 14,15:PRINT "LOAN
      PAYMENTS:
AG 890 LOCATE 16,18:PRINT "Mont
      hly";TAB(40) USING F1$;PP
      P
BE 900 LOCATE 17,18:PRINT "Tota
      l";TAB(40) USING F1$;TPAY
      MENT
HJ 910 LOCATE 18,18:PRINT "Prin
      cipal";TAB(40) USING F1$;
      LOAN
HP 920 LOCATE 19,18:PRINT "Inte
      rest";TAB(40) USING F1$;T
      PAYMENT - LOAN
FA 930 LOCATE 22,1:PRINT H$
OE 940 LOCATE 23,34: PRINT "Pre
      ss any key
IN 950 S$ = INKEY$
KC 960 IF S$ = "" THEN 950
NB 970 RETURN
```

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# College Planner

Brian Flynn

College costs are spiraling ever upward. Tuition with room and board at many state-supported schools often runs a couple of thousand dollars a year, and double or triple that at private schools. With costs like these, a long-range savings plan is certainly useful. That's where "College Planner," written for the IBM PC/PCjr and compatibles, can help. Excerpted from *Easy BASIC Programs for the IBM PC and PCjr* by Brian Flynn (COMPUTE! Books). Cartridge BASIC is required for the PCjr.

If you have children, you probably assume they'll go on to some form of higher education. Perhaps they'll take classes at a community college. Or maybe at the local technical school. Perhaps even at a four-year university. All cost money. How much are you going to have to save for those years?

"College Planner" gives you an idea of what it will cost to educate a child beyond high school. As with "Car Payments," found elsewhere in this issue, you can run the program as many times as you want, changing the parameters to reflect different situations. This will give you a better idea of what it might cost to send your child to college.

## The Paper Chase

After typing in and saving a copy of College Planner, run it. You have to select the appropriate menu if you want to change the default parameters

(the values that are set when the program first runs). It's not difficult.

The easiest way to show how College Planner works is to go through an example.

Let's assume your child is now 12 years old. The first display screen asks for the number of years until the paper chase begins. Respond with 6 ( $18 - 12 = 6$ ).

The computer then displays the main menu. Here, you decide if you want to review savings, expenses, or economic assumptions; to compute totals; or to exit the program. Pressing a single key selects another menu.

**Review savings.** By pressing the 1 key, you'll see this menu on the screen:

Annual Savings	
A. Parents	= \$1,000.00
B. Kids	= 500.00

Change Value (Y/N)?

Notice the default settings of \$1,000 for parents' and \$500 for child's savings. Just press the Y key to change either of these. You'll be asked for the item to change (A or B), and then for the new amount. Let's change them to \$500 for the parents' contribution and to \$250 for the child's contribution. After you've entered the figures, press the N key; you'll return to the main menu.

**Review expenses.** Now press the 2 key. You should see something similar to this:

## First-Year Expenses (Today's Prices)

A. Tuition	= \$4,000.00
B. Room & Board	= 3,500.00
C. Books	= 300.00
D. Travel	= 150.00
E. Laundry	= 75.00
F. Entertainment	= 250.00

Change Value (Y/N)?

Again, to change the amount in each category, press the Y key, select the item, and enter the new figure. For example, let's say that your child is going to a school several states away, with higher travel expenses to and from school. Change that category to \$500. Press the N key to return to the main menu.

**Review economic assumptions.** Press the 3 key and you'll see the display change:

## Economic Assumptions

A. Expected interest rate	= 10.00%
B. Expected inflation rate	= 5.00%

Change Value (Y/N)?

The default values of 10 and 5 percent can be changed. The interest rate is what your yearly savings will be compounded by, while the inflation rate signifies how much costs increase each year. College Planner assumes that college costs increase at the same rate as inflation. This might not be true in a single year, but over a longer period of time it's accurate enough for this forecaster. Let's change the interest rate to 12 percent. (You were able to make better-than-average investments.) Hit the N key to return to the main menu.



**Compute totals.** Hit the 4 key and the program will figure out what it's going to cost you to send your child to college. The first screen displays the cost of a college education (based on what you entered in the Review Expenses menu) in terms of *today's dollars*, discounting inflation. All four years should have the same total. Press any key and another display appears. This shows what the cost of the education will be when your child reaches college age. The numbers are adjusted for inflation, and in fact increase each year by 5 percent, or by the rate of inflation you earlier specified. Note that these figures are in *future dollars*. Hit any key and the Bottom Line screen displays. It shows how much you saved, the interest you received over those six years, the total money available, the cost of college in today's dollars, the total in inflated dollars, and the final balance. Hitting any key will return you to the main menu again.

Now you can run the program again, this time entering a higher amount of savings. By trial and error, you'll find how much you'll have to save in order to pay for your child's education. Of course, when you use this program yourself, you'll be entering different parameters to reflect your child's age and your own estimates of what college will cost.

## School Colors

Adding color is relatively simple. If you want to change the display, insert a new line 90, in the format

90 COLOR f,b

where *f* is the foreground color value and *b* is the background color value. A line 90 that includes COLOR 15,4, for example, will show the text in high-intensity white on a red background. If you have a PCjr and you're using a color TV or a non-RGB monitor for your display, you'll have to make one additional change. In line 290, change the SCREEN 0 statement to SCREEN 0,1. Make sure you include the colon that follows. If you don't make this change, you'll see the screen in shades of gray, not color.

## College Planner

For instructions on entering this program, please refer to "COMPUTE's Guide to Typing In Programs" elsewhere in this issue.

```

FI 10 ' COPYRIGHT 1987 COMPUTE!
      PUBLICATIONS, INC.
FK 20 ' ALL RIGHTS RESERVED
KL 30 REM COLLEGE PAYMENTS
CM 40 REM INITIALIZE
CA 50 GOSUB 130
NN 60 REM ENTER VALUES
HD 70 GOSUB 470
II 80 REM CHOOSE FROM MAIN MENU
GL 90 GOSUB 630
HN 100 ON PICK GOSUB 760,760,76
      0,1170
GC 110 IF PICK <> 5 THEN 90
LO 120 END
MF 130 REM INITIALIZE
KN 140 REM TITLE
BP 150 GOSUB 210
PL 160 REM HEADING
GH 170 GOSUB 270
EE 180 REM KEY VALUES
EA 190 GOSUB 330
MM 200 RETURN
HC 210 REM TITLE
OB 220 KEY OFF: SCREEN 0: WIDTH
      80: LOCATE ,,0: CLS
OD 230 PRINT TAB(20)"Copyright 1
      987 Compute! Publications
      , Inc.":PRINT TAB(30)"All
      Rights Reserved"
KA 240 LOCATE 13,32: PRINT "Col
      lege Planner"
CD 250 FOR DELAY=1 TO 2500: NEX
      T
NI 260 RETURN
BK 270 REM HEADING
JA 280 CLS
IF 290 PRINT "College Planner i
      s designed to help you de
      velop a plan to pay for y
      our child's
NA 300 PRINT "education. Colle
      ge Planner assumes that y
      our annual savings will e
      arn interest
BI 310 PRINT "but that inflatio
      n will force expenses upw
      ard.
MB 320 RETURN
MP 330 REM KEY VALUES
EN 340 DEFINT I-Q,T,Z: DEFDBL C
      ,E,R,S,V,X
MB 350 REM NUMBER OF CATEGORIES
LC 360 K = 3
KH 370 REM MAX NUMBER OF ITEMS
      PER CATEGORY
JB 380 DATA 10
PM 390 READ NX
KK 400 DIM C$(3), EK(NX+1,4),
      EF(NX+1,4), X$(NX,3), X(N
      X,3)
DM 410 REM ACTUAL NUMBER OF ITE
      MS
AG 420 DATA 2,6,2
BM 430 FOR I=1 TO K
OM 440 READ N(I)
MI 450 NEXT
NK 460 RETURN
QL 470 REM ENTER VALUES
QM 480 REM YEARS TO COLLEGE
CJ 490 LOCATE 5,39: PRINT SPC(
      30): BEEP
IF 500 LOCATE 5,1: INPUT "How m
      any years until college b
      egin ";S$
DO 510 N = VAL(S$)
BE 520 IF N < 1 THEN LOCATE 23
      ,23: PRINT "It's a bit to
      o late for planning !": G
      OTO 490

```

```

QL 530 REM CATEGORIES
BP 540 FOR I=1 TO K
OC 550 READ C$(I)
ML 560 NEXT
NP 570 REM ITEMS
SH 580 FOR I=1 TO K
NN 590 FOR J=1 TO N(I)
AH 600 READ X$(J,I), X(J,I)
ME 610 NEXT J,I
ME 620 RETURN
HP 630 REM MAIN MENU
JM 640 CLS
PN 650 LOCATE 10,31: PRINT "Wou
      ld you like to
KH 660 PRINT : PRINT TAB(32)"1.
      Review savings
IF 670 PRINT TAB(32)"2. Review
      expenses
KK 680 PRINT TAB(32)"3. Review
      economic assumptions
DB 690 PRINT TAB(32)"4. Compute
      totals
FE 700 PRINT TAB(32)"5. Exit
ED 710 PRINT: PRINT TAB(31)"Cho
      ice = ?_": BEEP
HF 720 S$ = INKEY$
CF 730 PICK = INT(VAL(S$))
DA 740 IF PICK < 1 OR PICK > 5
      THEN 720
NL 750 RETURN
CF 760 REM UPDATE
JD 770 H$ = STRING$(80,CHR$(205
      ))
FF 780 P = PICK
PG 790 Z = N(P)
OF 800 REM DISPLAY
JE 810 GOSUB 850
IF 820 REM SELECT
MB 830 GOSUB 970
NK 840 RETURN
DF 850 REM DISPLAY
LF 860 IF PICK <> 3 THEN F$ = "
      = $$$,###.##" ELSE F$ =
      "= ###.## %"
JE 870 CLS
JC 880 PRINT H$;
AD 890 LN = LEN(C$(P))
EK 900 PRINT TAB(40-LN/2)C$(P)
FL 910 PRINT H$
HM 920 FOR J=1 TO Z
      PRINT TAB(13)CHR$(J+64)
      ;".":TAB(16)X$(J,P);TAB(4
      5) USING F$;X(J,P)
DK 940 NEXT J
OI 950 LOCATE 16,1: PRINT H$
NP 960 RETURN
CG 970 REM SELECT
BA 980 LOCATE 18,1: PRINT "Chan
      ge value (Y/N) ?": BEEP
IF 990 S$ = INKEY$
ON 1000 IF S$ = "N" OR S$ = "n"
      THEN 1160
II 1010 IF S$ <> "Y" AND S$ <>
      "y" THEN 990
NE 1020 LOCATE 20,1: PRINT "Ite
      m = ?": BEEP
BM 1030 S$ = INKEY$
JJ 1040 IF S$ = "" THEN 1030
BI 1050 Q = ASC(S$)
DF 1060 REM CAPS
ID 1070 IF Q > 96 THEN Q = Q -
      32
JD 1080 REM ELEMENT IN VECTOR
ML 1090 Q = Q-64
AG 1100 IF Q < 1 OR Q > Z THEN
      1030
KB 1110 REM NEW VALUE
NK 1120 LOCATE 22,1: BEEP: INP
      UT "New value = ";S$
DM 1130 X(Q,P) = VAL(S$)
PB 1140 GOSUB 850
CD 1150 GOTO 980
JP 1160 RETURN
EH 1170 REM COMPUTE TOTALS

```



```

JP 1180 CLS: LOCATE 13,35: PRIN
T "Computing ...
GH 1190 REM COMPUTE
CN 1200 REM SAVINGS
CF 1210 GOSUB 1320
BP 1220 REM EXPENSES
EK 1230 GOSUB 1510
NB 1240 REM TOTAL EXPENSES
FA 1250 GOSUB 1610
MA 1260 REM DISPLAY EXPENSES
QP 1270 TITLE$ = "TODAY'S": G
OSUB 1750
ID 1280 TITLE$ = "INFLATED": G
OSUB 1750
NF 1290 REM DISPLAY TOTALS
PC 1300 GOSUB 2010
IE 1310 RETURN
EH 1320 REM SAVINGS
AD 1330 T = N+4
BI 1340 REM INTEREST RATE IN IN
DEX FORM
GE 1350 RATE = 1 + X(1,3)/100
GE 1360 REM SAVINGS PER YEAR
KK 1370 SPY = 0
CN 1380 FOR J=1 TO N(1)
JB 1390 SPY = SPY + X(J,1)
BC 1400 NEXT
PL 1410 REM PRINCIPAL
OH 1420 SAVPRN = SPY*T
GF 1430 REM TOTAL (INCLUDES INT
EREST)
JJ 1440 SAVTOT = 0
NB 1450 FOR I=1 TO T
BP 1460 SAVTOT = SAVTOT + SPY
*RATE^(T-I+1)
CH 1470 NEXT
CK 1480 REM INTEREST
KE 1490 SAVINT = SAVTOT - SAVP
RN
IF 1500 RETURN
JE 1510 REM EXPENSES
GI 1520 REM INFLATION RATE IN I
NDEX FORM
HH 1530 RATE = 1 + X(2,3)/100
HE 1540 Q = N(2)
NI 1550 FOR I=1 TO Q
IC 1560 FOR J=1 TO 4
IO 1570 EK(I,J) = X(I,2)
OP 1580 EF(I,J) = X(I,2)*RATE
^(N+J)
CC 1590 NEXT J,I
CH 1600 RETURN
NG 1610 REM TOTALS
LN 1620 FOR I=1 TO 4
FM 1630 EK(Q+1,I)=0: EF(Q+1,I)
=0
KF 1640 FOR J=1 TO Q
QK 1650 EK(Q+1,I) = EK(Q+1,I)
+ EK(J,I)
LD 1660 EF(Q+1,I) = EF(Q+1,I)
+ EF(J,I)
CO 1670 NEXT J,I
AC 1680 REM GRAND TOTALS
LK 1690 COSTK=0: COSTF=0
HI 1700 FOR I=1 TO 4
JN 1710 COSTK = COSTK + EK(Q+
1,I)
GE 1720 COSTF = COSTF + EF(Q+
1,I)
CB 1730 NEXT
JF 1740 RETURN
EL 1750 REM DISPLAY
JJ 1760 F$ = "$$$,####.##
FE 1770 H$ = STRING$(80,CHR$(20
5))
FC 1780 X$(Q+1,2) = "Total
JK 1790 CLS
OP 1800 PRINT H$;
KE 1810 T$ = "COLLEGE EXPENSES:
" + TITLE$ + " DOLLARS"
GL 1820 L = LEN(T$)
GI 1830 PRINT TAB(40-L/2)T$
HG 1840 PRINT H$
GO 1850 PRINT TAB(2)"Category";

```

```

TAB(31)"1st Year";TAB(44
)"2nd Year";TAB(57)"3rd
Year";TAB(70)"4th Year
GH 1860 PRINT
OJ 1870 FOR I=1 TO Q+1
JD 1880 PRINT TAB(3)X$(I,2);TA
B(28);
JB 1890 FOR J=1 TO 4
CI 1900 IF TITLE$ = "TODAY'S"
THEN VL = EK(I,J) ELSE
VL = EF(I,J)
LP 1910 PRINT USING F$;VL;: P
RINT " ";
GE 1920 NEXT J
MC 1930 PRINT
DP 1940 IF I = Q THEN PRINT
OI 1950 NEXT I
LN 1960 LOCATE 20,1: PRINT H$
NC 1970 LOCATE 23,34: PRINT "Pr
ess any key
DN 1980 S$ = INKEY$
QP 1990 IF S$ = "" THEN 1980
IH 2000 RETURN
NL 2010 REM TOTALS
LL 2020 F$ = "$$,#####.##
HL 2030 CLS
OM 2040 PRINT H$;
GO 2050 PRINT TAB(33)"THE BOTTO
M LINE
HN 2060 PRINT H$
CF 2070 PRINT TAB(16)"SAVINGS F
OR COLLEGE
FD 2080 PRINT
JG 2090 PRINT TAB(18)"Principal
";TAB(40) USING F$;SAVPR
N
NK 2100 PRINT TAB(18)"Interest"
;TAB(40) USING F$;SAVINT
IH 2110 PRINT TAB(18)"Total";TA
B(40) USING F$;SAVTOT
NL 2120 LOCATE 12,16:PRINT "COS
T OF COLLEGE
EG 2130 PRINT
JM 2140 PRINT TAB(18)"In today'
s dollars";TAB(40) USING
F$;COSTK
BK 2150 PRINT TAB(18)"In inflat
ed dollars";TAB(40) USIN
G F$;COSTF
IO 2160 LOCATE 18,16: PRINT "SA
VINGS - INFLATED COST";T
AB(40) USING F$;SAVTOT-C
OSTF
KB 2170 LOCATE 20,1: PRINT H$
NG 2180 LOCATE 23,34: PRINT "Pr
ess any key
CB 2190 S$ = INKEY$
EH 2200 IF S$ = "" THEN 2190
ID 2210 RETURN
JD 2220 REM DATA
PJ 2230 REM CATEGORIES
HP 2240 DATA Annual Savings, F
irst-Year Expenses (Esti
mate), Economic Assumpti
ons
DO 2250 REM SAVINGS
FF 2260 DATA Parents, 1000
BB 2270 DATA Kids - summer job
s, 500
ND 2280 REM EXPENSES
OD 2290 DATA Tuition, 4000
NF 2300 DATA Room & Board, 3500
QI 2310 DATA Books, 300
OB 2320 DATA Travel To & From
School, 150
DG 2330 DATA Laundry, 75
AH 2340 DATA Entertainment, 250
JD 2350 REM ECONOMIC ASSUMPTIO
N
FN 2360 DATA Expected interest
rate, 10
JC 2370 DATA Expected inflatio
n rate, 5

```

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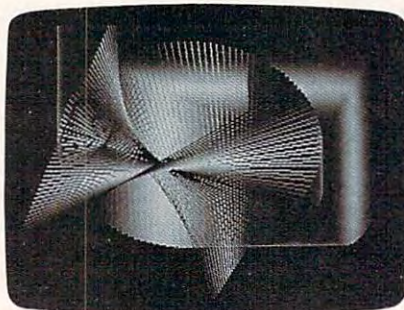
# GraphiDemo For Amiga

Stefan Lindahl

*This intriguing graphics program, written by a COMPUTE! reader in Sweden, demonstrates the the Amiga's tremendous graphics processing power as well as the speed of Amiga BASIC. 512K of memory is required*

"GraphiDemo" demonstrates just how easy it is to create impressive graphics in Amiga BASIC. Type it in and save a copy of the program, then run it. GraphiDemo begins by displaying a help screen that explains all of the program's options. You can recall this screen at any time by pressing the Help key. Take a moment to look at all the different options—you'll want to try them all.

GraphiDemo's options can be invoked in two different ways. If you press the right mouse button and examine the menus at the top of the screen, you will see that every option can be selected from a menu, using the mouse pointer. However, GraphiDemo uses all of the Amiga's colors, which can make the menus unreadable at times. Thus, you can also select any option by pressing the key indicated



*"GraphiDemo" can produce thousands of interesting designs similar to the one shown here.*

in the help screen. If you forget which key is assigned to which option, simply press Help. When you exit the help screen, the main screen is restored to its original condition.

Since the program is entirely self-prompting, no elaborate explanations are necessary. Just run it, follow the prompts, and enjoy the show. If you are interested in graphics programming, the program provides examples of how to draw different shapes and control the color palette for various effects.

## GraphiDemo for Amiga

For instructions on entering this program, please refer to "COMPUTE!'s Guide to Typing In Programs" elsewhere in this issue.

```
REM ** Copyright 1987 Compute! Publications, Inc. **
REM ** All Rights Reserved **
CLEAR ,13000 :REM * Release basic memory to system *
DEFINT b-y :REM * Integer definition *
RANDOMIZE TIMER :REM * New random seed *
b=5 :REM * Maximum step length *
cm=0 :REM * Circle mode off *
depth=4 :REM * No of bitlayers *
SCREEN 2,640,200,depth,2
WINDOW 2,,,16,2
maxcol=2^depth-1
GOSUB Setcol
GOSUB CLRmenu
ch=2:ch2temp=3:GOSUB 10:GOSUB 20
:REM * Set menus & check marks *
ON MENU GOSUB Mnucl
MENU ON
ON MOUSE GOSUB Chkms
```







# Font Loader

## For Apple ImageWriter

Ed Thompson

*This convenient utility allows you to preview a custom printer font on the screen before downloading it to an Apple ImageWriter printer. An ImageWriter I or ImageWriter II printer is required. The program runs on any Apple II-series computer, but only under ProDOS.*

One powerful special feature of Apple's ImageWriter printers is the ability to print user-defined character sets, or *fonts*. A wide variety of font designs are available commercially and through Apple user groups. "Font Loader" is a utility for loading a standard printer font to an Apple ImageWriter I or ImageWriter II printer. You must have one or more ImageWriter font files to use this program. Font Loader doesn't have any provision for creating new fonts; it simply makes existing fonts easier to use.

Type in and save a copy of Font Loader. Before you run the program for the first time, create a disk subdirectory named FONTS and copy all of your font files into that subdirectory. When you run Font Loader, it loads the first font from the FONTS subdirectory and displays it on the screen.

At this point, you have several options as indicated by the on-screen prompts. Use the right- and left-arrow keys to cycle forward or backward through different fonts. Press Return to load and view a font, and press L to download a

font to the printer. The P key prints the entire font on the printer. The C key clears a downloaded font from the printer, and R resets the printer.

### Font Loader

For instructions on entering this program, please refer to "COMPUTE!'s Guide to Typing In Programs" elsewhere in this issue.

```

88 10 REM * COPYRIGHT 1987
*
46 20 REM * COMPUTE! PUBLICATION
S, INC.*
80 30 REM * ALL RIGHTS RESERVED
*
37 100 HIMEM: 136 * 256
CF 110 TEXT : PRINT : PRINT CHR$
(21): GOSUB 1120: GOTO 5
60
21 120 REM PRINT FONT
46 130 PRINT CHR$ (4)"PR#1"
E8 140 PRINT
42 150 PRINT CHR$ (4)"PR#0"
A8 160 E$ = CHR$ (27) + CHR$ (43
) + CHR$ (27) + CHR$ (73)
53 170 P = 768 + 12:S = 768 + 16
+ 6
A4 180 POKE 48688,12: POKE 48689
,3
F8 190 PRINT E$;
85 200 ADD = 34816
40 210 FOR C = 32 TO 126
66 220 PRINT CHR$ (C)"G";
08 230 POKE 1, INT (ADD / 256)
FC 240 POKE 0, INT (ADD - PEEK (
1) * 256)
45 250 POKE 3,7
03 260 CALL S
EA 270 ADD = ADD + 8
EB 280 NEXT C
45 290 PRINT CHR$ (4)
18 300 PRINT CHR$ (4)"PR#1"
E4 310 PRINT
42 320 PRINT CHR$ (27)" "
78 330 IF FLAG < > 1 THEN 350
AE 340 FLAG = 0: GOTO 430
39 350 PRINT A$(X) + ".SET"
44 360 FOR I = 32 TO 63: PRINT C
HR$ (I);: NEXT
F8 370 PRINT
BF 380 FOR I = 64 TO 95: PRINT C
HR$ (I);: NEXT

```

```

F4 390 PRINT
39 400 FOR I = 96 TO 126: PRINT
CHR$ (I);: NEXT
3B 410 PRINT CHR$ (27)"$
34 420 PRINT A$(X) + ".SET"
E9 430 PRINT
19 440 PRINT CHR$ (4)"PR#0
DD 450 POKE 48688,240: POKE 4868
9,253
F8 460 POKE 0,76: POKE 1,60: POK
E 76,1
24 470 GOTO 660
F8 480 REM LOAD FONT ONLY
A8 490 FLAG = 1
98 500 GOTO 120
49 510 REM RESET PRINTER
48 520 PRINT CHR$ (4)"PR#1"
95 530 PRINT CHR$ (27) + CHR$ (9
9)
44 540 PRINT CHR$ (4)"PR#0"
21 550 GOTO 660
75 560 REM DEMO ROUTINE
A2 570 DATA 76,48,3,0,0,0,0,1
41,144,192,96,41,127,16,2
40,169,0,133,0,169,64,160
,0,177,0,106,145,0,102,2,
200
88 580 DATA 192,8,208,244,165,2,
32,0,3,198,3,208,233,96,0
,0,72,173,153,192,41,48,2
01,16,208,247,104,141,152
,192,96,240
F6 590 DATA 216,120,133,69,134,7
0,132,71,166,7,10,10,176,
4,16,62,48,4,16,1,232,232
,10,134,27,24,101,6,133,2
6,144,2
8C 600 DATA 230,27,165,40,133,8,
165,41,41,3,5,230,133,9,1
62,8,160,0,177,26,36,50,4
8,2,73,127,164,36,145,8,2
30,26
77 610 DATA 208,2,230,27,165,9,2
4,105,4,133,9,202,208,226
,165,69,166,70,164,71,88,
76,240,253
5B 620 D$ = CHR$ (4)
FF 630 FOR I = 768 TO 919: READ
J: POKE I,J: NEXT
1C 640 HIMEM: 150 * 256
84 650 PRINT CHR$ (4);"BLOAD/FON
TLOADER/FONTS/ASCII.SET,A
$8B00"
48 660 HIMEM: 136 * 256

```



```

A2 670 POKE 6,0: POKE 7,139
B4 680 HGR2
C1 690 PRINT CHR$(4); "PR# A$340"
DF 700 GOSUB 1070
B6 710 X = 1
97 720 VTAB 16: PRINT "NEXT SET
IS ";A$(X); ".SET"
42 730 A$(1) = "APL"
F6 740 HIMEM: 150 * 256:D$ = CHR
$(4)
E6 750 PRINT D$;"BLOAD/FONTLOADE
R/FONTS/"A$(X)".SET,A$880
0"
49 760 HIMEM: 136 * 256
42 770 VTAB 5: PRINT A$(X) + ".S
ET"
B0 780 POKE 6,0: POKE 7,139
A8 790 VTAB 8: FOR I = 32 TO 63:
PRINT CHR$(I);: NEXT
E7 800 PRINT
B6 810 VTAB 10: FOR I = 64 TO 95
: PRINT CHR$(I);: NEXT
E8 820 PRINT
21 830 VTAB 12: FOR I = 96 TO 12
7: PRINT CHR$(I);: NEXT
EF 840 PRINT
A0 850 POKE 6,0: POKE 7,139
A2 860 GET KY$
A8 870 IF KY$ = CHR$(13) THEN 1
010
D1 880 IF KY$ = CHR$(69) THEN 1
040
3D 890 IF KY$ = CHR$(80) THEN 6
OTO 120
0D 900 IF KY$ = CHR$(76) THEN 6
OTO 480
F6 910 IF KY$ = CHR$(8) THEN 97
0
D3 920 IF KY$ = CHR$(67) THEN 5
10

```

```

53 930 IF KY$ = CHR$(21) THEN 9
50
24 940 GOTO 860
A7 950 X = X + 1: IF X > NU THEN
X = 1
AA 960 GOTO 980
16 970 X = X - 1: IF X < 1 THEN
X = NU
59 980 VTAB 16: PRINT "
"
A7 990 VTAB 16: PRINT "NEXT SET
IS ";A$(X); ".SET"
D7 1000 GOTO 860
C1 1010 HOME: CALL - 3092: GOSU
B 1070
D2 1020 VTAB 16: PRINT "NEXT SET
IS ";A$(X); ".SET"
DE 1030 GOTO 740
FF 1040 REM END
34 1050 PRINT CHR$(4) "PR#0"
C1 1060 TEXT: END
B7 1070 VTAB 2: PRINT "COPYRIGHT
1987 COMPUTE! PUBLICATI
ONS"
59 1075 VTAB 3: PRINT "
ALL RIGHTS RESERVED"
DE 1080 VTAB 20: PRINT "USE <- -
> TO MOVE FORWARD OR BAC
KWARD"
5D 1090 VTAB 22: PRINT "'Return'
-Select Font 'L'-Downloa
d Font"
23 1100 VTAB 23: PRINT "'P'-Prin
t Font 'C'-Clear Font '
E'-End"
D7 1110 RETURN
41 1120 REM READ FONT NAMES
49 1130 DIM A$(60):NU = 0
66 1140 D$ = CHR$(4)

```

```

4E 1150 PR$ = "/FONTLOADER/FONTS
"
A7 1160 PRINT D$ "OPEN ";PR$; ",TD
IR"
B7 1170 PRINT D$ "READ ";PR$
B7 1180 INPUT N$: REM READ DIREC
TORY NAME
EE 1190 INPUT T$: REM READ COLUM
N TITLES
69 1200 INPUT L$: REM READ BLANK
LINE
DA 1210 INPUT AA$: REM READ FIL
E NAME
D9 1220 NU = NU + 1
BC 1230 A$(NU) = AA$
EB 1240 IF AA$ < > "" THEN GOTO
1210
E9 1250 NU = NU - 1
21 1260 INPUT B$: REM READ BLOCK
COUNT
A1 1270 PRINT D$;"CLOSE ";PR$
A0 1275 TEXT: HOME
01 1280 VTAB 12: HTAB 13: INVERS
E: PRINT "ANALYZING DAT
A": NORMAL: VTAB 1: HTA
B 1
1E 1290 FOR I = 1 TO NU
49 1300 A$(I) = LEFT$(A$(I),15)
25 1310 IF RIGHT$(A$(I),1) = "
" THEN GOTO 1330
72 1320 GOTO 1350
01 1330 A$(I) = LEFT$(A$(I), LE
N(A$(I)) - 1)
6A 1340 GOTO 1310
0F 1350 A$(I) = LEFT$(A$(I), LE
N(A$(I)) - 4)
A4 1360 A$(I) = MID$(A$(I),2, L
EN(A$(I)))
4E 1370 PRINT D$ "FRE"
91 1380 NEXT I
FB 1390 RETURN

```

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## Commodore Peripherals

Two peripheral systems for the Commodore 64 have been announced by Computer Specialties (CSI).

The ST10C is a ten-megabyte hard drive system that is compatible with the Commodore 8050, 8250, 4040, and 1541 drives. It features unlimited directory space, 154 tracks with 256 sectors per track, IEEE and serial interface, built-in diagnostics for sector errors, built-in backup, an external format disable switch to prevent accidental erasure, and an external device switch. The internal drive read/write transfer rate is five million bps, and the track-to-track access time is three milliseconds. The ST10C has 10,092,544 formatted bytes and a 16,000-word DOS.

The C-64 Power Plus combines surge protection with power supply for your Commodore 64. It has one on/off control to turn on your computer and three peripherals at once. There is a single AC-switched power supply, and the short circuit current is limited to .75 amps for DC power. There's also over-current protection, over-temperature protection that starts at 56 degrees C, surge protection up to 470 volts AC, AC fuse protection externally mounted, and over-voltage protection to prevent burnout.

Suggested retail price for the ST10C hard drive is \$895, and the Power Plus costs \$59.95. CSI also offers a variety of other peripherals for the Commodore 64.

Computer Specialties, P.O. Box 1718, Melbourne, FL 32902-1718

Circle Reader Service Number 200.

## Interactive Comics On The Apple II

Accolade has released *Accolade's Comics*, an interactive comic book for Apple II computers. Comprised of three disks and retailing for \$44.95, the program features two distinct themes and dozens of major and minor story lines incorporating eight arcadelikey games. Its main plot follows a spy named Steve Keene, whose mission is to thwart evil plots for the chief of Spystuff, Inc.

Unlike text adventures, *Accolade's Comics* offers the experience of reading a

comic book on a computer screen, combining detailed graphics and humorous animation. The player determines the direction of the story by continually selecting from a series of possible answers to questions asked of Keene; some are dead ends, and others lead the player in more fruitful directions.



*Accolade's Comics* is an interactive computer comic book available in Commodore and Apple formats.

The first theme revolves around the kidnapping of Professor Zoron Farad, a Nobel Prize winner. The second focuses on a scheming underworld character named Zardo, who has developed a system by which fire hydrants reproduce, thereby getting people to park in garages instead of on the streets.

Accolade has also announced a Commodore 64 version of the program, set to retail for \$39.95.

Accolade, 20813 Stevens Creek Blvd., Cupertino, CA 95014

Circle Reader Service Number 201.

## Professional Keyboards For Macintosh

DataDesk International has announced two high-performance, full-function keyboards for the Apple Macintosh: the MAC 101/ADB and the MAC-101. Both keyboards use the industry standard 101-key layout, have a full complement of function keys, and are designed to meet the high-speed data input needs of corporate word processing, spreadsheet, and desktop publishing applications.

The MAC 101/ADB takes advantage of the features of the new Macin-

tosh II and Macintosh SE computers. It has built-in Apple DeskTop Bus connectors, which allow daisy-chaining of up to 16 input devices, including a mouse, graphics tablets, and joysticks. The MAC-101 is designed for use with the installed base of Macintosh computers. Both keyboards are bundled with a macro-creating accessory program. They also take particular advantage of new Macintosh software, like Microsoft Word 3.0.

In addition to the 15 function keys, both MAC-101 keyboards offer a separate numeric pad, extra-large RETURN and SHIFT keys, two command and option keys for ease of operation with either right or left separate cursor cluster in the industry-standard inverted T arrangement, six separate file/edit keys, a separate dedicated cancel key, keyboard status indicator lights, and multikey rollover.

Each keyboard is available for \$169.95.

DataDesk International, 7650 Haskell Ave., Van Nuys, CA 91406

Circle Reader Service Number 202.

## Disk Utilities For Commodore 1571 Drive

Free Spirit Software has released a new utilities disk for the Commodore 128 computer and 1571 disk drive.

*Super Disk Utilities* includes two-drive and single-drive backup; File Unscratch, Create Autoboot, Lock and Unlock Files, and Write-Protect utilities; disk editor; CP/M Plus disk backup; and the ability to print in either hexadecimal or ASCII to any sector on disk. Many other utilities are included, many of which also work on the 1541 drive.

*Super Disk Utilities* is available for \$39.95.

Free Spirit offers a varied line of programs for the Commodore 64, including *Super 64 Librarian*, a disk cataloging and library system for the 64 and 1541 drive (\$29.95); *The Weapon of Choice*, a text adventure game (\$29.95); *Wheel & Deal*, a fast-paced real estate game (19.95); *Fun Biorhythms*, a program that lets you print personalized biorhythm charts using Commodore



and Commodore-compatible printers (\$9.95); and Strider's Computer Classics, a new series of classical music disks, each of which contains about one hour of classical music and 40 screens of commentary (\$9.95 each).

*Free Spirit Software*, 538 S. Edgewood, LaGrange, IL 60525  
Circle Reader Service Number 203.

## Desktop Organizer For IBM PC And Compatibles

*First Avenue*, a desktop organizer, helps save time as well as simplify and organize your day better through its accessible menu, organizer, and communication features.

The Desktop Organizer features include an autodialer, memo pad/letter writer, to-do lists, directory, index card catalog, and calculator. The Software Librarian lets you easily load a program from your software library when cataloged within the library function. And the Micro Networker allows you to connect up to five computers together to perform four functions: electronic mail, file transfer, phone-message handling, and schedule updating.

*First Avenue*, available for MS-DOS machines, retails for \$69 (copy-protected) or \$99 (unprotected).

*Times Square* is an add-on organizer-to-go that makes work done within *First Avenue* portable; it includes software, a binder, and insert tabs for \$29.95.

*CANAL Systems*, 5230 Clark Ave., Lakewood, CA 90712

Circle Reader Service Number 204.

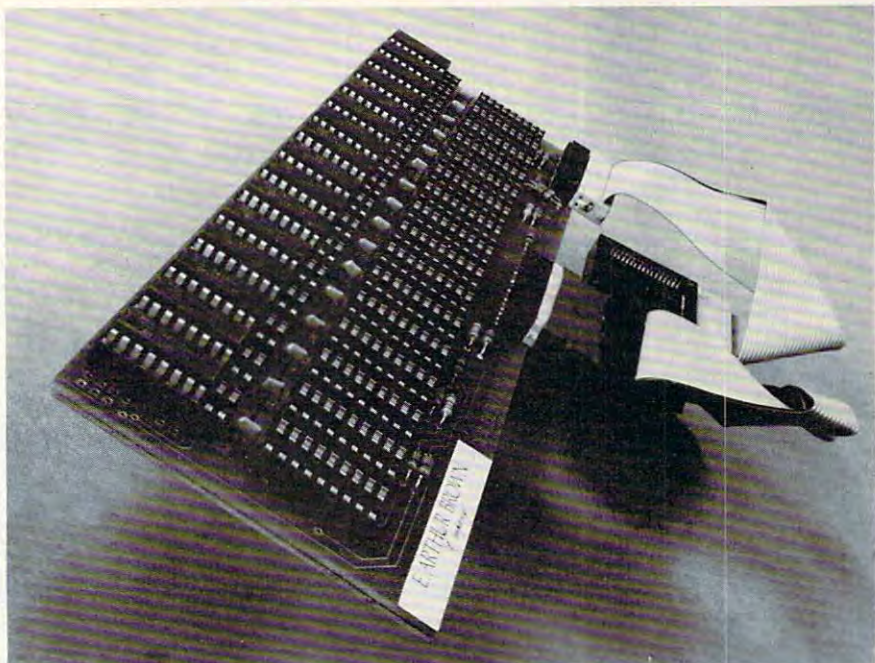
## New Graphics Disk From Epyx

Epyx has introduced a new collection of graphics compatible with the popular packages *Print Shop*, *PrintMaster*, *IBM PrintMaster Plus*, and all other print packages that accept fonts and borders from other disks. Geared to educational applications, *Graphics Scrapbook Chapter III: School* offers art for newsletters, banners, flyers, cards, and posters. It covers a wide variety of subjects, including geometry, drivers' education, student-body elections, band practice, school plays, cheerleading tryouts, dances, fund-raisers, rallies, graduation, and more.

The program is available for Commodore 64, Apple II series, and IBM PC and compatible computers. (Epyx does not set suggested retail prices for products.)

*Epyx*, 600 Galveston Dr., P.O. Box 8020, Redwood City, CA 94063

Circle Reader Service Number 205.



The ST Solderless RAM adds up to 4 megabytes to the Atari ST.

## RAM Expansion For The Atari ST

A new 1-4 megabyte upgradable RAM add-on has been announced by the E. Arthur Brown Company for the Atari ST. The unit features solderless plug-in installation, and comes with enough RAM to upgrade a 520ST to 1 megabyte. Upgrading to 2.5 and 4 megabytes is simply a matter of plugging 1-megabyte RAM into the empty sockets.

Suggested retail price for the ST Solderless RAM is \$199.95.

*E. Arthur Brown*, 3404 Pawnee Dr., Alexandria, MN 56308

Circle Reader Service Number 206.

## DLM Educational Software

DLM has released Commodore 64 and Apple II versions of the new deluxe package for its *Create with Garfield*, a program for designing and printing cartoons based on the popular Garfield cartoon character. This version contains two disks (program and graphics library) that offer special features, including more than 200 pieces of artwork; a wide variety of typefaces for writing captions and stories; color printing capabilities; and an electronic comic strip, in which cartoons move continuously across the screen. The program, which was designed for both the home and school markets, offers users the chance to create their own posters, cartoons, labels, invitations, and other similar items. The original version is available for \$29.95, and the deluxe version, for \$39.95.

DLM has also announced *Teddy*

*Bear\*rels of Fun*, a new two-disk program for the Commodore 64 and Apple II family that makes it easy for both youngsters and adults to design and produce charming teddy bear artwork. It contains more than 200 graphics, including teddy bear characters, backgrounds, scenes and props, as well as a variety of borders and typefaces for writing stories, messages, and captions. Suggested retail price is \$39.95.

*Decimal Discovery* and *Fast-track Fractions* introduce DLM's new Intermediate Math Series, modeled after similar DLM programs designed to develop other skill areas. The programs, available for the Apple II family, retail for \$46 each.

*DLM Teaching Resources*, One DLM Park, Allen, TX 75002

Circle Reader Service Number 207.

## Clip Art For Atari ST

*More! Graphics ST* is a collection of 128 icons, symbols, letters, and other clip art that can supplement many other ST graphics programs, including *Printmaster*, *Printmaster Plus*, *DEGAS*, *DEGAS Elite*, *Typesetter Elite*, *PM Interface*, and *Publishing Partner*. Suggested retail price for the Atari ST version is \$14.95.

An eight-bit Atari version that offers 128 icons and 11 screen-magic files compatible with *Print Shop*, *PS Interface*, and compatible programs, is available for \$12.95.

(When ordering direct, add \$3 shipping and handling charge. Add \$2 more for C.O.D. orders. California residents add 6% tax.)



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The Pierstorff Company, 131 W. Main St., Woodland, CA 95695  
Circle Reader Service Number 208.

### New Revision And Printer Driver For ST/MAC Emulator

Data Pacific has announced the fourth enhancement to its Magic Sac, which runs Macintosh software on the Atari ST, and a printer driver for Epson printers.

Revision 4.0 of the Magic Sac adds support for double-sided (800K) disk drives and limited color monitor support; it also adds GEM-based formatters and copiers, and compatibility with Apple's Finder 5.3/System 3.2 operating system (the latest revisions). It is available as an upgrade to registered owners for \$10; suggested retail price is \$149.95.

The Magic Printer Driver enables the Magic Sac to use Epson printers and compatibles like Citizen and Panasonic. It previously supported only the ImageWriter. Price is \$45.

Data Pacific, 609 E. Speer Blvd., Denver, CO 80203

Circle Reader Service Number 209.

### Electronic Card File For MS-DOS Machines

Tracker is an interactive card filing system that locates information quickly and easily via its extensive search and update functions. The program may be run in a memory-resident or non-memory resident mode; an autodial function is also included to provide instant access to online services through a modem.

Searches can be accomplished through any 8 of the 15 main working screens. Date-stamped notes may be appended to each file, as can up to 20 keywords that can be used later to include or exclude records from the four available reporting functions. For example, lists of people to contact may be produced onscreen with a couple of keystrokes as daily reminders.

Tracker runs on the IBM PC, AT, and compatibles, and retails for \$99.

Adaptive (USA), 3701 Birch St., Newport Beach, CA 92660

Circle Reader Service Number 210.

### Clip Art For Flexidraw And Doodle!

Inkwell Systems, manufacturer of Flexidraw—a high-resolution graphics program coupled with an industrial-quality light pen—recently released *The Graphics Galleria*, a collection of clip art and illustrations for use with the Flexidraw or Doodle! graphics programs. Each volume is a collection of clip art

and illustrations based on one particular theme; the first four are *Borders & Signs*, *Clip Art Potpourri*, *Holiday Themes*, and *Maps of the World*. Each disk contains the Flexidraw format on one side and Doodle! on the other, and retails for \$24.95. Additional disks are planned.

Inkwell Systems, P.O. Box 85152 MB290, 5710 Ruffin Rd., San Diego, CA 92138

Circle Reader Service Number 211.

### Mouse Protector

H & H Enterprises has developed a product that offers protection as well as a new look for your computer's mouse. The MouseTop mouse cover fits most popular mouse devices, including those available for Apple, Commodore, IBM, Atari, and Tandy. Made from a silver/gray furlike fabric, the MouseTop comes in two different looks. One is slightly nearsighted and wears wire-rimmed glasses; it retails for \$5.95. The other has 20/20 vision, and costs \$5.49. This washable mouse cover protects the input device from the grime of daily use in addition to its aesthetic value.

H & H Enterprises, P.O. Box 2672, Corona, CA 91718

Circle Reader Service Number 212.

### Popular ST Game Now Available For IBM PC

Starglider, an extremely popular game from Firebird Licensees, is now available for MS-DOS machines.

Starglider puts the player in command of an airborne ground attack vehicle which must ultimately do battle with the starship Starglider. Cunning, skill, and quick reflexes are all required to succeed in this deep-space conflict; 3-D animation and challenging maneuvers are arcade-quality. The program comes with a flight training manual, full-color poster, key guide, and a 64-page novella that sets the stage for the action. The MS-DOS (and upcoming Amiga and Apple II) versions retail for \$44.95; a Commodore 64 version is also planned for \$39.95.

Firebird Licensees, P.O. Box 49, Ramsey, NJ 07446

Circle Reader Service Number 213.

### EA Game Available In New Format

Racing Destruction Set, a popular Electronic Arts game that lets two players compete using racetracks and vehicles of their own design is now available for the Atari 800/XL. The program features



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a unique "isolated camera" display with true split-screen scrolling so that each player can view his or her own car and position on the track no matter where the opponent is. The game also comes with predesigned tracks representing some of the most famous race-tracks in the world.

The 800/XL version retails for \$32.95.

Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404

Circle Reader Service Number 214.

## Inexpensive Productivity Software

Easy Working Software, the newest division of Spinnaker Software, has announced the release of three inexpensive new productivity programs: *The Writer*, *The Planner*, and *The Filer*.

*The Writer* is designed for the first-time word processor user. Standard editing functions are included, like cut-and-paste, automatic page numbering, search and replace, and underlining. The spellchecking feature recognizes over 99 percent of spelling and typing errors.

*The Filer* functions as a database manager to store and organize records more efficiently. It can be used for a variety of applications, like creating and storing mailing lists, club membership files, and inventories. Over 50,000 records can be stored per file; form letters can be generated by integrating *The Filer* and *The Writer*.

*The Planner* is an electronic spreadsheet, easy enough for an inexperienced spreadsheet user to plan home budgets, as well as tax and other financial statements. It features extensive math calculations, standard editing functions, onscreen help, and allows easy manipulation of existing data.

All three programs can be fully integrated and require little prior computer knowledge. Each is available for IBM PC and compatibles, Apple II series, and Commodore 64 computers for \$9.95.

Spinnaker Software, One Kendall Sq., Cambridge, MA 02139

Circle Reader Service Number 215.

## World War II Conflict Game Available From Avalon Hill

Named after the German general who commanded on the WWII Eastern front and designed the Blitzkrieg tactics that revolutionized armor tactics, *Guderian* simulates a critical campaign of the Second World War using Avalon Hill's joystick-driven system from *Gulf Strike*.

Driving towards Moscow, the Ger-

man army encounters resistance around the city of Smolensk. As the German commander, you must use the Blitzkrieg tactics of encirclement and deep penetration behind enemy lines to trap and destroy the enemy. The Soviet commander, meanwhile, must organize an effective resistance and organize local counterattacks to halt the German forces. Time becomes a critical factor as the German units must cross the map within 12 turns or lose the game.

*Guderian* has a solitaire option which allows the player to take command of either the German or Soviet armies, as well as to control overrun attacks, supply rules, Soviet leaders, rail movement, and optional reinforcements. The rulebook introduces new players to historical gaming, explaining concepts like zones of control, supply, combat, and movement.

Available for Atari, Commodore, and Apple eight-bit machines, *Guderian* retails for \$30.

The Avalon Hill Game Company, 4517 Harford Rd., Baltimore, MD 21214  
Circle Reader Service Number 216.

## Miniature Golf Program For IBM and ST

Artwork Software has begun shipping *Minigolf* for IBM PC and compatibles and Atari ST computers.

*Minigolf* is a miniature golf game that comes with three different courses. (The ST version provides an editor to create or modify your own courses.) Each course confronts you with various obstacles to decrease the chances of making a hole-in-one. The program's scorecard displays the low score for each course, and tracks up to four players. *Minigolf* courses are designed to conform to professional and tournament-class standards. Suggested retail price is \$29.95 for IBM PC and compatibles and \$19.95 for the Atari ST version.

Artworx Software, 1844 Penfield Rd., Penfield, NY 14526

Circle Reader Service Number 217.

## File Command Window For IBM PC

MicroMath is announcing *DirectoryWindow*, a memory-resident directory utility that can be popped up at any time to provide access to various file commands without disturbing the computer's current activity. It allows users to scroll through file directories; sort directories by date, by size, or alphabetically; compare directories by popping up two or three simultaneously; rename files by typing over the filename on the screen display; delete files; and print directories for archival purposes.

In addition to accepting the full array of file specifications that the DIR command accepts, *DirectoryWindow* allows the display to be restricted to subdirectories within a given directory. Directory trees may also be traversed. *DirectoryWindow* displays the number of bytes occupied by the specified files, as well as space remaining on the disk. The program, available for MS-DOS machines, costs \$14.95 plus \$2 shipping and handling.

MicroMath Scientific Software, 3690 E. Fort Union Blvd., Ste. 204, Salt Lake City, UT 84121-4550

Circle Reader Service Number 218.

## Interface Support For Eight-Bit Ataris

Two new products from ICD offer Atari eight-bit computer users new interface options.

The P:R:Connection plugs directly into the serial port of any eight-bit Atari and provides the user with a standard Centronics printer port and two RS-232 type serial ports. It draws energy from the computer itself, which means one less cord needing an outlet. Its serial ports resemble those of the Atari 850 interface, possessing the same signals and functions and using a fully compatible built-in R: handler. The P:R:Connection retails for \$89.95.

The Multi I/O offers five functions in one box for your Atari 130XE or 800XL: a 256K or one-megabyte RAM disk; centronics parallel interface; serial printer/modem interface; print spooler; and hard disk interface. The 256K version retails for \$199.95; the one-version, for \$349.95. A 130XE Adapter (adding two cartridge ports) is also available for \$19.95.

ICD, 1220 Rock St., Rockford, IL 61101-1437

Circle Reader Service Number 219.

## New Baseball Strategy Game For Commodore 64

*Monday Morning Manager* puts 64 major league baseball teams with full rosters (over 1500 players) at your command. It's a statistic-based baseball strategy game whose master disk contains real information on the greatest teams from 1905 through 1985 and four All Star teams.

Nine main menu selections let you create your own teams; make trades; draft teams; keep personal, current statistics on Little League, softball, or major league teams; and save and print stats, game score cards, rosters, and won-lost records. The program stores up to 65,000 at-bats per player and over 20,000 innings pitched per pitcher. Designed for



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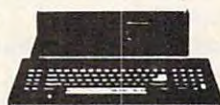
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**P.O. BOX 13428 COLUMBUS, OHIO 43213**



the Atari eight-bit machines, *Monday Morning Manager* is now available for the Commodore 64 for \$39.95.

TK Computer Products also offers a line of inexpensive software called White Bag Software for the 64: *Money Spin*, a puzzle-solving program, and *Crypto-Mania*, an educational word game. Each retails for \$14.95.

TK Computer Products, P.O. Box 9617, Downers Grove, IL 60515

Circle Reader Service Number 220.

## Recording Studio For The ST

*Midisoft Studio* lets you edit, compose, and record music using an Atari ST and any instrument that has a MIDI connection. The program's features include real-time record, playback, overdub, rewind, and fast-forward; 32 polyphonic independently-controlled tracks; 30,000 notes per song; full-track editing and flexible region editing; and many other features standard in such a program. In addition, it offers external sequencer control to recognize and send codes to other equipment, and instrument set-up for control over special options on synthesizers.

The price of *Midisoft Studio* is \$99; a special studio demo disk is available for \$10.

Midisoft, P.O. Box 1000, Bellevue, WA 98009

Circle Reader Service Number 221.

## SDI Simulation For The 64

Now you can play "star wars" as if your computer were actually linked to an existing SDI (Strategic Defense Initiative) system with *DEF CON 5* from Cosmi. With this interstellar defense simulation, you control 16 orbiting visual reconnaissance satellites that provide 23 different geostationary and close-up maps of the earth's surface. Using a series of command and operator control functions, you bring your SDI system into action against incoming enemy ballistic missiles. Weapons such as ground-based chemical lasers, orbiting laser reflectors, free-electron lasers, neutral particle beams, electro-magnetic launchers, nuclear-pulsed x-ray lasers, and antispace mine robots are available to intercept and destroy the enemy warheads.

Retail price is \$19.95.

COSMI, 415 N. Figueroa St., Wilmington, CA 90744

Circle Reader Service Number 222.

## Electronic Arts To Distribute Sierra On-Line Software

Electronic Arts has announced an agreement to distribute the first five Sierra On-Line Amiga products under a new

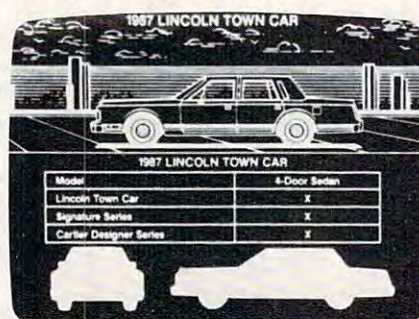
affiliated label agreement. *King's Quest* and its sequels, *Romancing the Throne* and *To Heir Is Human*, make up a trilogy of 3-D animated fantasy adventure games; each is \$49.95. *Space Quest*, a science fiction parody game, also carries a suggested retail price of \$49.95; and *Winnie the Pooh in the Hundred Acre Wood* is a children's entertainment/educational product with a price of \$24.95.

Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404

Circle Reader Service Number 223.

## Lease Or Buy?

Lincoln-Mercury is offering a free program that explains the advantages of leasing new Lincoln-Mercury and Mercury XR4Ti model cars. The program also features color graphics illustrations of all Lincoln-Mercury car models.



Lincoln-Mercury offers a free disk that explores vehicle leasing options.

The disk is available free of charge for the IBM PC and compatibles, Macintosh, and Commodore 64/128.

Lease Program Headquarters, P.O. Box 2909, Farmington Hills, MI 48018-2909

Circle Reader Service Number 224.

## WWII Wargame Simulation For The Amiga

Strategic Simulations has released an Amiga version of *Kampfgruppe*, an advanced-level war simulation. This game explores the tactical opportunities between the German and Soviet units on the Eastern Front during WWII. You can create your own scenarios or follow the four historic models. There are over 45 armored vehicles, plus guns and infantrymen for you to command.

Suggested retail price is \$59.95.

Strategic Simulations, 1046 N. Rengstorff Ave., Mountain View, CA 94043

Circle Reader Service Number 225.

## Educational Ants

Nine busy ants in Sunburst's *Ant Farm* help kids in grades 3 and up learn to become better problem solvers. The object of this game is to find the correct

workstations for the ants based on each ant's work pattern. To do so, students must gather information about the ants and place them in the farm accordingly. There are different levels of play and challenges plus an onscreen toolbox for assistance.

*Ant Farm* is available for Apple II-series computers. Each package includes a disk, backup, and teacher's guide.

Retail price for *Ant Farm* is \$59.

Sunburst Communications, 39 Washington Ave., Pleasantville, NY 10570

Circle Reader Service Number 226.

## Amiga Astronomy Program

Infinity Software has released *Galileo*, a full-featured desktop astronomy program for the Amiga. This program uses a database of over 1600 stars and over 400 deep-sky objects. Users can scroll to any part of the sky to identify constellations, planets, and a solar eclipse. *Galileo* shows the sky from any point on Earth for any date in this century and shows each star in nine different levels of brightness.

*Galileo* retails for \$99.95.

Infinity Software, 1331 61st St., Ste. F, Emeryville, CA 94608

Circle Reader Service Number 227.

## Math Tutorial For Apple

Scholastic Software has introduced *Math Tutor*, a comprehensive series of four math tutorials for the Apple II-series of computers (48K RAM minimum). Designed for students in grades 1-6, the series includes programs in addition, subtraction, multiplication, and division. Each gives students an introduction to the arithmetic operation or concept and reinforces learning with practice problems.

With *Math Tutor*, students learn in a logical step-by-step sequence. First, they take a placement test that evaluates their strengths and weaknesses and places them at one of seven levels. They receive instruction and repeated practice at that level, and then move to the next. Student progress is continually evaluated to provide the learner with additional feedback and instruction as needed.

*Math Tutor* also offers teachers and parents a management system to track and monitor students' progress. It can print out records of each student's performance or can be turned off to allow for home use or specific teacher needs. Each package contains worksheets that correspond to each lesson on the curriculum disks.

All four *Math Tutor* packages are available in both school and home editions. The home editions, retailing for \$59.95 each, contain two lesson disks, a management disk, and a user handbook



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New York, NY 10003

Circle Reader Service Number 228.

## Desk Accessory For Macintosh

Target Software has begun shipping *Memorandum*, a desk accessory that allows users to attach electronic "sticky notes" to files and documents. They can be attached to cells in spreadsheets, fields in a database, or a portion of text in a word processing document. These notes can then be popped up at the user's discretion. All note files are managed via a window called the Note Manager, which allows files to be imported (appended) and exported (saved to another file). It also allows users to perform substring searches through all notes with the click of the mouse, as well as several other housekeeping functions.

*Memorandum* is compatible with the Macintosh 512K, Plus, SE, and II. It supports all hard disk drives and runs with virtually all Macintosh applications that support desk accessories. Suggested retail price is \$99.95.

Target Software, 14206 S.W. 136th St., Miami, FL 33186

Circle Reader Service Number 229.

## New Amiga Word Processor

New Horizons Software, publisher of *Flow*, an outline processor for the Amiga, is now shipping *ProWrite*, a sophisticated word processor for the Amiga. Its many features allow you to do things like create and edit documents using multiple fonts, sizes, styles, and colors; include IFF color graphics in your word processing documents; edit up to eight documents at one time, then cut and paste between them; and use the mouse or keyboard for all commands. It fully supports multitasking and all foreign characters, and is compatible with *Flow*.

*ProWrite* retails for \$124.95.

New Horizons Software, P.O. Box 43167, Austin, TX 78745

Circle Reader Service Number 230.

## Poetry Generator

Users of IBM PC and compatibles, Apple II, Macintosh, and Atari ST computers can now have their computers compose personalized poems for use in greeting cards or other correspondence.

*Your Personal Poet* composes customized poems after the user answers questions like *Who is this poem going to?*, *What is your message to him/her/them?*, *How can you best describe him/her/them?*, *Would you like your poem light and limerical or sentimental and*

*serious?*, and *Personalize your card even more with a date or P.S. message?* Taking your answers to these questions, the program composes and displays a unique, personal poem for and about the person or people you want to send a card to. Then you can print the poem using a decorative font onto special 5 x 7 greeting card-sized form-fed paper, remove the peel-off strip from the back, and fit it into one of the cards.

The \$9.95 package includes the software disk, six sheets of greeting card paper, four greeting card covers, and four envelopes.

Computer Poet, P.O. Box 7707, Incline Village, NV 89450

Circle Reader Service Number 231.

## New Scenery Disk For Flight Simulator II And Jet

SubLOGIC has released Scenery Disk #7 for Commodore 64 users of *Flight Simulator II* and *Jet*. It covers the East Coast of the U.S. in detail, from Washington D.C. through Key West, Florida. SD #7 features hundreds of miles of coastline, many rivers and roads, railroads, racetracks, transmitter towers (some with blinking lights at night), and elevated bridges that cast shadows. Highly detailed sight-seeing areas are now available, along with more generic scenery areas that include enough radio NAVaids and refueling facilities to keep users occupied for a long time. Over 130 airports and a dozen military airports are included.

Scenery Disk #7 is available for \$19.95 (plus \$2 shipping and handling for mail order).

SubLOGIC, 713 Edgebrook Dr., Champaign, IL 61820

Circle Reader Service Number 232.

## Educational Software For Commodore, Apple

Gamco Industries announces *Chance It! A Game of Details* for Commodore 64 and Apple II-series computers.

This two-player educational game uses a TV game-show format to encourage students to read for detail, and includes a complete student management system as well. On each turn, students are asked a question and whether they want to "chance it." If they don't, they read a paragraph and answer a question concerning details. If they answer correctly, they get to place one of their markers on the game board. If students choose to chance it, they are shown a randomly chosen message which may instruct them to place a free marker, read a paragraph and answer the questions, lose a marker, or give the other player a free marker.

Apple II and Commodore 64 versions are available for third- and fourth-grade levels, and for fifth- and sixth-grade levels at \$39.95 each.

Gamco Industries, P.O. Box 1911, Big Spring, TX 79721

Circle Reader Service Number 233.

## Speech Construction Set

Covox has introduced *Speech Construction Set*, a powerful speech-editing tool that facilitates the creation of high-quality speech from data encoded using Covox's Voice Master module. Since the output is digitally constructed from the user's own voice patterns, the resulting speech is clear and natural-sounding. *Speech Construction Set* provides sophisticated routines for editing and modifying the amplitude portions of stored speech for refined quality during playback.



*Speech Construction Set*, from Covox, is a multi-featured speech-editing tool.

The program is available for Apple II-series computers at a suggested retail price of \$49.95, and for Commodore 64 at \$39.95.

Covox, 675-D Conger St., Eugene, OR 97402

Circle Reader Service Number 234.

## Classic Adventure Game Now Available For Macintosh

A spate of adventure games have come down the pike since Don Woods and William Crowther codeveloped the acknowledged first of this popular computer genre, *Adventure* (sometimes referred to as *Original Adventure*). This classic is now available for the Macintosh (128/512K) for \$29.95.

Other versions available include IBM PC and compatibles (\$24.95; Norell Data Systems, P.O. Box 70127, 3400 Wilshire Blvd., Los Angeles, CA 90010) and Atari eight-bit (\$14.95; Lotsabits, 15445 Yentura Blvd., Suite 10G, Sherman Oaks, CA 91413).

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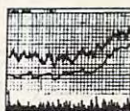
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# COMPUTE!'s Author's Guide

Most of the following suggestions serve to improve the speed and accuracy of publication. COMPUTE! is primarily interested in new and timely articles on the Commodore 64/128, Atari, Apple, IBM PC/PCjr, Amiga, and Atari ST. We are much more concerned with the content of an article than with its style, but articles should be clear and well-explained.

The guidelines below will permit your good ideas and programs to be more easily edited and published:

1. The upper left corner of the first page should contain your name, address, telephone number, and the date of submission.

2. The following information should appear in the upper right corner of the first page: If your article is specifically directed to one make of computer, please state the brand name and, if applicable, the BASIC or ROM or DOS version(s) involved. In addition, *please indicate the memory requirements of programs.*

3. The underlined title of the article should be placed about  $\frac{2}{3}$  of the way down the first page.

4. Following pages should be typed normally, except that in the upper right corner there should be an abbreviation of the title, your last name, and the page number—for example: Memory Map/Smith/2.

5. All lines within the text of the article must be double- or triple-spaced. A one-inch margin should be left at the right, left, top, and bottom of each page. No words should be divided at the ends of lines. And please do not right-justify. Leave the lines ragged.

6. Standard typing paper should be used (no erasable, onionskin, or other thin paper), and typing should be on one side of the paper only (upper- and lowercase).

7. If you are submitting more than one article, send each one in a separate mailer with its own tape or disk.

8. Short programs (under 20 lines) can easily be included within the text. Longer programs should be separate listings. *It is essential that we have a copy of the program, recorded twice, on a tape or disk.* If your article was written with a word processor, we request that you include a copy of the text file on the tape or disk. If you include a copy of your article on disk, please save the article as plain text, without any special formatting characters or control codes. Most word processors provide an option for saving a document as plain ASCII text or in unformatted form. Please use high-quality 10- or 30-minute tapes with the program recorded on both sides. The tape or disk should be labeled with your name, the title of the article, and, if applicable, the BASIC/ROM/DOS version(s). Tapes are fairly sturdy, but disks need to be enclosed within

plastic or cardboard mailers (available at photography, stationery, or computer supply stores). If possible, programs written in machine language or a compiled language should include source code (or an annotated disassembly if the program was written with a machine language monitor).

9. A good general rule is to spell out the numbers zero through ten in your article and write higher numbers as numerals (1024). The exceptions to this are: Figure 5, Table 3, TAB(4), and so on. Within ordinary text, however, the zero through ten should appear as words, not numbers. Also, symbols and abbreviations should not be used within text: Use *and* (not &), *reference* (not ref.), *through* (not thru).

10. For greater clarity, use all capitals when referring to keys (RETURN, TAB, ESC, SHIFT), BASIC words (LIST, RND, GOTO), and three languages (BASIC, APL, PILOT). Headlines and subheads should, however, be initial caps only, and emphasized words are not capitalized. If you wish to emphasize, underline the word; then it will be italicized during typesetting.

11. Articles can be of any length—from a single-line routine to a multiple-issue series. The average article is about four to eight double-spaced, typed pages.

12. We do not consider articles which are submitted simultaneously to other publishers. If you wish to send an article to another magazine for consideration, please do not submit it to us.

13. COMPUTE! pays between \$70 and \$800 for published articles. In general, the rate reflects the length and quality of the article. Payment is made upon acceptance. Following submission (to Editorial Department, COMPUTE! Magazine, P.O. Box 5406, Greensboro, NC 27403), it will take from three to six weeks for us to reply. If your work is accepted, you will be notified by a letter which will include a contract for you to sign and return. *Rejected manuscripts are returned to authors who enclose a self-addressed, stamped envelope.*

14. If your article is accepted and you have since made improvements to the program, please submit an entirely new tape or disk and a new copy of the article reflecting the update. We cannot easily make revisions to programs and articles. It is necessary that you send the revised version as if it were a new submission entirely, but be sure to indicate that your submission is a revised version by writing *Revision* on the envelope and the article.

15. COMPUTE! does not accept unsolicited product reviews. If you are interested in serving on our panel of reviewers, contact the Features Editor for details.



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# COMPUTE!'s Guide To Typing In Programs

Computers are precise—type the program *exactly* as listed, including necessary punctuation and symbols, except for special characters noted below. We have provided a special listing convention as well as a program to check your typing—"The Automatic Proofreader."

Programs for the IBM, TI-99/4A, and Atari ST models should be typed exactly as listed; no special characters are used. Programs for Commodore, Apple, and Atari 400/800/XL/XE computers may contain some hard-to-read special characters, so we have a listing system that indicates these control characters. You will find these Commodore and Atari characters in curly braces; *do not type the braces*. For example, {CLEAR} or {CLR} instructs you to insert the symbol which clears the screen on the Atari or Commodore machines. A complete list of these symbols is shown in the tables below. For Commodore, Apple, and Atari, a single symbol by itself within curly braces is usually a control key or graphics key. If you see {A}, hold down the CONTROL key and press A. This will produce a reverse video character on the Commodore (in quote mode), a graphics character on the Atari, and an invisible control character on the Apple.

Graphics characters entered with the Commodore logo key are enclosed in a special bracket: [A]. In this case, you would hold down the Commodore logo key as you type A. Our Commodore listings are in uppercase, so shifted symbols are underlined. A graphics heart symbol (SHIFT-S) would be listed as S. One exception is {SHIFT-SPACE}. When you see this, hold down SHIFT and press the space bar. If a number precedes a symbol, such as {5 RIGHT}, {6 S}, or {8 Q>}, you would enter five cursor rights, six shifted S's, or eight Commodore-Q's. On the Atari, inverse characters (white on black) should be entered with the inverse video

## Atari 400/800/XL/XE

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

## Commodore PET/CBM/VIC/64/128/16/+4

When You Read:	Press:	See:	When You Read:	Press:	See:
{CLR}	SHIFT CLR/HOME	⌫	[ 1 ]	COMMODORE	1
{HOME}	CLR/HOME	⌫	[ 2 ]	COMMODORE	2
{UP}	SHIFT ↑ CRSR ↓	⬆	[ 3 ]	COMMODORE	3
{DOWN}	↑ CRSR ↓	⬇	[ 4 ]	COMMODORE	4
{LEFT}	SHIFT ← CRSR →	⬅	[ 5 ]	COMMODORE	5
{RIGHT}	← CRSR →	➡	[ 6 ]	COMMODORE	6
{RVS}	CTRL 9	⌛	[ 7 ]	COMMODORE	7
{OFF}	CTRL 0	⬛	[ 8 ]	COMMODORE	8
{BLK}	CTRL 1	⬛	{ F1 }	f1	⌨
{WHT}	CTRL 2	⬜	{ F2 }	SHIFT f1	⌨
{RED}	CTRL 3	⬜	{ F3 }	f3	⌨
{CYN}	CTRL 4	⬜	{ F4 }	SHIFT f3	⌨
{PUR}	CTRL 5	⬜	{ F5 }	f5	⌨
{GRN}	CTRL 6	⬜	{ F6 }	SHIFT f5	⌨
{BLU}	CTRL 7	⬜	{ F7 }	f7	⌨
{YEL}	CTRL 8	⬜	{ F8 }	SHIFT f7	⌨
				←	⌨



key (Atari logo key on 400/800 models).

Whenever more than two spaces appear in a row, they are listed in a special format. For example, {6 SPACES} means press the space bar six times. Our Commodore listings never leave a single space at the end of a line, instead moving it to the next printed line as {SPACE}.

Amiga program listings contain only one special character, the left arrow (-) symbol. This character marks the end of each program line. Wherever you see a left arrow, press RETURN or move the cursor off the line to enter that line into memory. Don't try to type in the left arrow symbol; it's there only as a marker to indicate where each program line ends.

### The Automatic Proofreader

Type in the appropriate program listed below, then save it for future use. The Commodore Proofreader works on the Commodore 128, 64, Plus/4, 16, and VIC-20. Don't omit any lines, even if they contain unfamiliar commands or you think they don't apply to your computer. When you run the program, it installs a machine language program in memory and erases its BASIC portion automatically (so be sure to save several copies before running the program for the first time). If you're using a Commodore 128, Plus/4 or 16, do not use any GRAPHIC commands while the Proofreader is active. You should disable the Commodore Proofreader before running any other program. To do this, either turn the computer off and on or enter SYS 64738 (for the 64), SYS 65341 (128), SYS 64802 (VIC-20), or SYS 65526 (Plus/4 or 16). To reenact the Proofreader, reload the program and run it as usual. Unlike the original VIC/64 Proofreader, this version works the same with disk or tape.

On the Atari, run the Proofreader to activate it (the Proofreader remains active in memory as a machine language program); you must then enter NEW to erase the BASIC loader. Pressing SYSTEM RESET deactivates the Atari Proofreader; enter PRINT USR(1536) to reenact it.

The Apple Proofreader erases the BASIC portion of itself after you run it, leaving only the machine language portion in memory. It works with either DOS 3.3 or ProDOS. Disable the Apple Proofreader by pressing CTRL-RESET before running another BASIC program.

The IBM Proofreader is a BASIC program that simulates the IBM BASIC line editor, letting you enter, edit, list, save, and load programs that you type. Type RUN to activate. Be sure to leave Caps Lock on, except when typing lowercase characters.

Once the Proofreader is active, try typing in a line. As soon as you press RETURN, either a hexadecimal number (on the Apple) or a pair of letters (on the Commodore, Atari, or IBM) appears. The number or pair of letters is called a *checksum*.

Compare the value displayed on the screen by the Proofreader with the checksum printed in the program listing in the magazine. The checksum is given to the left of each line number. Just type in the program a line at a time (without the printed checksum), press RETURN or Enter, and compare the checksums. If they match, go on to the next line. If not, check your typing; you've made a mistake. Because of the checksum method used, do not type abbreviations, such as ? for PRINT. On the Atari and Apple Proofreaders, spaces are not counted as part of the checksum, so be sure you type the right number of spaces between quote marks. The Atari Proofreader does not check to see that you've typed the characters in the right order, so if characters are transposed, the checksum still matches the listing. The Commodore Proofreader catches transposition errors and ignores spaces unless they're enclosed in quotation marks. The IBM Proofreader detects errors in spacing and transposition.

### IBM Proofreader Commands

Since the IBM Proofreader replaces the computer's normal BASIC line editor, it has to include many of the direct-mode IBM BASIC commands. The syntax is identical to IBM BASIC. Commands simulated are LIST, LLIST, NEW, FILES, SAVE, and LOAD. When listing your program, press any key (except Ctrl-Break) to stop the listing. If you enter NEW, the Proofreader prompts you to press Y to be especially sure you mean yes.

Two new commands are BASIC and CHECK. BASIC exits the Proofreader back to IBM BASIC, leaving the Proofreader in memory. CHECK works just like LIST, but shows the checksums along with the listing. After you have typed in a program, save it to disk. Then exit the Proofreader with the BASIC command, and load the program as usual (this replaces the Proofreader in memory). You can now run the program, but you may want to re-save it to disk. This will shorten it on disk and make it load faster, but it can no longer be edited with the Proofreader. If you want to convert an existing BASIC program to Proofreader format, save it to disk with SAVE "filename", A.

### Program 1: Atari Proofreader

By Charles Brannon

```
100 GRAPHICS 0
110 FOR I=1536 TO 1700:READ A:POKE I,A:CK=CK+A:NEXT I
120 IF CK<>19072 THEN ? "Error in DATA Statement s. Check Typing.":END

130 A=USR(1536)
140 ? :? "Automatic Proofreader Now Activated."
150 END
160 DATA 104,160,0,185,26,3,201,69,240,7
170 DATA 200,200,192,34,208,243,96,200,169,74
180 DATA 153,26,3,200,169,6,153,26,3,162
190 DATA 0,189,0,228,157,74,6,232,224,16
200 DATA 208,245,169,93,141,78,6,169,6,141
210 DATA 79,6,24,173,4,228,105,1,141,95
220 DATA 6,173,5,228,105,0,141,96,6,169
230 DATA 0,133,203,96,247,238,125,241,93,6
240 DATA 244,241,115,241,124,241,76,205,238
250 DATA 0,0,0,0,32,62,246,8,201
260 DATA 155,240,13,201,32,240,7,72,24,101
270 DATA 203,133,203,104,40,96,72,152,72,138
280 DATA 72,160,0,169,128,145,88,200,192,40
290 DATA 208,249,165,203,74,74,74,24,105
300 DATA 161,160,3,145,88,165,203,41,15,24
310 DATA 105,161,200,145,88,169,0,133,203,104
320 DATA 170,104,168,104,40,96
```

### Program 2: IBM Proofreader

By Charles Brannon

```
10 'Automatic Proofreader Version 3.0 (Lines 205,206 added/190 deleted/470,490 changed from V2.0)
100 DIM L$(500),LNUM(500):COLOR 0,7,7:KEY OFF:CLS:MAX=0:LNUM(0)=65536!
110 ON ERROR GOTO 120:KEY 15,CHR$(4)+CHR$(70):ON KEY(15)GOSUB 640:KEY (15) ON:GOTO 130
120 RESUME 130
130 DEF SEG=&H40:W=PEEK(&H4A)
140 ON ERROR GOTO 650:PRINT:PRINT "Proofreader Ready."
150 LINE INPUT L$:Y=CSRLIN-INT(LEN(L$)/W)-1:LOCATE Y,1
160 DEF SEG=0:POKE 1050,30:POKE 1052,34:POKE 1054,0:POKE 1055,79:POKE 1056,13:POKE 1057,28:LINE INPUT L$:DEF SEG:IF L$="" THEN 150
170 IF LEFT$(L$,1)="" THEN L$=MID$(L$,2):GOTO 170
```



```

180 IF VAL(LEFT$(L$,2))=0 AND
MID$(L$,3,1)=" " THEN L$=M
ID$(L$,4)
200 IF ASC(L$)>57 THEN 260 'no
line number, therefore co
mmand
205 BL=INSTR(L$, " "):IF BL=0 T
HEN BL=L$:GOTO 206 ELSE B
L$=LEFT$(L$,BL-1)
206 LNUM=VAL(BL$):TEXT$=MID$(L
$,LEN(STR$(LNUM))+1)
210 IF TEXT$="" THEN GOSUB 540
:IF LNUM=LNUM(P) THEN GOSU
B 560:GOTO 150 ELSE 150
220 CKSUM=0:FOR I=1 TO LEN(L$)
:CKSUM=(CKSUM+ASC(MID$(L$,
I)))AND 255:NEXT I:LOCATE
Y,1:PRINT CHR$(65+CKSUM/1
6)+CHR$(65+(CKSUM AND 15))
+" "+L$
230 GOSUB 540:IF LNUM(P)=LNUM
THEN L$(P)=TEXT$:GOTO 150
'replace line
240 GOSUB 580:GOTO 150 'insert
the line
260 TEXT$="":FOR I=1 TO LEN(L$)
:A=ASC(MID$(L$,I)):TEXT$=
TEXT$+CHR$(A+32*(A>96 AND
A<123)):NEXT I
270 DELIMITER=INSTR(TEXT$," ")
:COMMAND$=TEXT$:ARG$="":IF
DELIMITER THEN COMMAND$=L
EFT$(TEXT$,DELIMITER-1):AR
G$=MID$(TEXT$,DELIMITER+1)
ELSE DELIMITER=INSTR(TEXT
$,CHR$(34)):IF DELIMITER T
HEN COMMAND$=LEFT$(TEXT$,D
ELIMITER-1):ARG$=MID$(TEXT
$,DELIMITER)
280 IF COMMAND$<>"LIST" THEN 4
10
290 OPEN "scrn:" FOR OUTPUT AS
#1
300 IF ARG$="" THEN FIRST=0:P=
MAX-1:GOTO 340
310 DELIMITER=INSTR(ARG$,"-"):
IF DELIMITER=0 THEN LNUM=V
AL(ARG$):GOSUB 540:FIRST=P
:GOTO 340
320 FIRST=VAL(LEFT$(ARG$,DELI
METER)):LAST=VAL(MID$(ARG$,
DELIMITER+1))
330 LNUM=FIRST:GOSUB 540:FIRST
=P:LNUM=LAST:GOSUB 540:IF
P=0 THEN P=MAX-1
340 FOR X=FIRST TO P:N$=MID$(S
TR$(LNUM(X)),2)+" "
350 IF CKFLAG=0 THEN A$="":GOT
O 370
360 CKSUM=0:A$=N$+L$(X):FOR I=
1 TO LEN(A$):CKSUM=(CKSUM+
ASC(MID$(A$,I)))AND 255
:NEXT I:A$=CHR$(65+CKSUM/16)
+CHR$(65+(CKSUM AND 15))+
"
370 PRINT #1,A$+N$+L$(X)
380 IF INKEY$<>" " THEN X=P
390 NEXT :CLOSE #1:CKFLAG=0
400 GOTO 130
410 IF COMMAND$="LLIST" THEN O
PEN "lpt1:" FOR OUTPUT AS
#1:GOTO 300
420 IF COMMAND$="CHECK" THEN C
KFLAG=1:GOTO 290
430 IF COMMAND$<>"SAVE" THEN 4
50
440 GOSUB 600:OPEN ARG$ FOR OU
TPUT AS #1:ARG$="":GOTO 30
0
450 IF COMMAND$<>"LOAD" THEN 4
90

```

```

460 GOSUB 600:OPEN ARG$ FOR IN
PUT AS #1:MAX=0:P=0
470 WHILE NOT EOF(1):LINE INPU
T #1,L$:BL=INSTR(L$, " "):B
L$=LEFT$(L$,BL-1):LNUM(P)=
VAL(BL$):L$(P)=MID$(L$,LEN
(STR$(VAL(BL$)))+1):P=P+1:
WEND
480 MAX=P:CLOSE #1:GOTO 130
490 IF COMMAND$="NEW" THEN INP
UT "Erase program - Are yo
u sure";L$:IF LEFT$(L$,1)=
"Y" OR LEFT$(L$,1)="Y" THE
N MAX=0:LNUM(0)=65536:GOT
O 130:ELSE 130
500 IF COMMAND$="BASIC" THEN C
OLOR 7,0,0:ON ERROR GOTO 0
:CLS:END
510 IF COMMAND$<>"FILES" THEN
520
515 IF ARG$="" THEN ARG$="A:"
ELSE SEL=1:GOSUB 600
517 FILES ARG$:GOTO 130
520 PRINT"Syntax error":GOTO 1
30
540 P=0:WHILE LNUM>LNUM(P) AND
P<MAX:P=P+1:WEND:RETURN
560 MAX=MAX-1:FOR X=P TO MAX:L
NUM(X)=LNUM(X+1):L$(X)=L$(
X+1):NEXT:RETURN
580 MAX=MAX+1:FOR X=MAX TO P+1
STEP -1:LNUM(X)=LNUM(X-1)
:L$(X)=L$(X-1):NEXT:L$(P)=
TEXT$:LNUM(P)=LNUM:RETURN
600 IF LEFT$(ARG$,1)<>CHR$(34)
THEN 520 ELSE ARG$=MID$(A
RG$,2)
610 IF RIGHT$(ARG$,1)=CHR$(34)
THEN ARG$=LEFT$(ARG$,LEN(
ARG$)-1)
620 IF SEL=0 AND INSTR(ARG$,".
")=0 THEN ARG$=ARG$+".BAS"
630 SEL=0:RETURN
640 CLOSE #1:CKFLAG=0:PRINT"St
opped.":RETURN 150
650 PRINT "Error #";ERR:RESUME
150

```

### Program 3: Commodore Proofreader

By Philip Nelson, Assistant Editor

```

10 VEC=PEEK(772)+256*PEEK(773)
:LO=43:HI=44
20 PRINT "AUTOMATIC PROOFREADER
FOR ";:IF VEC=42364 THEN
[SPACE]PRINT "C-64"
30 IF VEC=50556 THEN PRINT "VI
C-20"
40 IF VEC=35158 THEN GRAPHIC C
LR:PRINT "PLUS/4 & 16"
50 IF VEC=17165 THEN LO=45:HI=
46:GRAPHIC CLR:PRINT"128"
60 SA=(PEEK(LO)+256*PEEK(HI))+
6:ADR=SA
70 FOR J=0 TO 166:READ BYT:POK
E ADR,BYT:ADR=ADR+1:CHK=CHK
+BYT:NEXT
80 IF CHK<>20570 THEN PRINT "**
ERROR* CHECK TYPING IN DATA
STATEMENTS":END
90 FOR J=1 TO 5:READ RF,LF,HF:
RS=SA+RF:HB=INT(RS/256):LB=
RS-(256*HB)
100 CHK=CHK+RF+LF+HF:POKE SA+L
F,LB:POKE SA+HF,HB:NEXT
110 IF CHK<>22054 THEN PRINT "
*ERROR* RELOAD PROGRAM AND

```

```

[SPACE]CHECK FINAL LINE":EN
D
120 POKE SA+149,PEEK(772):POKE
SA+150,PEEK(773)
130 IF VEC=17165 THEN POKE SA+
14,22:POKE SA+18,23:POKESA+
29,224:POKESA+139,224
140 PRINT CHR$(147);CHR$(17);"
PROOFREADER ACTIVE":SYS SA
150 POKE HI,PEEK(HI)+1:POKE (P
EEK(LO)+256*PEEK(HI))-1,0:N
EW
160 DATA 120,169,73,141,4,3,16
9,3,141,5,3
170 DATA 88,96,165,20,133,167,
165,21,133,168,169
180 DATA 0,141,0,255,162,31,18
1,199,157,227,3
190 DATA 202,16,248,169,19,32,
210,255,169,18,32
200 DATA 210,255,160,0,132,180
,132,176,136,230,180
210 DATA 200,185,0,2,240,46,20
1,34,208,8,72
220 DATA 165,176,73,255,133,17
6,104,72,201,32,208
230 DATA 7,165,176,208,3,104,2
08,226,104,166,180
240 DATA 24,165,167,121,0,2,13
3,167,165,168,105
250 DATA 0,133,168,202,208,239
,240,202,165,167,69
260 DATA 168,72,41,15,168,185,
211,3,32,210,255
270 DATA 104,74,74,74,168,1
85,211,3,32,210
280 DATA 255,162,31,189,227,3,
149,199,202,16,248
290 DATA 169,146,32,210,255,76
,86,137,65,66,67
300 DATA 68,69,70,71,72,74,75,
77,80,81,82,83,88
310 DATA 13,2,7,167,31,32,151,
116,117,151,128,129,167,136
,137

```

### Program 4: Apple Proofreader

By Tim Victor, Editorial Programmer

```

10 C = 0: FOR I = 768 TO 768 +
68: READ A:C = C + A: POKE I
,A: NEXT
20 IF C < > 7258 THEN PRINT "ER
ROR IN PROOFREADER DATA STAT
EMENTS": END
30 IF PEEK(190 * 256) < > 76 T
HEN POKE 56,0: POKE 57,3: CA
LL 1002: GOTO 50
40 PRINT CHR$(4);"IN#A300"
50 POKE 34,0: HOME : POKE 34,1:
VTAB 2: PRINT "PROOFREADER
INSTALLED"
60 NEW
100 DATA 216,32,27,253,201,141
110 DATA 208,60,138,72,169,0
120 DATA 72,189,255,1,201,160
130 DATA 240,8,104,10,125,255
140 DATA 1,105,0,72,202,208
150 DATA 238,104,170,41,15,9
160 DATA 48,201,58,144,2,233
170 DATA 57,141,1,4,138,74
180 DATA 74,74,74,41,15,9
190 DATA 48,201,58,144,2,233
200 DATA 57,141,0,4,104,170
210 DATA 169,141,96

```



# MLX Machine Language Entry Program For Commodore 64 And 128

Ottis Cowper, Technical Editor

"MLX" is a labor-saving utility that allows almost fail-safe entry of machine language programs. Included are versions for the Commodore 64 and 128.

Type in and save some copies of whichever version of MLX is appropriate for your computer (you'll want to use it to enter future ML programs from COMPUTE!). Program 1 is for the Commodore 64, and Program 2 is for the 128 (128 MLX can also be used to enter Commodore 64 ML programs for use in 64 mode). When you're ready to enter an ML program, load and run MLX. It asks you for a starting address and an ending address. These addresses appear in the article accompanying the MLX-format program listing you're typing.

If you're unfamiliar with machine language, the addresses (and all other values you enter in MLX) may appear strange. Instead of the usual decimal numbers you're accustomed to, these numbers are in *hexadecimal*—a base 16 numbering system commonly used by ML programmers. Hexadecimal—hex for short—includes the numerals 0-9 and the letters A-F. But don't worry—even if you know nothing about ML or hex, you should have no trouble using MLX.

After you enter the starting and ending addresses, you'll be offered the option of clearing the workspace. Choose this option if you're starting to enter a new listing. If you're continuing a listing that's partially typed from a previous session, don't choose this option.

A functions menu will appear. The first option in the menu is ENTER DATA. If you're just starting to type in a program, pick this. Press the E key, and type the first number in the first line of the program listing. If you've already typed in part of a program, type the line number where you left off typing at the end of the previous session (be sure to load the partially completed program before you resume entry). In any case, make sure the address you enter corresponds to the address of a line in the listing you are entering. Otherwise, you'll be unable to enter the data correctly. If you pressed E by mistake, you can return to the command menu by pressing RETURN alone when asked for the address. (You can get back to the menu from most options by pressing RETURN with no other input.)

## Entering A Listing

Once you're in Enter mode, MLX prints the address for each program line for you. You then type in all nine numbers on that line, beginning with the first two-digit number after the colon (:). Each line represents eight data bytes and a checksum. Although an MLX-format listing appears similar to the "hex dump" listings from a machine language monitor program, the extra checksum number on the end allows MLX to check your typing. (Commodore 128 users can enter the data from an MLX listing using the built-in monitor if the rightmost column of data is omitted, but we recommend against it. It's much easier to let MLX do the proofreading and error checking for you.)

Figure 1: 64 MLX Keypad

7	8	9	0
4 U	5 I	6 O	F P
1 J	2 K	3 L	E :
A M	B ,	C .	D /
0 Space			

Figure 2: 128 MLX Keypad

A (F1)	B (F3)	C (F5)	D (F7)
7	8	9	E (+)
4	5	6	F (-)
1	2	3	E N T E R
0	.		

When you enter a line, MLX recalculates the checksum from the eight bytes and the address and compares this value to the number from the ninth column. If the values match, you'll hear a bell tone, the data will be added to the workspace area, and the prompt for the next line of data will appear. But if MLX detects a typing error, you'll hear a low buzz and see an error message. The line will then be redisplayed for editing.

## Invalid Characters Banned

Only a few keys are active while you're entering data, so you may have to unlearn some habits. You *do not* type spaces between the columns; MLX automatically inserts these for you. You *do not* press RETURN after typing the last number in a line; MLX automatically enters and checks the line after you type the last digit.

Only the numerals 0-9 and the letters A-F can be typed in. If you press any other key (with some exceptions noted below), you'll hear a warning buzz. To simplify typing, 128 MLX redefines the function keys and + and - keys on the numeric keypad so that you can enter data one-handed. In either case, the keypad is active only while entering data. Addresses must be entered with the normal letter and number keys. The figures below show the keypad configurations for each version.

MLX checks for transposed characters. If you're supposed to type in A0 and instead enter 0A, MLX will catch your mistake. There is one error that can slip past MLX: Because of the checksum formula used, MLX won't notice if you accidentally type FF in place of 00, and vice versa. And there's a very slim chance that you could garble a line and still end up with a combination of characters that adds up to the proper checksum. However, these mistakes should not occur if you take reasonable care while entering data.

## Editing Features

To correct typing mistakes before finishing a line, use the INST/DEL key to delete the character to the left of the cursor. (The cursor-left key also deletes.) If you mess up a line really badly, press CLR/HOME to start the line over. The RETURN key is also active, but only before any data is typed on a line. Pressing RETURN at this point returns you to the command menu. After you



type a character of data, MLX disables RETURN until the cursor returns to the start of a line. Remember, you can press CLR/HOME to quickly get to a line number prompt.

More editing features are available when correcting lines in which MLX has detected an error. To make corrections in a line that MLX has redisplayed for editing, compare the line on the screen with the one printed in the listing, then move the cursor to the mistake and type the correct key. The cursor left and right keys provide the normal cursor controls. (The INST/DEL key now works as an alternative cursor-left key.) You cannot move left beyond the first character in the line. If you try to move beyond the rightmost character, you'll reenter the line. During editing, RETURN is active; pressing it tells MLX to recheck the line. You can press the CLR/HOME key to clear the entire line if you want to start from scratch, or if you want to get to a line number prompt to use RETURN to get back to the menu.

## Display Data

The second menu choice, DISPLAY DATA, examines memory and shows the contents in the same format as the program listing (including the checksum). When you press D, MLX asks you for a starting address. Be sure that the starting address you give corresponds to a line number in the listing. Otherwise, the checksum display will be meaningless. MLX displays program lines until it reaches the end of the program, at which point the menu is redisplayed. You can pause the display by pressing the space bar. (MLX finishes printing the current line before halting.) Press space again to restart the display. To break out of the display and get back to the menu before the ending address is reached, press RETURN.

## Other Menu Options

Two more menu selections let you save programs and load them back into the computer. These are SAVE FILE and LOAD FILE; their operation is quite straightforward. When you press S or L, MLX asks you for the filename. You'll then be asked to press either D or T to select disk or tape.

You'll notice the disk drive starting and stopping several times during a load or save (save only for the 128 version). Don't panic; this is normal behavior. MLX opens and reads from or writes to the file instead of using the usual LOAD and SAVE commands (128 MLX makes use of BLOAD). Disk users should also note that the drive prefix 0: is automatically added to the filename (line 750 in 64 MLX), so this should not be included when entering

the name. This also precludes the use of @ for Save-with-Replace, so remember to give each version you save a different name. The 128 version makes up for this by giving you the option of scratching the existing file if you want to reuse a filename.

Remember that MLX saves the entire workspace area from the starting address to the ending address, so the save or load may take longer than you might expect if you've entered only a small amount of data from a long listing. When saving a partially completed listing, make sure to note the address where you stopped typing so you'll know where to resume entry when you reload.

MLX reports the standard disk or tape error messages if any problems are detected during the save or load. (Tape users should bear in mind that Commodore computers are never able to detect errors during a save to tape.) MLX also has three special load error messages: INCORRECT STARTING ADDRESS, which means the file you're trying to load does not have the starting address you specified when you ran MLX; LOAD ENDED AT address, which means the file you're trying to load ends before the ending address you specified when you started MLX; and TRUNCATED AT ENDING ADDRESS, which means the file you're trying to load extends beyond the ending address you specified when you started MLX. If you see one of these messages and feel certain that you've loaded the right file, exit and rerun MLX, being careful to enter the correct starting and ending addresses.

The 128 version also has a CATALOG DISK option so you can view the contents of the disk directory before saving or loading.

The QUIT menu option has the obvious effect—it stops MLX and enters BASIC. The RUN/STOP key is disabled, so the Q option lets you exit the program without turning off the computer. (Of course, RUN/STOP-RESET also gets you out.) You'll be asked for verification; press Y to exit to BASIC, or any other key to return to the menu. After quitting, you can type RUN again and reenter MLX without losing your data, as long as you don't use the clear workspace option.

## The Finished Product

When you've finished typing all the data for an ML program and saved your work, you're ready to see the results. The instructions for loading and using the finished product vary from program to program. Some ML programs are designed to be loaded and run like BASIC programs, so all you need to type is LOAD "filename",8 for disk

(DLOAD "filename" on the 128) or LOAD "filename" for tape, and then RUN. Such programs will usually have a starting address of 0801 for the 64 or 1C01 for the 128. Other programs must be reloaded to specific addresses with a command such as LOAD "filename",8,1 for disk (BLOAD "filename" on the 128) or LOAD "filename",1,1 for tape, then started with a SYS to a particular memory address. On the Commodore 64, the most common starting address for such programs is 49152, which corresponds to MLX address C000. In either case, you should always refer to the article which accompanies the ML listing for information on loading and running the program.

## An Ounce Of Prevention

By the time you finish typing in the data for a long ML program, you may have several hours invested in the project. Don't take chances—use our "Automatic Proofreader" to type the new MLX, and then test your copy thoroughly before first using it to enter any significant amount of data. Make sure all the menu options work as they should. Enter fragments of the program starting at several different addresses, then use the Display option to verify that the data has been entered correctly. And be sure to test the Save and Load options several times to insure that you can recall your work from disk or tape. Don't let a simple typing error in the new MLX cost you several nights of hard work.

## Program 1: MLX For Commodore 64

```
SS 10 REM VERSION 1.1: LINES 8
30,950 MODIFIED, LINES 4
85-487 ADDED
EK 100 POKE 56,50:CLR:DIM IN$,
I,J,A,B,A$,B$,A(7),N$
DM 110 C4=48:C6=16:C7=7:Z2=2:Z
4=254:Z5=255:Z6=256:Z7=
127
CJ 120 FA=PEEK(45)+Z6*PEEK(46)
:BS=PEEK(55)+Z6*PEEK(56)
):H$="0123456789ABCDEF"
SB 130 R$=CHR$(13):L$="{LEFT}"
:S$=" ":D$=CHR$(20):Z$=
CHR$(0):T$="{13 RIGHT}"
CQ 140 SD=54272:FOR I=SD TO SD
+23:POKE I,0:NEXT:POKE
{SPACE}SD+24,15:POKE 78
8,52
FC 150 PRINT "{CLR}"CHR$(142)CH
R$(8):POKE 53280,15:POK
E 53281,15
EJ 160 PRINT T$ "{RED}"{RVS}
{2 SPACES}{8 @}
{2 SPACES}"SPC(28)"
{2 SPACES}{OFF}{BLU} ML
X II {RED}{RVS}
{2 SPACES}"SPC(28)"
{12 SPACES}{BLU}"
FR 170 PRINT "{3 DOWN}
{3 SPACES}COMPUTE!'S MA
```



```

CHINE LANGUAGE EDITOR
[3 DOWN]
JB 180 PRINT"[BLK]STARTING ADD
RESS[43]";:GOSUB300:SA=A
D:GOSUB1040:IF F THEN18
0
GF 190 PRINT"[BLK]{2 SPACES}EN
DING ADDRESS[43]";:GOSUB
300:EA=AD:GOSUB1030:IF
[SPACE]F THEN190
KR 200 INPUT"[3 DOWN]{BLK}CLEA
R WORKSPACE [Y/N][43]";A
$:IF LEFT$(A$,1)<>"Y"TH
EN220
PG 210 PRINT"[2 DOWN]{BLU}WORK
ING...";:FORI=BS TO BS+
EA-SA+7:POKE I,0:NEXT:P
RINT"DONE"
DR 220 PRINTTAB(10)"[2 DOWN]
{BLK}{RVS} MLX COMMAND
[SPACE]MENU [DOWN][43]";
PRINT T$[RVS]E[OFF]NTE
R DATA"
BD 230 PRINT T$[RVS]D[OFF]ISP
LAY DATA:PRINT T$
[RVS]L[OFF]OAD FILE"
JS 240 PRINT T$[RVS]S[OFF]AVE
FILE":PRINT T$[RVS]Q
[OFF]UIT[2 DOWN]{BLK}"
JH 250 GET A$:IF A$=N$ THEN250
HK 260 A=0:FOR I=1 TO 5:IF A$=
MID$( "EDLSQ",I,1)THEN A
=I:I=5
FD 270 NEXT:ON A GOTO420,610,6
90,700,280:GOSUB1060:GO
TO250
EJ 280 PRINT"[RVS] QUIT ":INPU
T"[DOWN][43]ARE YOU SURE
[Y/N]";A$:IF LEFT$(A$,
1)<>"Y"THEN220
EM 290 POKE SD+24,0:END
JX 300 IN$=N$:AD=0:INPUTIN$:IF
LEN(IN$)<>4THENRETURN
KF 310 B$=IN$:GOSUB320:AD=A:B$
=MID$(IN$,3):GOSUB320:A
D=AD*256+A:RETURN
PP 320 A=0:FOR J=1 TO 2:A$=MID
$(B$,J,1):B=ASC(A$)-C4+
(A$="Q")*C7:A=A*C6+B
JA 330 IF B<0 OR B>15 THEN AD=
0:A=-1:J=2
GX 340 NEXT:RETURN
CH 350 B=INT(A/C6):PRINT MID$(
H$,B+1,1);B=A-B*C6:PRI
NT MID$(H$,B+1,1);:RETU
RN
RR 360 A=INT(AD/Z6):GOSUB350:A
=AD-A*Z6:GOSUB350:PRINT
":":
BE 370 CK=INT(AD/Z6):CK=AD-Z4*
CK+Z5*(CK>Z7):GOTO390
PX 380 CK=CK*Z2+Z5*(CK>Z7)+A
JC 390 CK=CK+Z5*(CK>Z5):RETURN
QS 400 PRINT"[DOWN]STARTING AT
[43]";:GOSUB300:IF IN$<>
N$ THEN GOSUB1030:IF F
[SPACE]THEN400
EX 410 RETURN
HD 420 PRINT"[RVS] ENTER DATA
[SPACE]";:GOSUB400:IF IN
$=N$ THEN220
JK 430 OPEN3,3:PRINT
SK 440 POKE198,0:GOSUB360:IF F
THEN PRINT IN$:PRINT"
[UP][5 RIGHT]";
GC 450 FOR I=0 TO 24 STEP 3:B$
=$$:FOR J=1 TO 2:IF F T
HEN B$=MID$(IN$,I+J,1)
HA 460 PRINT"[RVS]"B$LS$;:IF I<
24THEN PRINT"[OFF]";
HD 470 GET A$:IF A$=N$ THEN470
FK 480 IF (A$>"/"ANDAS<"")OR(A
$>"@"ANDAS<"G")THEN540
GS 485 A=- (A$="M")-2*(A$=",")-
3*(A$=".")-4*(A$="/")-5
*(A$="J")-6*(A$="K")
FX 486 A=A-7*(A$="L")-8*(A$="
")-9*(A$="U")-10*(A$="I
")-11*(A$="O")-12*(A$="
P")
CM 487 A=A-13*(A$=SS$):IF A THE
N A$=MID$( "ABCD123E456F
0",A,1):GOTO 540
MP 490 IF A$=R$ AND((I=0)AND(J
=1)OR F)THEN PRINT B$;:
J=2:NEXT:I=24:GOTO550
KC 500 IF A$=" [HOME]" THEN PRI
NT B$:J=2:NEXT:I=24:NEX
T:F=0:GOTO440
MX 510 IF (A$=" [RIGHT]")ANDF TH
ENPRINT B$LS$;:GOTO540
GK 520 IF A$<>L$ AND A$<>D$ OR
((I=0)AND(J=1))THEN GOS
UB1060:GOTO470
HG 530 A$=L$+S$+L$:PRINT B$LS$;
:J=2-J:IF J THEN PRINT
[SPACE]LS$;:I=I-3
QS 540 PRINT A$;:NEXT J:PRINT
[SPACE]S$;
PM 550 NEXT I:PRINT:PRINT"[UP]
[5 RIGHT]";:INPUT#3,IN$
:IF IN$=N$ THEN CLOSE3:
GOTO220
QC 560 FOR I=1 TO 25 STEP3:B$=
MID$(IN$,I):GOSUB320:IF
I<25 THEN GOSUB380:A(I
/3)=A
PK 570 NEXT:IF A<>CK THEN GOSU
B1060:PRINT"[BLK]{RVS}
[SPACE]ERROR: REENTER L
INE [43]":F=1:GOTO440
HJ 580 GOSUB1080:B=BS+AD-SA:FO
R I=0 TO 7:POKE B+I,A(I
):NEXT
QQ 590 AD=AD+8:IF AD>EA THEN C
LOSE3:PRINT"[DOWN]{BLU}
** END OF ENTRY **[BLK]
[2 DOWN]":GOTO700
GQ 600 F=0:GOTO440
QA 610 PRINT"[CLR]{DOWN}{RVS}
[SPACE]DISPLAY DATA ":G
OSUB400:IF IN$=N$ THEN2
20
RJ 620 PRINT"[DOWN]{BLU}PRESS:
[RVS]SPACE[OFF] TO PAU
SE, [RVS]RETURN[OFF] TO
BREAK[43][DOWN]"
KS 630 GOSUB360:B=BS+AD-SA:FOR
I=BTO B+7:A=PEEK(I):GOS
UB350:GOSUB380:PRINT S$
;
CC 640 NEXT:PRINT"[RVS]";:A=CK
:GOSUB350:PRINT
KH 650 F=1:AD=AD+8:IF AD>EA TH
ENPRINT"[DOWN]{BLU}** E
ND OF DATA ***:GOTO220
KC 660 GET A$:IF A$=R$ THEN GO
SUB1080:GOTO220
EQ 670 IF A$=S$ THEN F=F+1:GOS
UB1080
AD 680 ONFGOTO630,660,630
CM 690 PRINT"[DOWN]{RVS} LOAD
[SPACE]DATA ":OP=1:GOTO
710
PC 700 PRINT"[DOWN]{RVS} SAVE
[SPACE]FILE ":OP=0
RX 710 IN$=N$:INPUT"[DOWN]FILE
NAME[43]";IN$:IF IN$=N$
[SPACE]THEN220
PR 720 F=0:PRINT"[DOWN]{BLK}
[RVS]T[OFF]APE OR [RVS]
D[OFF]ISK: [43]";
FP 730 GET A$:IF A$="T"THEN PR
INT"[DOWN]":GOTO880
HQ 740 IF A$<>"D"THEN730
HH 750 PRINT"D[DOWN]":OPEN15,8
,15,"I0":B=EA-SA:IN$="
0":IN$:IF OP THEN810
SQ 760 OPEN 1,8,8,IN$+"P,W":G
OSUB860:IF A THEN220
FJ 770 AH=INT(SA/256):AL=SA-(A
H*256):PRINT#1,CHR$(AL)
;CHR$(AH);
PE 780 FOR I=0 TO B:PRINT#1,CH
R$(PEEK(BS+I));:IF ST T
HEN800
FC 790 NEXT:CLOSE1:CLOSE15:GOT
O940
GS 800 GOSUB1060:PRINT"[DOWN]
{BLK}ERROR DURING SAVE:
[43]":GOSUB860:GOTO220
MA 810 OPEN 1,8,8,IN$+"P,R":G
OSUB860:IF A THEN220
GE 820 GET#1,A$,B$:AD=ASC(A$+Z
$)+256*ASC(B$+Z$):IF AD
<>SA THEN F=1:GOTO850
RX 830 FOR I=0 TO B:GET#1,A$:P
OKE BS+I,ASC(A$+Z$):IF(
I<>B)AND ST THEN F=2:AD
=I:I=B
FA 840 NEXT:IF ST<>64 THEN F=3
FQ 850 CLOSE1:CLOSE15:ON ABS(F
+0)+1 GOTO960,970
SA 860 INPUT#15,A,A$:IF A THEN
CLOSE1:CLOSE15:GOSUB10
60:PRINT"[RVS]ERROR: "A
$
GQ 870 RETURN
EJ 880 POKE183,PEEK(FA+2):POKE
187,PEEK(FA+3):POKE188,
PEEK(FA+4):IFOP=0THEN92
0
HJ 890 SYS 63466:IF(PEEK(783)A
ND1)THEN GOSUB1060:PRIN
T"[DOWN]{RVS} FILE NOT
[SPACE]FOUND ":GOTO690
CS 900 AD=PEEK(829)+256*PEEK(8
30):IF AD<>SA THEN F=1:
GOTO970
SC 910 A=PEEK(831)+256*PEEK(83
2)-1:F=F-2*(A<EA)-3*(A>
EA):AD=A-AD:GOTO930
KM 920 A=SA:B=EA+1:GOSUB1010:P
OKE780,3:SYS 63338
JF 930 A=BS:B=BS+(EA-SA)+1:GOS
UB1010:ON OP GOTO950:SY
S 63591
AE 940 GOSUB1080:PRINT"[BLU]**
SAVE COMPLETED ***:GOT
O220
XP 950 POKE147,0:SYS 63562:IF
[SPACE]ST>0 THEN970
FR 960 GOSUB1080:PRINT"[BLU]**
LOAD COMPLETED ***:GOT
O220
DP 970 GOSUB1060:PRINT"[BLK]
[RVS]ERROR DURING LOAD:
[DOWN][43]":ON F GOSUB98
0,990,1000:GOTO220
PP 980 PRINT"INCORRECT STARTIN
G ADDRESS ("":GOSUB360:
PRINT")":RETURN
GR 990 PRINT"LOAD ENDED AT "":
AD=SA+AD:GOSUB360:PRINT
D$:RETURN
FD 1000 PRINT"TRUNCATED AT END
ING ADDRESS":RETURN
RX 1010 AH=INT(A/256):AL=A-(AH
*256):POKE193,AL:POKE1
94,AH
FF 1020 AH=INT(B/256):AL=B-(AH
*256):POKE174,AL:POKE1
75,AH:RETURN

```



```

FX 1030 IF AD<SA OR AD>EA THEN
1050
HA 1040 IF (AD>511 AND AD<40960
)OR(AD>49151 AND AD<53
248)THEN GOSUB1080:F=0
:RETURN
HC 1050 GOSUB1060:PRINT"[RVS]
{SPACE}INVALID ADDRESS
{DOWN}{BLK}":F=1:RETU
RN
AR 1060 POKE SD+5,31:POKE SD+6
,208:POKE SD,240:POKE
{SPACE}SD+1,4:POKE SD+
4,33
DX 1070 FOR S=1 TO 100:NEXT:GO
TO1090
PF 1080 POKE SD+5,8:POKE SD+6,
240:POKE SD,0:POKE SD+
1,90:POKE SD+4,17
AC 1090 FOR S=1 TO 100:NEXT:PO
KE SD+4,0:POKE SD,0:PO
KE SD+1,0:RETURN

```

## Program 2: MLX For Commodore 128

```

AE 100 TRAP 960:POKE 4627,128:
DIM NL$,A(7)
XP 110 Z2=2:Z4=254:Z5=255:Z6=2
56:Z7=127:BS=256*PEEK(4
627):EA=65280
FB 120 BE$=CHR$(7):RT$=CHR$(13
):DL$=CHR$(20):SP$=CHR$(
32):LF$=CHR$(157)
KE 130 DEF FNHB(A)=INT(A/256):
DEF FNLB(A)=A-FNHB(A)*2
56:DEF FNAD(A)=PEEK(A)+
256*PEEK(A+1)
JB 140 KEY 1,"A":KEY 3,"B":KEY
5,"C":KEY 7,"D":VOL 15
:IF RGR(0)=5 THEN FAST
FJ 150 PRINT"[CLR]"CHR$(142):C
HR$(8):COLOR 0,15:COLOR
4,15:COLOR 6,15
GQ 160 PRINT TAB(12)"[RED]
{RVS}{2 SPACES}{9 @}
{2 SPACES}"RT$:TAB(12)"
{RVS}{2 SPACES}{OFF}
{BLU} 128 MLX {RED}
{RVS}{2 SPACES}"RT$:TAB
(12)"{RVS}{13 SPACES}
{BLU}"
FE 170 PRINT"[2 DOWN]
{3 SPACES}COMPUTE!S MA
CHINE LANGUAGE EDITOR
{2 DOWN}"
DK 180 PRINT"[BLK]STARTING ADD
RESS[4]":GOSUB 260:IF
{SPACE}AD THEN SA=AD:EL
SE 180
FH 190 PRINT"[BLK]{2 SPACES}EN
DING ADDRESS[4]":GOSUB
260:IF AD THEN EA=AD:E
LSE 190
MF 200 PRINT"[DOWN]{BLK}CLEAR
{SPACE}WORKSPACE [Y/N]?
[4]":GETKEY AS:IF AS<>"
Y" THEN 220
QH 210 PRINT"[DOWN]{BLU}WORKIN
G...":BANK 0:FOR A=BS
{SPACE}TO BS+(EA-SA)+7:
POKE A,0:NEXT A:PRINT"D
ONE"
DC 220 PRINT TAB(10)"[DOWN]
{BLK}{RVS} MLX COMMAND
{SPACE}MENU [4]{DOWN}":
PRINT TAB(13)"{RVS}E
{OFF}NTER DATA"RT$:TAB(
13)"{RVS}D{OFF}ISPLAY D
ATA"RT$:TAB(13)"{RVS}L
{OFF}OAD FILE"

```

```

HB 230 PRINT TAB(13)"[RVS]S
{OFF}AVE FILE"RT$:TAB(1
3)"{RVS}C{OFF}ATALOG DI
SK"RT$:TAB(13)"{RVS}Q
{OFF}UIT{DOWN}{BLK}"
AP 240 GETKEY AS:A=INSTR("EDLS
CQ",AS):ON A GOTO 340,5
50,640,650,930,940:GOSU
B 950:GOTO 240
SX 250 PRINT"STARTING AT":GOS
UB 260:IF (AD<>0)OR(AS=N
L$)THEN RETURN:ELSE 250
BG 260 AS=NL$:INPUT AS:IF LEN(
AS)=4 THEN AD=DEC(AS)
PP 270 IF AD=0 THEN BEGIN:IF A
S<>NL$ THEN 300:ELSE RE
TURN:BEND
MA 280 IF AD<SA OR AD>EA THEN
{SPACE}300
PM 290 IF AD>511 AND AD<65280
{SPACE}THEN PRINT BE$,:
RETURN
SQ 300 GOSUB 950:PRINT"[RVS] I
NVALID ADDRESS {DOWN}
{BLK}":AD=0:RETURN
RD 310 CK=FNHB(AD):CK=AD-Z4*CK
+Z5*(CK>Z7):GOTO 330
DD 320 CK=CK*Z2+Z5*(CK>Z7)+A
AH 330 CK=CK+Z5*(CK>Z5):RETURN
QD 340 PRINT BE$:"[RVS] ENTER
{SPACE}DATA ":GOSUB 250
:IF AS=NL$ THEN 220
JA 350 BANK 0:PRINT:F=0:OPEN 3
,3
BR 360 GOSUB 310:PRINT HEX$(AD
)+":":IF F THEN PRINT
{SPACE}L$:PRINT"[UP]
{5 RIGHT}"
QA 370 FOR I=0 TO 24 STEP 3:BS
=SP$:FOR J=1 TO 2:IF F
{SPACE}THEN BS=MID$(L$,
I+J,1)
PS 380 PRINT"[RVS]"BS+LF$:IF
{SPACE}I<24 THEN PRINT"
{OFF}":
RC 390 GETKEY AS:IF (AS>"/" AN
D AS<"") OR(AS>"@") AND
AS<"G") THEN 470
AC 400 IF AS="+" THEN AS="E":G
OTO 470
QB 410 IF AS="-" THEN AS="F":G
OTO 470
FB 420 IF AS=RT$ AND ((I=0) AN
D (J=1) OR F) THEN PRIN
T BS:J=2:NEXT I=24:GOT
O 480
RD 430 IF AS="[HOME]" THEN PRI
NT BS:J=2:NEXT I=24:NEX
T:F=0:GOTO 360
XB 440 IF (AS="[RIGHT]") AND F
THEN PRINT BS+LF$:GOT
O 470
JP 450 IF AS<>LF$ AND AS<>DL$
{SPACE}OR ((I=0) AND (J
=1)) THEN GOSUB 950:GOT
O 390
PS 460 AS=LF$+SP$+LF$:PRINT BS
+LF$:J=2-J:IF J THEN P
RINT LF$:I=I-3
GB 470 PRINT AS:NEXT J:PRINT
{SPACE}SP$:
HA 480 NEXT I:PRINT:PRINT"[UP]
{5 RIGHT}":L$="
{27 SPACES}"
DP 490 FOR I=1 TO 25 STEP 3:GE
T#3,AS,BS:IF AS=SP$ THE
N I=25:NEXT:CLOSE 3:GOT
O 220
BA 500 AS=AS+BS:A=DEC(AS):MID$(
L$,I,2)=AS:IF I<25 THE
N GOSUB 320:A(I/3)=A:GE
T#3,AS

```

```

AR 510 NEXT I:IF A<>CK THEN GO
SUB 950:PRINT:PRINT"
[RVS] ERROR: REENTER LI
NE ":F=1:GOTO 360
DX 520 PRINT BE$:B=BS+AD-SA:FO
R I=0 TO 7:POKE B+I,A(I
):NEXT I
XB 530 F=0:AD=AD+8:IF AD<=EA T
HEN 360
CA 540 CLOSE 3:PRINT"[DOWN]
{BLU}** END OF ENTRY **
{BLK}{2 DOWN}":GOTO 650
MC 550 PRINT BE$:"[CLR]{DOWN}
{RVS} DISPLAY DATA ":GO
SUB 250:IF AS=NL$ THEN
{SPACE}220
JF 560 BANK 0:PRINT"[DOWN]
{BLU}PRESS: [RVS]SPACE
{OFF} TO PAUSE, [RVS]RE
TURN{OFF} TO BREAK[4]
{DOWN}"
XA 570 PRINT HEX$(AD)+":":GOS
UB 310:B=BS+AD-SA
DJ 580 FOR I=B TO B+7:A=PEEK(I
):PRINT RIGHT$(HEX$(A),
2):SP$:GOSUB 320:NEXT
{SPACE}I
XB 590 PRINT"[RVS]":RIGHT$(HEX
$(CK),2)
GR 600 F=1:AD=AD+8:IF AD>EA TH
EN PRINT"[BLU]** END OF
DATA **":GOTO 220
EB 610 GET AS:IF AS=RT$ THEN P
RINT BE$:GOTO 220
QK 620 IF AS=SP$ THEN F=F+1:PR
INT BE$:
XS 630 ON F GOTO 570,610,570
RF 640 PRINT BE$"{DOWN}{RVS} L
OAD DATA ":OP=1:GOTO 66
0
BP 650 PRINT BE$"{DOWN}{RVS} S
AVE FILE ":OP=0
DM 660 F=0:F$=NL$:INPUT"FILENA
ME[4]":F$:IF F$=NL$ THE
N 220
RF 670 PRINT"[DOWN]{BLK}{RVS}T
{OFF}APE OR {RVS}D{OFF}
ISK: [4]":
SQ 680 GETKEY AS:IF AS="T" THE
N 850:ELSE IF AS<>"D" T
HEN 680
SP 690 PRINT"DISK{DOWN}":IF OP
THEN 760
EH 700 DOPEN#1,(F$+"",P"),W:IF
{SPACE}DS THEN AS=D$:GO
TO 740
JH 710 BANK 0:POKE BS-2,FNLB(S
A):POKE BS-1,FNHB(SA):P
RINT"SAVING":F$:PRINT
FOR A=BS-2 TO BS+EA-SA:
PRINT#1,CHR$(PEEK(A)):
IF ST THEN AS="DISK WRI
TE ERROR":GOTO 750
GC 730 NEXT A:CLOSE 1:PRINT"
{BLU}** SAVE COMPLETED
{SPACE}WITHOUT ERRORS *
*":GOTO 220
RA 740 IF DS=63 THEN BEGIN:CLO
SE 1:INPUT"[BLK]REPLACE
EXISTING FILE [Y/N][4]
":AS:IF AS="Y" THEN SCR
ATCH(F$):PRINT:GOTO 700
:ELSE PRINT"[BLK]":GOTO
660:BEND
GA 750 CLOSE 1:GOSUB 950:PRINT
{BLK}{RVS} ERROR DURIN
G SAVE: [4]":PRINT AS:G
OTO 220
FD 760 DOPEN#1,(F$+"",P"):IF DS
THEN AS=D$:F=4:CLOSE
{SPACE}1:GOTO 790

```



# MLX Machine Language Entry Program For Apple

Tim Victor, Editorial Programmer

*To make it easier to enter machine language programs into your computer without typos, COMPUTE! is introducing its "MLX" entry program for the Apple II series. It's our best MLX yet. It runs on the II, II+, IIe, and IIc, and with either DOS 3.3 or ProDOS.*

A machine language (ML) program is usually listed as a long series of numbers. It's hard to keep your place and even harder to avoid making mistakes as you type in the listing, since an incorrect line looks almost identical to a correct one. To make error-free entry easier, COMPUTE! generally lists ML programs for Commodore and Atari computers in a format designed to be typed in with a utility called "MLX." The MLX program uses a checksum system to catch typing errors almost as soon as they happen.

Apple MLX checks your typing on a line-by-line basis. It won't let you enter invalid characters or let you continue if there's a mistake in a line. It won't even let you enter a line or digit out of sequence. Best of all, you don't have to know anything about machine language to enter ML programs with MLX. Apple MLX makes typing ML programs almost foolproof.

## Using Apple MLX

Type in and save some copies of Apple MLX on disk (you'll want to use MLX to enter future ML programs in COMPUTE!). It doesn't matter whether you type it in on a disk formatted for DOS 3.3 or ProDOS. Programs entered with Apple MLX, however, must be saved to a disk formatted with the same operating system as Apple MLX itself.

If you have an Apple IIe or IIc, make sure that the key marked CAPS LOCK is in the down position. Type RUN. You'll be asked for the starting and ending addresses of the ML program. These values vary for each program, so they're given at the beginning of the ML program listing and in the program's accompanying article. Find them and type them in.

## Invalid Characters Banned

Apple MLX is fairly flexible about how you type in the numbers. You can put extra spaces between numbers or leave the spaces out entirely, compressing a line into 18 keypresses. Be careful not to put a space between two digits in the middle of a number. Apple MLX will

read two single-digit numbers instead of one two-digit number (F 6 means F and 6, not F6).

You can't enter an invalid character with Apple MLX. Only the numerals 0-9 and the letters A-F can be typed in. If you press any other key (with some exceptions noted below), nothing happens. This safeguards against entering extraneous characters. Even better, Apple MLX checks for transposed characters. If you're supposed to type in A0 and instead enter 0A, Apple MLX will catch your mistake.

The next thing you'll see is a menu asking you to select a function. The first is (E)NTER DATA. If you're just starting to type in a program, pick this. Press the E key, and the program asks for the address where you want to begin entering data. Type the first number in the first line of the program listing if you're just starting, or the line number where you left off if you've already typed in part of a program. Hit the RETURN key and begin entering the data.

Once you're in Enter mode, Apple MLX prints the address for each program line for you. You then type in all nine numbers on that line, beginning with the first two-digit number after the colon (:). Each line represents eight bytes and a checksum. When you enter a line and hit RETURN, Apple MLX recalculates the checksum from the eight bytes and the address. If you enter more or less than nine numbers, or the checksum doesn't exactly match, Apple MLX erases the line you just entered and prompts you again for the same line.

Apple MLX also checks to make sure you're typing in the right line. The address (the number to the left of the colon) is part of the checksum recalculation. If you accidentally skip a line and try to enter incorrect values, Apple MLX won't let you continue. Just make sure you enter the correct starting address; if you don't, you won't be able to enter any of the following lines. Apple MLX will stop you.

## Editing Features

Apple MLX also includes some editing features. The left- and right-arrow keys allow you to back up and go forward on the line that you are entering, so you can retype data. Pressing the CONTROL (CTRL) and D keys at the same time (delete) removes the character under the

```
PX 770 GET#1,A$,B$:CLOSE 1:AD=
ASC(A$)+256*ASC(B$):IF
[SPACE]AD<>SA THEN F=1:
GOTO 790
KB 780 PRINT"LOADING ";F$:PRIN
T:BLOAD(F$),B0,P(B$):AD
=SA+FNAD(174)-BS-1:F=-2
*(AD<EA)-3*(AD>EA)
RQ 790 IF F THEN 800:ELSE PRIN
T"[BLU]** LOAD COMPLETE
D WITHOUT ERRORS **":GO
TO 220
ER 800 GOSUB 950:PRINT"[BLK]
[RVS] ERROR DURING LOAD
: [43]":ON F GOSUB 810,8
20,830,840:GOTO220
QJ 810 PRINT"INCORRECT STARTIN
G ADDRESS (";HEX$(AD);"
)":RETURN
DP 820 PRINT"LOAD ENDED AT ";H
EX$(AD):RETURN
EB 830 PRINT"TRUNCATED AT ENDI
NG ADDRESS (";HEX$(EA);"
)":RETURN
FP 840 PRINT"DISK ERROR ";A$:R
ETURN
KS 850 PRINT"TAPE":AD=POINTER(
F$):BANK 1:A=PEEK(AD):A
L=PEEK(AD+1):AH=PEEK(AD
+2)
XX 860 BANK 15:SYS DEC("FF68")
,0,1:SYS DEC("FFBA"),1,
1,0:SYS DEC("FFBD"),A,A
L,AH:SYS DEC("FF90"),12
8:IF OP THEN 890
FG 870 PRINT:A=SA:B=EA+1:GOSUB
920:SYS DEC("E919"),3:
PRINT"SAVING ";F$:
AB 880 A=BS:B=BS+(EA-SA)+1:GOS
UB 920:SYS DEC("EA18"):
PRINT"[DOWN]{BLU]** TAP
E SAVE COMPLETED **":GO
TO 220
CP 890 SYS DEC("E99A"):PRINT:I
F PEEK(2816)=5 THEN GOS
UB 950:PRINT"[DOWN]
{BLK}{RVS} FILE NOT FOU
ND ":GOTO 220
GQ 900 PRINT"LOADING ...{DOWN}
":AD=FNAD(2817):IF AD<>
SA THEN F=1:GOTO 800:EL
SE AD=FNAD(2819)-1:F=-2
*(AD<EA)-3*(AD>EA)
JD 910 A=BS:B=BS+(EA-SA)+1:GOS
UB 920:SYS DEC("E9FB"):
IF ST>0 THEN 800:ELSE 7
90
XB 920 POKE193,FNLB(A):POKE194
,FNLB(A):POKE 174,FNLB(
B):POKE 175,FNLB(B):RET
URN
CP 930 CATALOG:PRINT"[DOWN]
{BLU]** PRESS ANY KEY F
OR MENU **":GETKEY A$:G
OTO 220
MM 940 PRINT BE$"{RVS} QUIT
[43]";RT$:"ARE YOU SURE
[SPACE][Y/N]?" :GETKEY A
$:IF A$<>"Y" THEN 220:E
LSE PRINT"[CLR]":BANK 1
5:END
JE 950 SOUND 1,500,10:RETURN
AF 960 IF ER=14 AND EL=260 THE
N RESUME 300
MK 970 IF ER=14 AND EL=500 THE
N RESUME NEXT
KJ 980 IF ER=4 AND EL=780 THEN
F=4:A$=DS$:RESUME 800
DQ 990 IF ER=30 THEN RESUME:EL
SE PRINT ERR$(ER);" ERR
OR IN LINE":EL
```

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cursor, shortening the line by one character. Pressing CTRL-I (*insert*) puts a space under the cursor and shifts the rest of the line to the right, making the line one character longer. If the cursor is at the right end of the line, neither CTRL-D nor CTRL-I has any effect.

When you've entered the entire listing (up to the ending address that you specified earlier), Apple MLX automatically leaves Enter mode and redisplay the functions menu. If you want to leave Enter mode before then, press the RETURN key when Apple MLX prompts you with a new line address. (For instance, you may want to leave Enter mode to enter a program listing in more than one sitting; see below.)

## Display Data

The second menu choice, (D)ISPLAY DATA, examines memory and shows the contents in the same format as the program listing. You can use it to check your work or to see how far you've gotten. When you press D, Apple MLX asks you for a starting address. Type in the address of the first line you want to see and hit RETURN. Apple MLX displays program lines until you press any key or until it reaches the end of the program.

## Save And Load

Two more menu selections let you save programs on disk and load them back into the computer. These are (S)AVE FILE and (L)OAD FILE. When you press S or L, Apple MLX asks you for the filename. The first time you save an ML program, the name you assign will be the program's filename on the disk. If you press L and specify a filename that doesn't exist on the disk, you'll see a disk error message.

If you're not sure why a disk error has occurred, check the drive. Make sure there's a formatted disk in the drive and that it was formatted by the same operating system you're using for Apple MLX (ProDOS or DOS 3.3). If you're trying to save a file and see an error message, the disk might be full. Either save the file on another disk or quit Apple MLX (by pressing the Q key), delete an old file or two, then run Apple MLX again. Your typing should still be safe in memory.

## Apple MLX: Machine Language Entry Program

For instructions on entering this program, please refer to "COMPUTE!'s Guide to Typing In Programs" elsewhere in this issue.

```
88 100 N = 9: HOME : NORMAL : PR
INT "APPLE MLX": POKE 34,
2: ONERR GOTO 610
CC 110 VTAB 1: HTAB 20: PRINT "S
TART ADDRESS": GOSUB 530
: IF A = 0 THEN PRINT CHR
$ (7): GOTO 110
BC 120 S = A
```

```
EE 130 VTAB 2: HTAB 20: PRINT "E
ND ADDRESS ": GOSUB 530
: IF S >= A OR A = 0 THE
N PRINT CHR$ (7): GOTO 13
0
28 140 E = A
85 150 PRINT : PRINT "CHOOSE: (E)
NTER DATA": HTAB 22: PR
INT "(D)ISPLAY DATA": HTAB
8: PRINT "(L)OAD FILE (
S)AVE FILE (Q)UIT": PRIN
T
AE 160 GET A$: FOR I = 1 TO 5: I
F A$ < > MID$ ("EDLSQ",I,
1) THEN NEXT : GOTO 160
93 170 ON I GOTO 270,220,180,200
: POKE 34,0: END
AF 180 INPUT "FILENAME: ":A$: IF
A$ < > "" THEN PRINT CHR
$ (4);"BLOAD";A$;"A";S
A1 190 GOTO 150
38 200 INPUT "FILENAME: ":A$: IF
A$ < > "" THEN PRINT CHR
$ (4);"BSAVE";A$;"A";S;"
,L";(E - S) + 1
92 210 GOTO 150
C2 220 GOSUB 590: IF B = 0 THEN
150
9E 230 FOR B = B TO E STEP 8:L =
4:A = B: GOSUB 580: PRIN
T A$;" ":L = 2
85 240 FOR F = 0 TO 7:V(F + 1) =
PEEK (B + F): NEXT : GOS
UB 560:V(9) = C
F2 250 FOR F = 1 TO N:A = V(F):
GOSUB 580: PRINT A$;" ":
NEXT : PRINT : IF PEEK (4
9152) < 128 THEN NEXT
94 260 POKE 49168,0: GOTO 150
CC 270 GOSUB 590: IF B = 0 THEN
150
48 280 FOR B = B TO E STEP 8
A6 290 HTAB 1:A = B:L = 4: GOSUB
580: PRINT A$;" ": CAL
L 64668:A$ = "":P = 0: GO
SUB 330: IF L = 0 THEN 15
0
F9 300 GOSUB 470: IF F < > N THE
N PRINT CHR$ (7): GOTO 2
90
27 310 IF N = 9 THEN GOSUB 560:
IF C < > V(9) THEN PRINT
CHR$ (7): GOTO 290
72 320 FOR F = 1 TO 8: POKE B +
F - 1,V(F): NEXT : PRINT
: NEXT : GOTO 150
8E 330 IF LEN (A$) = 33 THEN A$
= 0:P = 0: PRINT CHR$ (7
);
22 340 L = LEN (A$):O$ = A$:O =
P:L$ = "": IF P > 0 THEN
L$ = LEFT$ (A$,P)
EE 350 R$ = "": IF P < L - 1 THE
N R$ = RIGHT$ (A$,L - P -
1)
55 360 HTAB 7: PRINT L$;: FLASH
: IF P < L THEN PRINT MID
$ (A$,P + 1,1): NORMAL :
PRINT R$;
7B 370 PRINT " ": NORMAL
E6 380 K = PEEK (49152): IF K <
128 THEN 380
C1 390 POKE 49168,0:K = K - 128
58 400 IF K = 13 THEN HTAB 7: PR
INT A$;" ": RETURN
8A 410 IF K = 32 OR K > 47 AND K
< 58 OR K > 64 AND K < 7
1 THEN A$ = L$ + CHR$ (K)
+ R$:P = P + 1
C1 420 IF K = 4 THEN A$ = L$ + R
$
5F 430 IF K = 9 THEN A$ = L$ + "
" + MID$ (A$,P + 1,1) +
R$
8A 440 IF K = 8 THEN P = P - (P
> 0)
```

```
93 450 IF K = 21 THEN P = P + (P
< L)
9D 460 GOTO 330
37 470 F = 1:D = 0: FOR P = 1 TO
LEN (A$):C$ = MID$ (A$,P
,1): IF F > N AND C$ < >
" " THEN RETURN
88 480 IF C$ < > " " THEN GOSUB
520:V(F) = J + 16 * (D =
1) * V(F):D = D + 1
5F 490 IF D > 0 AND C$ = " " OR
D = 2 THEN D = 0:F = F +
1
88 500 NEXT : IF D = 0 THEN F =
F - 1
17 510 RETURN
85 520 J = ASC (C$):J = J - 48 -
7 * (J > 64): RETURN
AB 530 A = 0: INPUT A$:A$ = LEFT
$ (A$,4): IF LEN (A$) = 0
THEN RETURN
6F 540 FOR P = 1 TO LEN (A$):C$
= MID$ (A$,P,1): IF C$ <
"0" OR C$ > "9" AND C$ <
"A" OR C$ > "Z" THEN A =
0: RETURN
20 550 GOSUB 520:A = A * 16 + J:
NEXT : RETURN
28 560 C = INT (B / 256):C = B -
256 * C - 255 * (C > 127
):C = C - 255 * (C > 255)
28 570 FOR F = 1 TO 8:C = C * 2
- 255 * (C > 127) + V(F):
C = C - 255 * (C > 255):
NEXT : RETURN
DA 580 I = FRE (0):A$ = "": FOR
I = 1 TO L:T = INT (A / 1
6):A$ = MID$ ("0123456789
ABCDEF",A - 16 * T + 1,1)
+ A$:A = T: NEXT : RETUR
N
IF 590 PRINT "FROM ADDRESS ": G
OSUB 530: IF S > A OR E <
A OR A = 0 THEN B = 0: R
ETURN
8D 600 B = S + 8 * INT ((A - S)
/ 8): RETURN
86 610 PRINT "DISK ERROR": GOTO
150
```

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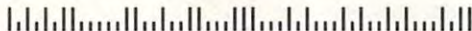
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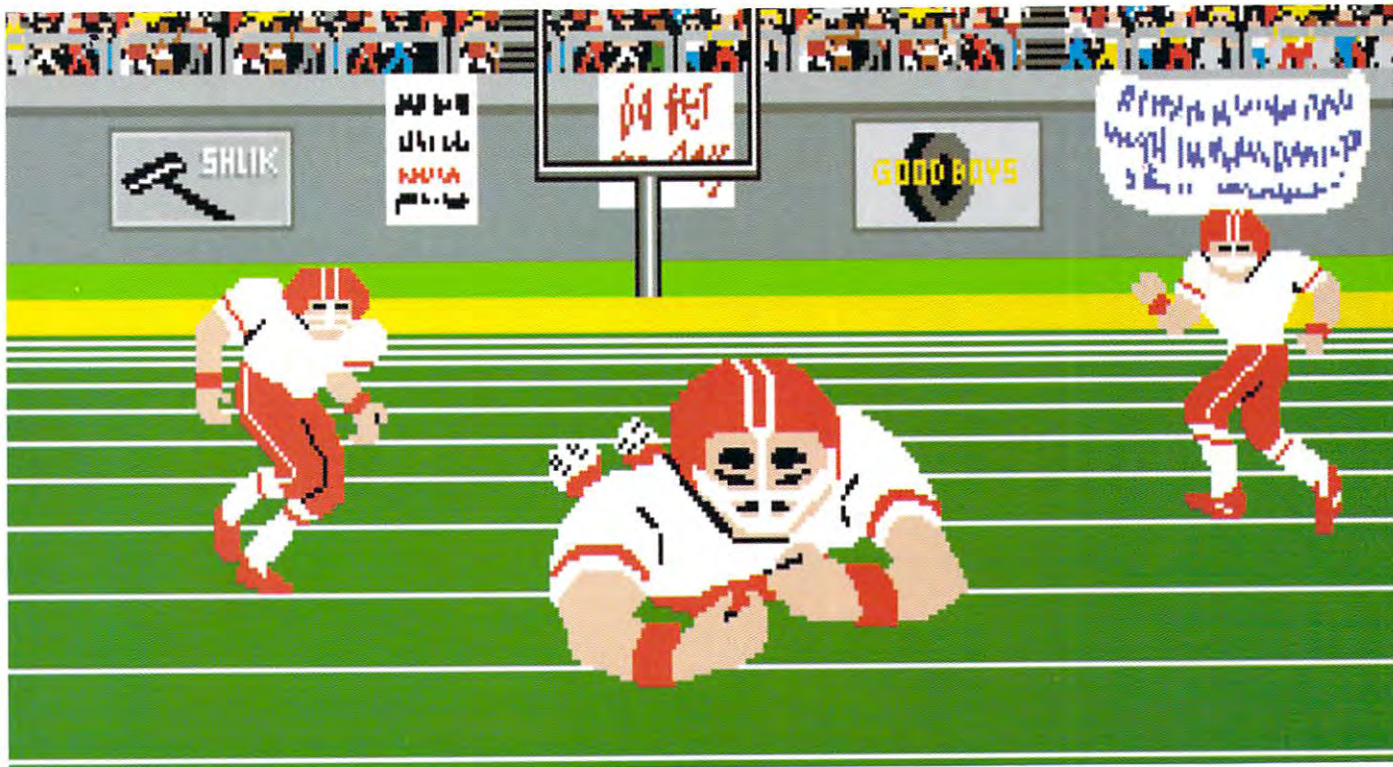
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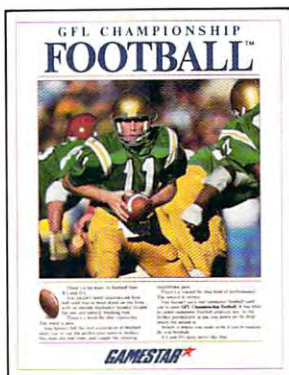
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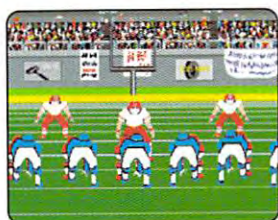
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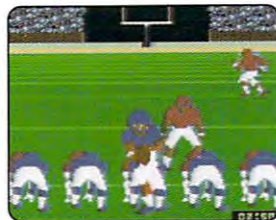
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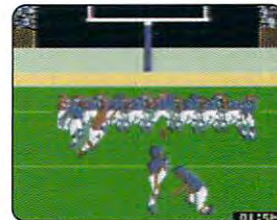
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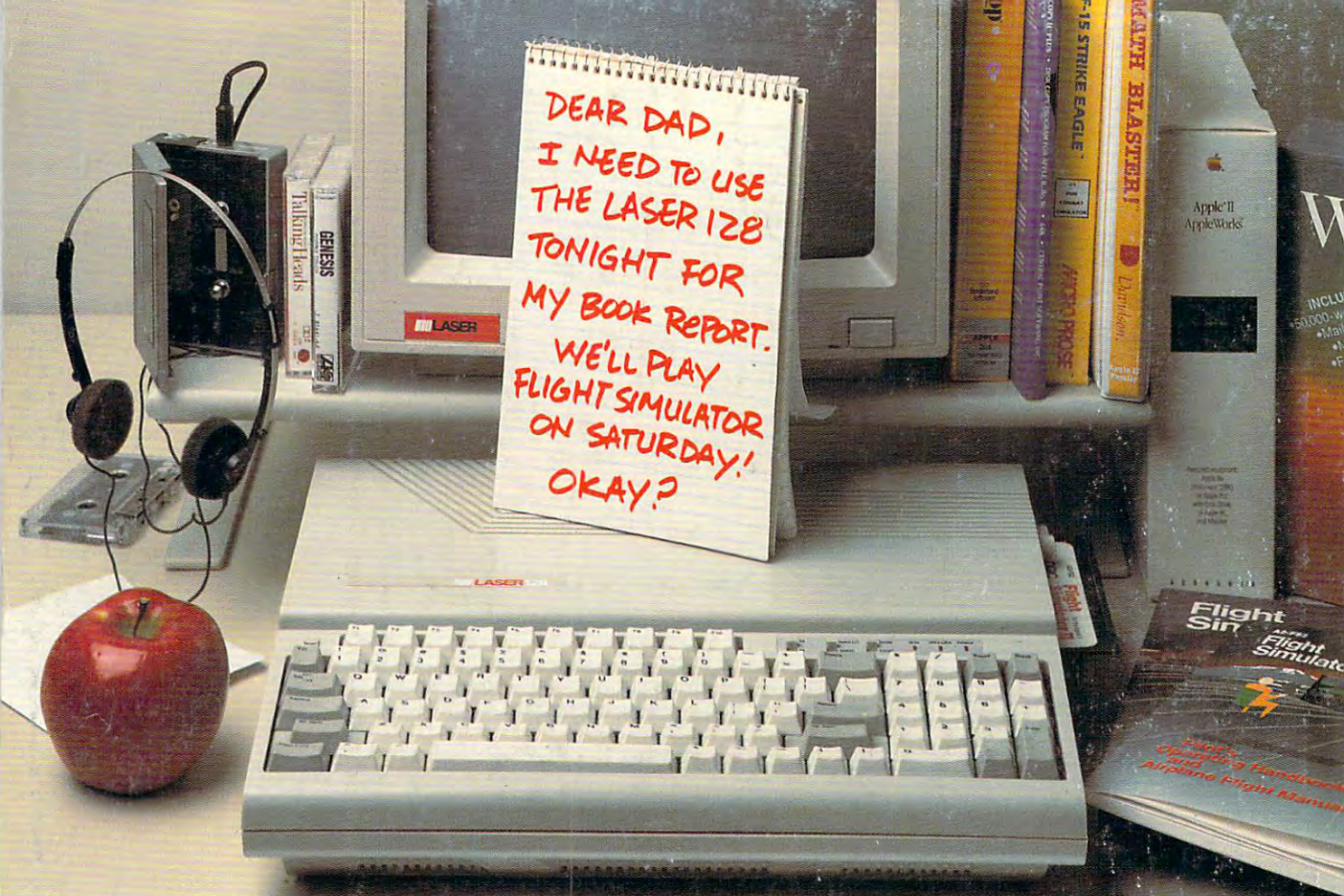
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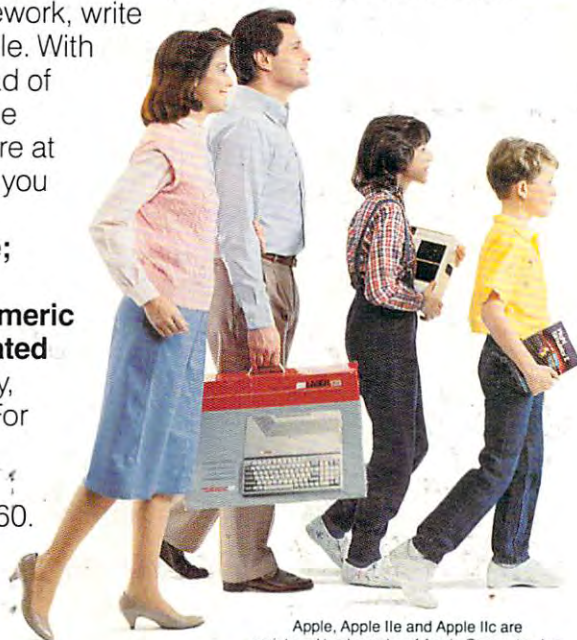


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