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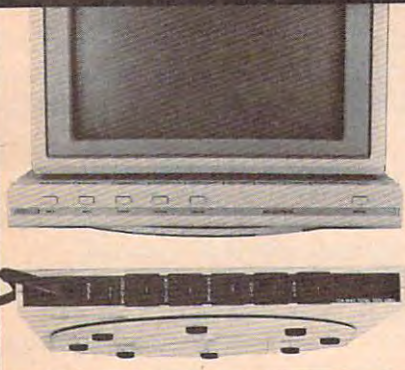
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Table with 16 columns of alphanumeric characters (hexadecimal values) for the left half of the keyboard layout.

Table with 16 columns of alphanumeric characters (hexadecimal values) for the right half of the keyboard layout.

Karma

For The Amiga

Todd Heimarck and Rhett Anderson

This colorful two-player strategy game demonstrates the power of the Amiga hardware and Amiga Basic; 512K required.

Imagine that you have the power to make people very happy. Perhaps you're a vice president in charge of awarding college scholarships. Or you're a billionaire who enjoys giving someone ten thousand bucks. Or maybe you just have a nice smile.

Paradoxically, while you're being altruistic and are dispensing gifts to a grateful and increasingly happy world, you're greedy, too. You want to gain the approbation and adoration of the beneficiaries of your largesse. You want people to like you.

Unfortunately, there's another philanthropist who has the same power as you. While you're dispensing your gifts and making people happy, your opponent is doing the same thing. You're locked in a popularity contest from which only one victor will emerge.

"Karma" is a two-player strategy game in which you and your opponent struggle for territory. Four different scenarios—each with a different goal—are included. Players take turns using the mouse to add happiness to households. When a certain level of happiness builds up, an explosion takes place. When one of the players achieves an explosion, that player captures all of the surrounding regions. Karma is easy to play, but difficult to win.

Getting Started

Karma is written in Amiga Basic. Type it in and save a copy to disk. When you're ready to play the game, run it. When you play, you'll first be asked to choose one of the four karmic variations: Capture All, Four Corners, Two Pies, and 2500 Points. Game play is identical for each game, although the goal is different. To select a game, press one of the number keys (1-4) from the keyboard or the numeric keypad. The standard game is Capture All, which you select by pressing the 1 key.

Levels Of Happiness

The screen is divided into three parts: the big map, the small map, and the scoreboard. The small map shows you which player owns which territories. The big map on the left contains the most important information—it tells you the relative levels of happiness within each household in the city of Karma:

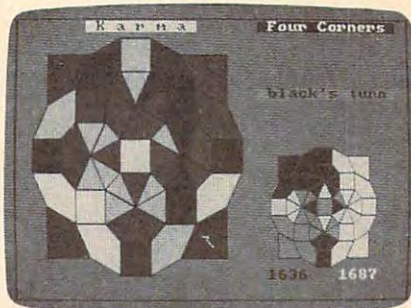
Level	Mood	Color
1	Gloomy	Deep Blue
2	Content	Deep Purple
3	Pleased	Maroon
4	Joyous	Red
5	Ecstatic	Bright Red

The black player moves first; white, second. During your turn, you may move the mouse pointer to any household on the big map, but the household must be on your side. Click the left button once (you may have to hold down the button for a microsecond or two to make sure the click registers).

Whichever block you select will instantly increase one step in happiness. A blue transforms to purple, purple becomes maroon,

and so on.

It may strike you that you're not gaining a lot of popularity if you can give happy points only to the households that are already on your side. You click the mouse pointer on your followers and your opponent clicks on his or her followers. How do you move into neutral (or unfriendly) territory? Good question.



"Karma," an unique two-player strategy game for the Amiga.

The Power Of Gossip

The levels of glee stop at ecstatic; there is no more blissful state. That's because ecstasy has a curious effect on the citizens of Karma. When their happiness hits level five, they immediately tell all of their next-door neighbors. This is known as a *gossip explosion*. Three things happen: The ecstatic household drops back down to a lower level of glee (one, two, or three, depending on the type of house). But at the same time, each of the neighbors jumps up one level in happiness. The neighbors also move over to your side. If you watch the two maps, you'll see the happy colors change on the big map. You'll

also see your own color spread outward on the smaller map.

Player	Color
Player 1	Black
Player 2	White
Neutral	Gray

As the game begins, a majority of cells are neutral, but once a household is converted to one side or the other, it can never again become neutral.

You win and lose games by controlling strategically located joyous households. If you click on a red piece, it affects all of the neighboring pieces. If a neighbor is also joyous, it explodes. It's fairly common to see long strings of chain reactions as gossip spreads through a block of neighbors and gradually affects every house in the city.

As you plan your strategy, remember this: If you own a joyous Karmalite, color red, and your own Karmalite lives next door to another joyous Karmalite on your enemy's side, either one of you can capture both of them (plus all of their neighbors).

From Condos To Suburbs

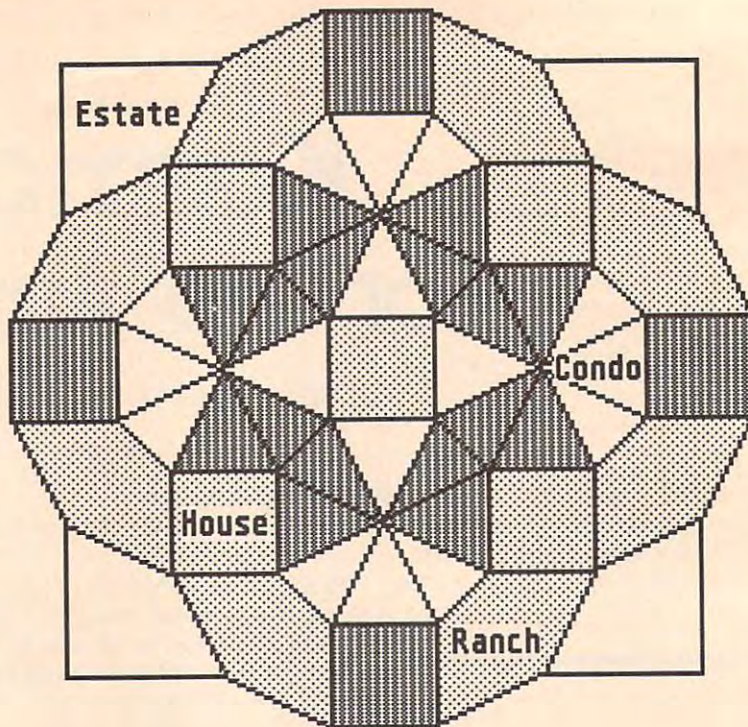
The city of Karma offers elegant living arranged as four types of dwelling units:

Unit	Points	Min. Happiness
Condos	3	Content/2
Houses	4	Gloomy/1
Ranches	4	Gloomy/1
Estates	2	Pleased/3

The condos appear on the screen as four pie-shaped units of eight wedge-shaped condos. Each condo has three neighbors and is worth three points. A group of eight condos looks circular like a pie and is commonly referred to as a *condo pie*.

Houses and ranches have four neighbors and a value of four. There are nine houses, which are square in shape. The house at the very top of the city is connected with the house on the southern edge. Likewise, the east and west houses are neighbors. The eight ranches are the five-sided shapes on the fringe of Karma. Each ranch borders on two houses, one condo, and an estate.

In the outer corners, you'll see the four estates. They have only two neighbors (both of which are ranches) and are worth two points.



The four types of properties in "Karma."

Scoring And Winning

At the end of each turn, both players are awarded popularity points according to which households they've swayed to their sides. The points accumulate as the game progresses. If you control 12 condos, 3 houses, a ranch, and 2 estates, you'll gain 56 points: $(12 \times 3) + (3 \times 4) + (1 \times 4) + (2 \times 2)$.

Underneath the score is a second number that indicates how many households are on your side. If this number dwindles to zero, the game automatically ends, because you can only click on households you currently own. If you don't own any, you can't make a move.

In the first three games, the points are irrelevant, except to provide the loser with some consolation in the case that he or she loses while leading in points. The fourth game (2500 points) is just what you might think. The first person to reach 2500 wins.

In game 1 (Capture All), the goal is to send your opponent packing. As soon as one player has no more friendly households, the game ends.

Game 2 (Two Pies) takes a lit-

tle less time, since the purpose is to capture two complete eight-unit condo pies. There are four condo points blocks, so you might believe a tie—two blocks each—could happen, but it's impossible. Say player 1 made a move that yielded complete control of two blocks (16 condos) and that the other player also owned two blocks at the end of the turn. Player 2 can't capture any cells during player 1's turn, so for a tie to occur, player 2 would have had to own two complete blocks before player 1 started his or her turn. But in that case, player 2 would have won the game before player one moved the mouse. Ties are impossible.

In the Four Corners game (game 3), your aim is to capture all four corner estates. Each corner has only two neighbors, so this is a game where defense is crucial. Once you control a corner, you can—and should try to—hold on to it for as long as you can.

Strategies And Tactics

The joyous households are on the verge of exploding with gossip, so watch them. At the beginning of

Karma, you may want to set off several strategic explosions, in order to gain more territory to develop.

In the middle game, push a few isolated cells (households in an unhappy neighborhood) up to the red level, and then leave them as an investment in the future. There's nothing worse than setting off a chain reaction that leaves the board in a situation where your opponent simply replies with another chain reaction that decimates your troops. If you have nothing but blues, you can't do much to get back.

The final few moves are crucial. You'll often see a city where one move creates a small chain reaction, while another move removes your opponent from play.

Although reds are primed to explode, maroons will often receive gossip from two directions. If three reds are immediate neighbors, all three will explode. If a maroon is next to two of the reds, it will receive gossip from two directions and will also explode.

Karma

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

```
'Copyright 1987<
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<
DEFINT a-z:DEFSNG r,g,b<
DIM sides(52),xcord(52,5),ycord(52,5),numadjacents(52),neighbors(52,3)<
DIM owner(52),reenter(52),update(52),start(20),xfind(52),yfind(52)<
DIM r(15),g(15),b(15),ToDo(100)<
gamenum=1<
<
RANDOMIZE TIMER<
<
SCREEN 1,320,200,4,1:WINDOW 3,"", (0,0)-(311,186)
,16,1:WINDOW OUTPUT 3<
<
newgame:<
<
COLOR 1,0:CLS:score(1)=10:score(2)=10<
COLOR 1,2:LOCATE 8,13:PRINT" Karma " <
COLOR 1,0:PRINT:PRINT" Copyright 1987 Compute!
Publ., Inc." <
PRINT" All Rights Reserved" <
PRINT:PRINT:COLOR 1,2<
PRINT" Choose game. " :C
OLOR 0,1:PRINT<
<
PRINT " 1. Capture All " <
PRINT " 2. Four Corners " <
PRINT " 3. Two Pies " <
PRINT " 4. 2500 Points " <
<
GetAKey:<
a$=INKEY$:IF a$="" THEN GetAKey<
IF a$<"1" OR a$>"4" THEN GetAKey<
gamenum=VAL(a$):LOCATE 21,19:PRINT " "a$" " <
<
RESTORE findpoints<
FOR i=0 TO 52<
READ x,y:xfind(i)=x*10:yfind(i)=y*10<
NEXT i<
<
RESTORE Karma<
FOR i=0 TO 52<
READ sides(i)<
FOR ii=0 TO sides(i)-2<
READ xc,yc<
xcord(i,ii)=xc*12 <
ycord(i,ii)=yc*12<
NEXT ii<
READ numadjacents(i)<
FOR ii=0 TO numadjacents(i)-1<
READ neighbors(i,ii)<
```

```
NEXT ii<
NEXT i<
<
RESTORE thecoLors<
FOR i=0 TO 15<
READ r,g,b:r(i)=r/100:g(i)=g/100:b(i)=b/100<
PALETTE i,r(i),g(i),b(i)<
NEXT i<
<
thecoLors:<
<
DATA 50,40,30<
DATA 16,16,16<
DATA 0,0,0 <
DATA 0,5,40<
DATA 25,5,30<
DATA 50,5,20<
DATA 75,5,10<
DATA 100,5,0<
DATA 100,55,0<
DATA 30,30,30<
DATA 0,0,0<
DATA 70,70,70<
DATA 0,0,0<
DATA 0,0,0<
DATA 0,0,0<
DATA 0,0,0<
<
COLOR 1,0:FOR i=0 TO 24:PRINT:NEXT i<
<
LOCATE 1,8:COLOR 10,11:PRINT" K a r m a " <
COLOR 11,10:LOCATE 1,25<
<
IF gamenum=1 THEN PRINT " Capture All " <
IF gamenum=2 THEN PRINT " Four Corners " <
IF gamenum=3 THEN PRINT " Two Pies " <
IF gamenum=4 THEN PRINT " 2500 Points " <
<
RESTORE start<
FOR i=0 TO 19<
READ start(i)<
NEXT i<
<
start:<
DATA 4,13,5,14,11,15,23,33,24,34,25,35,18,8,30,2
0,37,36,39,38 <
<
FOR i=0 TO 52<
owner(i)=0:reenter(i)=0:update(i)=0<
NEXT i<
<
FOR i=0 TO 19 <
owner(start(i))=(i AND 1)+1:reenter(start(i))=1<
NEXT i<
<
FOR i=0 TO 52<
GOSUB DoOne<
NEXT i<
<
pLayer=2:pLayer$(1)="black":pLayer$(2)="white"<
<
game:<
<
pLayer=3-pLayer<
LOCATE 7,25:COLOR 9+pLayer,9:PRINT " ";pLayer$(pLa
yer);"s turn " <
<
<
Loop:<
<
WHILE MOUSE(0)=0:WEND<
x=MOUSE(1):y=MOUSE(2):hue=POINT(x,y)<
IF hue<3 OR hue>8 THEN Loop<
PALETTE 15,r(hue),g(hue),b(hue)<
PAINT (x,y),15,2<
<
which=-1<
FOR i=0 TO 52<
IF POINT(xfind(i),yfind(i))=15 THEN which=i<
NEXT i<
IF which<0 THEN STOP<
<
```

```

IF owner(which) <> pLayer THEN PAINT (x,y),hue,2:G
OTO Loop<
<
SOUND WAIT<
SOUND 130,10,,0:SOUND 130.5,10,,2<
SOUND RESUME<
<
FOR real=0 TO 1 STEP .02<
h=hue:r=real<
PALETTE 15,r(h)+.25*r,.05,b(h)-.1*r<
NEXT real<
<
MaxToDo=0<
<
again:<
<
reuter(which)=reuter(which)+1<
IF reuter(which)+1>numadjacents(which) THEN <
FOR i=0 TO numadjacents(which)-1<
MaxToDo=MaxToDo+1:t=neighbors(which,i):ToDo(Ma
xToDo)=t<
REM PAINT (xfind(t),yfind(t)),POINT(xfind(t),
yfind(t))+1,2<
NEXT i:SOUND WAIT:SOUND 200+which*16,1,,0:SOUND
200+which*8,1,,2:SOUND RESUME <
reuter(which)=reuter(which)-numadjacents(which)
<
END IF <
<
i=which<
IF owner(i)=3-pLayer THEN score(3-pLayer)=score(
3-pLayer)-1<
IF owner(i) <> pLayer THEN score(pLayer)=score(pLa
yer)+1<
owner(i)=pLayer:GOSUB DoOne:SOUND 200+6*which,.1
5,80,1<
IF score(1)=0 OR score(2)=0 THEN gameOver<
IF MaxToDo <> 0 THEN which=ToDo(MaxToDo):MaxToDo=M
axToDo-1:GOTO again<
<
WHILE MOUSE(0) < 0:WEND<
<
IF gamenum=2 AND ((owner(0) AND owner(1) AND own
er(2) AND owner(3)) <> 0) THEN gameOver<
IF gamenum=3 THEN<
win1=0:win2=0<
FOR j=0 TO 3<
garbage=owner(j*8+4)<
FOR k=1 TO 7<
garbage=owner(j*8+4+k) AND garbage<
NEXT k<
IF garbage=1 THEN win1=win1+1<
IF garbage=2 THEN win2=win2+1<
NEXT j<
IF win1>=2 OR win2>=2 THEN gameOver<
END IF <
FOR j=1 TO 2<
FOR i=0 TO 52<
IF owner(i)=j THEN points(j)=points(j)+numadja
cents(i)<
NEXT i<
NEXT j<
LOCATE 23,25:COLOR 10,0:PRINT points(1)<
LOCATE 23,32:COLOR 11,0:PRINT points(2)<
IF gamenum=4 AND (points(1)>2499 OR points(2)>24
99) THEN gameOver<
<
GOTO game<
<
SCREEN CLOSE 1<
<
GOTO doIt<
<
END<
<
DoOne:<
<
si2=sides(i)-2:COLOR 7-(numadjacents(i)-reuter(i
)),0<
AREA (xcord(i,si2)+12,ycord(i,si2)+12)<
FOR ii=0 TO si2<
AREA (xcord(i,ii)+12,ycord(i,ii)+12)<
NEXT ii<
AREAFILL<
COLOR 2,1<
PSET (xcord(i,si2)+12,ycord(i,si2)+12)<
FOR ii=0 TO si2<
LINE -(xcord(i,ii)+12,ycord(i,ii)+12)<
NEXT ii<
<
DoOne2:<
<
si2=sides(i)-2:COLOR owner(i)+9,1<
AREA (xcord(i,si2)/2+202,ycord(i,si2)/2+90)<
FOR ii=0 TO si2<
AREA (xcord(i,ii)/2+202,ycord(i,ii)/2+90)<
NEXT ii<
AREAFILL<
COLOR 1,1<
PSET (xcord(i,si2)/2+202,ycord(i,si2)/2+90)<
FOR ii=0 TO si2<
LINE -(xcord(i,ii)/2+202,ycord(i,ii)/2+90)<
NEXT ii<
RETURN<
<
gameover:<
FOR i=0 TO 52<
GOSUB DoOne2<
NEXT i <
FOR i=0 TO 40<
FOR j=0 TO 3<
SOUND RND*i*10,2,,j<
NEXT j<
NEXT i <
FOR i=40 TO 0 STEP -1<
FOR j=0 TO 3<
SOUND RND*i*10,2,,j<
NEXT j<
NEXT i <
FOR i=0 TO 10000:NEXT i<
RUN<
<
Karma:<
<
DATA 5, 1,1, 4,1, 3,3, 1,4<
DATA 2, 43,44<
DATA 5, 10,1, 13,1, 13,4, 11,3<
DATA 2, 45,46<
DATA 5, 11,11, 13,10, 13,13, 10,13<
DATA 2, 40,47<
DATA 5, 1,10, 3,11, 4,13, 1,13<
DATA 2, 41,42<
DATA 4, 6,2, 8,2, 7,4<
DATA 3, 5,11,39<
DATA 4, 8,2, 9,3, 7,4<
DATA 3, 4,6,45<
DATA 4, 9,3, 9,5, 7,4<
DATA 3, 5,7,50<
DATA 4, 9,5, 8,6, 7,4<
DATA 3, 6,8,19<
DATA 4, 8,6, 6,6, 7,4<
DATA 3, 7,9,52<
DATA 4, 6,6, 5,5, 7,4<
DATA 3, 8,10,29<
DATA 4, 5,5, 5,3, 7,4<
DATA 3, 9,11,49<
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DATA 3, 4,10,44<
DATA 4, 9,5, 11,5, 10,7<
DATA 3, 13,19,50<
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DATA 3, 12,14,46<
DATA 4, 12,6, 12,8, 10,7<
DATA 3, 13,15,36<
DATA 4, 12,8, 11,9, 10,7<
DATA 3, 14,16,47<
DATA 4, 11,9, 9,9, 10,7<
DATA 3, 15,17,51<
DATA 4, 9,9, 8,8, 10,7<
DATA 3, 16,18,21<
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DATA 3, 17,19,52<
DATA 4, 8,6, 9,5, 10,7<
DATA 3, 7,12,18<
DATA 4, 6,8, 8,8, 7,10<
DATA 3, 21,27,52<

```

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 DATA 4, 5,5, 6,6, 4,7<
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 DATA 4, 6,8, 5,9, 4,7<
 DATA 3, 27,30,32<
 DATA 4, 5,9, 3,9, 4,7<
 DATA 3, 31,33,48<
 DATA 4, 3,9, 2,8, 4,7<
 DATA 3, 32,34,42<
 DATA 4, 2,8, 2,6, 4,7<
 DATA 3, 33,35,38<
 DATA 4, 2,6, 3,5, 4,7<
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 DATA 4, 14,38,46,47<
 DATA 5, 6,12, 8,12, 8,14, 6,14<
 DATA 4, 24,39,40,41<
 DATA 5, 0,6, 2,6, 2,8, 0,8<
 DATA 4, 34,36,42,43<
 DATA 5, 6,0, 8,0, 8,2, 6,2<
 DATA 4, 4,37,44,45<
 DATA 6, 9,11, 11,11, 10,13, 8,14, 8,12<
 DATA 4, 2,23,37,51<
 DATA 6, 3,11, 5,11, 6,12, 6,14, 4,13<

DATA 4, 3,25,37,48<
 DATA 6, 0,8, 2,8, 3,9, 3,11, 1,10<
 DATA 4, 3,33,38,48<
 DATA 6, 1,4, 3,3, 3,5, 2,6, 0,6<
 DATA 4, 0,35,38,49<
 DATA 6, 4,1, 6,0, 6,2, 5,3, 3,3<
 DATA 4, 0,11,39,49<
 DATA 6, 8,0, 10,1, 11,3, 9,3, 8,2<
 DATA 4, 1,5,39,50<
 DATA 6, 11,3, 13,4, 14,6, 12,6, 11,5<
 DATA 4, 1,13,36,50<
 DATA 6, 12,8, 14,8, 13,10, 11,11, 11,9<
 DATA 4, 2,15,36,51<
 DATA 5, 3,9, 5,9, 5,11, 3,11<
 DATA 4, 26,32,41,42<
 DATA 5, 3,3, 5,3, 5,5, 3,5<
 DATA 4, 10,28,43,44<
 DATA 5, 9,3, 11,3, 11,5, 9,5<
 DATA 4, 6,12,45,46<
 DATA 5, 9,9, 11,9, 11,11, 9,11<
 DATA 4, 16,22,40,47<
 DATA 5, 6,6, 6,8, 8,8, 8,6<
 DATA 4, 8,18,20,30<
 <
 findpoints:<
 <
 DATA 4,4, 16,5, 16,15, 4,15<
 DATA 10,4, 11,5, 11,6, 11,7, 10,8, 9,7, 8,6, 9,5
 <
 DATA 13,8, 14,9, 15,10, 15,11, 13,11, 12,11, 12,
 10, 12,8<
 DATA 10,11, 11,12, 11,13, 11,15, 10,15, 9,14, 8,
 13, 8,12<
 DATA 6,8, 7,9, 8,10, 8,11, 6,11, 5,11, 5,10, 5,8
 <
 DATA 17,10, 10,17, 3,10, 10,3<
 DATA 13,16, 7,16, 4,13, 4,7, 7,3, 12,3, 16,7, 16
 ,12<
 DATA 6,13, 6,6, 13,6, 13,13<
 DATA 10,10<
 <

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GET And PUT Graphics Commands For Atari

Bernard Cozier

BASIC and assembly language programmers alike will appreciate the two new graphics commands, GET and PUT. With these commands, any rectangular region can be captured from the screen and moved to any other screen location. Four demonstration programs are included to help you get started. For all Atari eight-bit computers. Joystick required for demo programs.

Although the Atari was designed nearly ten years ago, its graphics system is still widely respected. It was one of the first computers to have independently movable screen objects (known on other computers as *sprites*). Although the Atari's objects (called *player/missiles*) are useful, they do have some limitations. First, each of the four players are only eight pixels wide; the four missiles are each two pixels wide. Also, each player/missile is limited to one color.

"GET and PUT Graphics Commands" overcomes these limitations by letting you save and restore graphics directly on the graphics screen in any mode. For example, you can use the PLOT and LINE commands to draw a dolphin, then use GET to save the picture in memory. Now, you can put as many copies of the dolphin on the screen

as you like. You can even make it swim across the screen. The new commands are similar to the graphics GET and PUT commands in the IBM and Amiga versions of Microsoft BASIC.

I've included versions of GET And PUT for both BASIC and machine language programmers.

Using The Program

Atari BASIC users should type in Program 1. The program contains a machine language program in the form of DATA statements, so be sure to use the "Atari Proofreader," found elsewhere in this issue, when you enter the program. Save a copy of Program 1 to tape or disk before attempting to run it. As it is listed, the program does nothing when it is run—it is simply a skeleton around which you can build your own programs. Programs 2-5 are demo programs to help you get started. To use them, load Program 1. Then, add the lines from one of the four demo programs. When you finish, save a copy of the complete program and then type RUN. The best way to learn how to use the new routines is by studying and modifying these demos.

Demo 1 (Program 2) uses PLOT and DRAWTO to draw a large box. When the box appears, use a joystick to move it around the screen. Demo 2 (Program 3) draws a face. Hold down the joystick trig-

ger to animate it. Demo 3 (Program 4) shows how you can use GET And PUT to make windows on the text screen. Demo 4 (Program 5) demonstrates the collision register, described below. Program 5 includes a number of special graphics characters. Be sure to refer to the "Guide to Typing In Programs" article elsewhere in this issue for information on typing these characters. In particular, there are two inverse-video spaces between the CTRL-G and CTRL-F in line 33.

Calling GET And PUT

Since the new commands are written in machine language, they're accessed with BASIC's USR function. The syntax for GET is

```
D=USR(ADR(GP$)+GET,X,Y,WIDTH  
,LENGTH,BYTES PER  
ROW,ADR(IMAGES))
```

The syntax for PUT is

```
D=USR(ADR(GP$)+PUT,X,Y,WIDTH  
,LENGTH,BYTES PER  
ROW,ADR(IMAGES),CMD)
```

These commands are lengthy, so let's step through them parameter by parameter.

ADR(GP\$)+GET Or ADR(GP\$)+PUT

BASIC's ADR function is used to find the address of the string that holds the machine language GET/PUT routines. Note: Since both routines have the same starting address, the +GET and +PUT are

not strictly necessary (both are initialized to 0 at the start of the program). However, it makes it much easier to debug your programs if you can tell at a glance which statements do a PUT and which do a GET.

X

This is the horizontal byte offset from the left side of the screen for the object you wish to GET or PUT. For text mode, this works out to be the number of characters from the left side of the screen. For GTIA graphics modes (9-11), divide the number of pixels by 2 to find X. For four-color graphics modes (3, 5, and 7), divide by 4. For two-color modes (4, 6, and 8), divide by 8.

Since you can only GET and PUT to byte locations, horizontal movement may be a little choppy in certain graphics modes. For example, in mode 7, you must divide by 4 to find X. If you GET an image in mode 7, you can put it down only at every fourth pixel. Anything that moves across the screen will jump four pixels at a time. There are a few solutions to this problem. First, you may decide that the motion is acceptable for your application. Second, you may use vertical motion instead (vertical motion can always be done pixel by pixel). Finally, you can use PLOT and DRAW to redraw your shape four times, horizontally offset by a pixel each time. Each time you draw your picture, use GET to store it in a different variable. Now you can achieve smooth horizontal movement by PUTting all four images into the same place, then going to the next X location repeating the process. The four PUTs each move the entire image one pixel; then you reset to the first picture and move by one byte. This process is known as *preshifting*. It is commonly used on computers such as the Apple II and the Atari ST to achieve smooth animation.

Y

This is the vertical starting point for the image that you wish to PUT or GET.

WIDTH

This is the width in bytes of the image you wish to GET or PUT. In

two-color modes, every eight pixels make up one byte. In four-color modes, four pixels make up a byte. In GTIA modes, two pixels make up a byte. Be sure that you use a large enough number to get your entire picture.

LENGTH

This is the number of pixels of your image height.

BYTES PER ROW

This is the number of bytes per row in the graphics mode that you're using. Here's a list of the most popular graphics modes and the proper value for this variable:

Graphics Mode	Bytes Per Row
0	40
1	20
2	20
3	10
4	10
5	20
6	20
7-11	40
12	40
13	40
14	20
15	40

Note that graphics modes 12-15 are available only on XL and XE models.

ADR(IMAGES)

Strings are the best way to hold image data. Be sure to dimension your string to the proper size and clear it out before using it. (For a fast way to clear out a string, see line 20 in Program 2.) The size of the string should be WIDTH * LENGTH.

CMD

CMD (for CoMmanD) is used only for PUT operations. When CMD is set to 0, the image you are placing on the screen overwrites everything that was on the screen in that area. When CMD is set to 1, an overlay is done instead—background objects show through any holes in your picture.

Finally, the value returned by the GET/PUT function (assigned to the variable D in the example line above) is a way to test for collisions. When you perform a GET, this value will be 1 if the area you grabbed contained a picture, 0 if this area was blank. If you are performing a PUT operation, this value will be 1

if there was a picture in the area *before* the PUT took place.

Assembly Language GET And PUT

Machine language programmers can also take advantage of GET and PUT. Use Program 6 as a skeleton for your own programs. To use the routine, just store the values in the proper variables and execute a JSR GET or JSR PUT. The following table shows how the assembly language variables compare to the BASIC ones.

Assembly Language	BASIC
XLSB, XMSB	X
YLSB, YMSB	Y
WIDTH	WIDTH
LENGTH	LENGTH
BYTESLSB, BYTESMSB	BYTES PER ROW
IMAGELS, IMAGEMS	ADR(IMAGES)
CMD	CMD

Many of the variables are broken up into LSB (Least Significant Byte) and MSB (Most Significant Byte) in assembly language. See your assembler's manual for ways to break up a number into high-byte/low-byte form.

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

Program 1: GET And PUT

```

0P 1000 REM D=USR(ADR(GP$):
GET,X,Y,WIDTH,LENGTH
,BYTES PER ROW,ADR(I
MAGES$))
AJ 1010 REM D=USR(ADR(GP$):
PUT,X,Y,WIDTH,LENGTH
,BYTES PER ROW,ADR(I
MAGES$),CMD)
66 1015 REM COPYRIGHT 1987 C
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EE 1020 DIM GP$(244):FOR I=1
TO 244:READ CODE:GP
$(I,I)=CHR$(CODE):NE
XT I:LET GET=0:LET P
UT=0:RETURN
FE 1021 DATA 104,56,233,6,13
3,227,104,133,215,10
4,133,214,104,133,21
7,104
NN 1022 DATA 133,216,104,104
,133,218,104,104,133
,219,104,133,221,104
,133,220
BB 1023 DATA 104,133,223,104
,133,222,165,227,201
,0,240,4,104,104,133
,224
AI 1024 DATA 169,0,133,212,1
33,213,165,88,24,101
,214,133,225,165,89,
101
CJ 1025 DATA 215,133,226,162
,0,228,216,240,32,16
5,225,24,101,220,133
,225

```

```

BH 1026 DATA 165,226,101,221
      ,133,226,165,216,56,
      233,1,133,216,165,21
      7,233
PL 1027 DATA 0,133,217,169,0
      ,201,0,240,220,228,2
      17,240,6,169,0,201
DG 1028 DATA 0,240,214,162,1
      ,160,0,196,218,240,8
      1,165,227,201,1,208
JE 1029 DATA 55,165,224,201,
      1,208,22,177,222,201
      ,0,240,10,177,225,20
      1
CA 1030 DATA 0,240,4,169,1,1
      33,212,177,222,201,0
      ,240,20,165,224,201
CN 1031 DATA 1,240,10,177,22
      5,201,0,240,4,169,1,
      133,212,177,222,145
PL 1032 DATA 225,200,169,0,2
      01,0,240,191,177,225
      ,201,0,240,6,169,1
AF 1033 DATA 133,212,177,225
      ,145,222,169,0,201,0
      ,240,229,228,219,240
      ,35
PC 1034 DATA 160,0,165,222,2
      4,101,218,133,222,16
      5,223,105,0,133,223,
      165
FE 1035 DATA 225,24,101,220,
      133,225,165,226,101,
      221,133,226,232,169,
      0,201
DI 1036 DATA 0,240,191,96

```

Program 2: Demo 1

```

OC 5 REM COPYRIGHT 1987 COMP
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GF 8 PRINT "(CLEAR)COPYRIGHT
  1987":PRINT "COMPUTE!
  PUBLICATIONS, INC.":PRI
  NT "ALL RIGHTS RESERVED
  ."
BO 10 GOSUB 1000:GOSUB 2000
LD 20 DIM A$(20*48):A$=CHR$(
  0):A$(20*48)=CHR$(0):A
  $(2)=A$
GI 30 GRAPHICS 7+16:SETCOLOR
  0,3,0:SETCOLOR 1,0,15
  :SETCOLOR 2,8,0
HF 40 COLOR 1:PLOT 0,0:DRAW
  0 79,0:DRAWTO 79,47:DR
  AWTO 0,47:DRAWTO 0,0:C
  OLOR 2:DRAWTO 79,47:PL
  OT 79,0:DRAWTO 0,47
LA 45 COLOR 3:PLOT 0,23:DRAW
  TO 79,23:PLOT 39,0:DRA
  WTO 39,47
EG 50 D=USR(ADR(GP$)+GET,0,0
  ,20,48,40,ADR(A$)):G
  OTO 80
CL 60 X=0:Y=0
PK 80 S=STICK(0):X=X+DX(S):Y
  =Y+DY(S)*2:X=X+(X<0)-(
  X>20):Y=Y+2*(Y<0)-2*(Y
  >48)
OP 85 D=USR(ADR(GP$)+PUT,X,Y
  ,20,48,40,ADR(A$)):G
  OTO 80
GF 2000 DIM DX(15),DY(15):FO
  R I=1 TO 15:READ COD
  E:DX(I)=CODE:NEXT I:
  RETURN
IA 2010 FOR I=1 TO 15:READ C
  ODE:DY(I)=CODE:NEXT
  I:RETURN
KD 2020 DATA 0,0,0,0,1,1,1,0
  ,-1,-1,-1,0,0,0,0
KE 2030 DATA 0,0,0,0,1,-1,0,
  0,1,-1,0,0,1,-1,0

```

Program 3: Demo 2

```

OC 5 REM COPYRIGHT 1987 COMP
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GF 8 PRINT "(CLEAR)COPYRIGHT
  1987":PRINT "COMPUTE!
  PUBLICATIONS, INC.":PRI
  NT "ALL RIGHTS RESERVED
  ."
FK 10 DIM A$(3*10*40):A$=CHR
  $(0):A$(3*10*40)=CHR$(
  0):A$(2)=A$
HB 20 GOSUB 1000:I=0:GOTO 65
GO 30 GRAPHICS 7:SETCOLOR 2,
  8,0:COLOR 3
EG 40 PLOT 9,9:PLOT 0,0:DRAW
  TO 39,0:DRAWTO 39,P*5+
  1:DRAWTO 19,P*5+1:DRAW
  TO 19,40-P*5:DRAWTO 39
  ,40-P*5:DRAWTO 39,39
JF 50 DRAWTO 0,39:DRAWTO 0,0
HK 60 D=USR(ADR(GP$)+GET,0,0
  ,10,40,40,ADR(A$)+(I-1
  )*10*40)
JG 65 I=I+1
HB 70 IF I=1 THEN P=2:GOTO 3
  0
HE 71 IF I=2 THEN P=3:GOTO 3
  0
HH 72 IF I=3 THEN P=4:GOTO 3
  0
BL 80 GRAPHICS 7:SETCOLOR 2,
  8,0:X=14:Y=19:I=1:DI=1
ED 90 D=USR(ADR(GP$)+PUT,X,Y
  ,10,40,40,ADR(A$)+(I-1
  )*10*40,0)
JE 100 IF STRIG(0)<>0 THEN 1
  00
BJ 110 I=I+DI
PD 120 IF DI=1 THEN IF I=3 T
  HEN DI=-1:GOTO 140
OK 130 IF DI=-1 THEN IF I=1
  THEN DI=1
FH 140 FOR DE=1 TO 30:NEXT D
  E:GOTO 90

```

Program 4: Demo 3

```

KB 0 GOTO 8
GG 1 IF PEEK(764)<>255 THEN
  POKE 764,255:FLAG=1:GOT
  O 30:RETURN
BC 2 RETURN
OC 5 REM COPYRIGHT 1987 COMP
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GF 8 PRINT "(CLEAR)COPYRIGHT
  1987":PRINT "COMPUTE!
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  ."
DP 10 DIM A$(20*12*5)
GE 20 GOSUB 1000:FLAG=0
OE 30 GRAPHICS 0
FJ 35 POKE 82,2:POKE 752,0:?
  :? "ENTER DELAY (1-50
  0)":INPUT N:IF N>500
  OR N<1 THEN 35
CG 37 ? CHR$(125):POKE 752,1
  :POKE 82,0
ED 38 IF FLAG=1 THEN 110
HP 40 POSITION 0,0:? "(Q)
  {18 R}{E}":FOR I=1 TO
  10:? "{18 SPACES}!":NE
  XT I
LG 50 POSITION 0,11:? "(Z)
  {18 R}{C}"
NC 55 POSITION 1,7:? "Just
  an example":POSITION 1
  ,8:? " of how it's don
  e"
OI 60 FOR I=0 TO 4:POSITION
  1,5:? " THIS IS WINDOW
  #";I+1:D=USR(ADR(GP$)
  +GET,0,0,20,12,40,ADR(
  A$)+I*20*12):NEXT I
PH 110 FOR I=0 TO 4:D=USR(AD
  R(GP$)+PUT,I*4.98,I*2
  .98,20,12,40,ADR(A$)+
  I*20*12,0):FOR DE=1 T
  O N:GOSUB 1:NEXT DE:N
  EXT I

```

Program 6: Assembly Language Skeleton

```

10 ;Copyright 1987, COMPUTE! Publications, Inc. All rights reserved.
1000 XLSB = 214
1010 XMSB = 215
1020 YLSB = 216
1030 YMSB = 217
1040 WIDTH = 218
1050 LENGTH = 219
1060 BYTESLSB = 220
1070 BYTESMSB = 221
1080 IMAGELS = 222
1090 IMAGEMS = 223
1100 CMD = 224
1110 * = $FFFF ;Place your program's beginning assembling address here
1120 JMP BEGIN
1130 GET LDA #0
1140 JMP GP
1150 PUT LDA #1
1160 GP STA 227
1170 .BYTE 169,0,133,212,133,213,1
1180 .BYTE 214,133,225,165,89,101,215,133,226,162
1190 .BYTE 0,228,216,240,32,165,225,24,101,220
1200 .BYTE 133,225,165,226,101,221,133,226,165,216
1210 .BYTE 56,233,1,133,216,165,217,233,0,133
1220 .BYTE 217,169,0,201,0,240,220,228,217,240
1230 .BYTE 6,169,0,201,0,240,214,162,1,160
1240 .BYTE 0,196,218,240,81,165,227,201,1,208
1250 .BYTE 55,165,224,201,1,208,22,177,222,201
1260 .BYTE 0,240,10,177,225,201,0,240,4,169
1270 .BYTE 1,133,212,177,222,201,0,240,20,165
1280 .BYTE 224,201,1,240,10,177,225,201,0,240
1290 .BYTE 4,169,1,133,212,177,222,145,225,200
1300 .BYTE 169,0,201,0,240,191,177,225,201,0
1310 .BYTE 240,6,169,1,133,212,177,225,145,222
1320 .BYTE 169,0,201,0,240,229,228,219,240,35
1330 .BYTE 160,0,165,222,24,101,218,133,222,165
1340 .BYTE 223,105,0,133,223,165,225,24,101,220
1350 .BYTE 133,225,165,226,101,221,133,226,232,169
1360 .BYTE 0,201,0,240,191,96
1370 ; Begin your assembly language program at line 1400
1380 ; To use the routine, just store your values into the appropriate variables
  and do a 'JSR GET' or 'JSR PUT'
1390 BEGIN

```

```

MK 120 FOR I=0 TO 4:D=USR(ADR
R(GP$)+PUT,20-I*4.98,
I*2.98,20,12,40,ADR(A
$)+I*20*12,0):FOR DE=
1 TO N:GOSUB 1:NEXT D
E
CF 125 NEXT I:GOTO 110

```

Program 5: Demo 4

```

OC 5 REM COPYRIGHT 1987 COMP
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GF 8 PRINT "(CLEAR)COPYRIGHT
1987":PRINT "COMPUTE!
PUBLICATIONS, INC.":PRI
NT "ALL RIGHTS RESERVED
"
BO 10 GOSUB 1000:GOSUB 2000
JL 20 DIM A$(4*3),B$(4*3):A$
=CHR$(0):A$(4*3)=CHR$(
0):A$(2)=A$:B$=A$
HH 30 GRAPHICS 0:POKE 82,0:P
OKE 752,1
DI 31 POSITION 0,0:?" (Q)
(E) "
BH 32 POSITION 0,1:?" II "
HD 33 POSITION 0,2:?" (G)
(F) "
OB 34 D=USR(ADR(GP$)+GET,0,0
,4,3,40,ADR(A$))
JB 35 ? CHR$(125)
NC 40 POSITION 0,0:?" (Q)
{37 R}{E} "
FN 50 FOR I=1 TO 22:POSITION
0,I:?" I":POSITION 39
,I:?" I":NEXT I
EL 60 POSITION 0,23:?" (Z)
{37 R}{C} "
JE 70 FOR I=0 TO 40:POSITION
INT(RND(0)*37)+1,INT(
RND(0)*21)+1:?" (T)":N
EXT I
OJ 80 X=17:Y=9:D=USR(ADR(GP$
)+PUT,X,Y,4,3,40,ADR(A
$),1)
EP 90 S=STICK(0):IF S=15 THE
N 90
PP 100 D=USR(ADR(GP$)+PUT,X,
Y,4,3,40,ADR(B$),0):X
=X+DX(S):Y=Y+DY(S):D=
USR(ADR(GP$)+GET,X,Y,
4,3,40,ADR(B$))
OF 110 D=USR(ADR(GP$)+PUT,X,
Y,4,3,40,ADR(A$),1):I
F D=0 THEN 90
AF 120 D=USR(ADR(GP$)+PUT,X,
Y,4,3,40,ADR(B$),0):X
=X-DX(S):Y=Y-DY(S):D=
USR(ADR(GP$)+GET,X,Y,
4,3,40,ADR(B$))
LB 130 D=USR(ADR(GP$)+PUT,X,
Y,4,3,40,ADR(A$),1):G
OTO 90
EL 2000 DIM DX(15),DY(15):FO
R I=1 TO 15:READ COD
E:DX(I)=CODE:NEXT I
IA 2010 FOR I=1 TO 15:READ C
ODE:DY(I)=CODE:NEXT
I:RETURN
KD 2020 DATA 0,0,0,0,1,1,1,0
,-1,-1,-1,0,0,0,0
KE 2030 DATA 0,0,0,0,1,-1,0,
0,1,-1,0,0,1,-1,0

```

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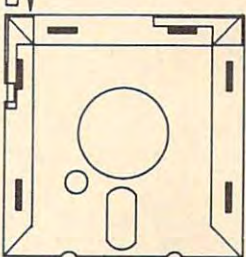
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Apple Kaleidoscope

Danny Faught

Turn your computer into an electronic kaleidoscope with these four programs. Each short program illustrates the techniques behind creating mesmerizing computer graphics, and a helpful tutorial discussion is included. Even if you don't own an Apple, the concepts and sample programs presented here can be used on almost any computer.

Kaleidoscope programs are not only entertaining to watch, but they provide excellent examples of how to generate computer graphics. Here, we offer four different kaleidoscope programs for the Apple that produce interesting high-resolution (hi-res) graphics. We'll discuss how each design is created and how the programs may be modified to run on other computers.

Four-Image Reflections

The first two examples divide the screen into four sections, creating a three-mirror kaleidoscope pattern.

The first example is fairly simple. This program chooses a random point in the upper left quarter of the screen and plots it. Now, to create the kaleidoscope effect, the point is mirrored onto the other three quarters of the screen. Mirroring graphics is the key to producing kaleidoscope images.

```
10 REM PROGRAM 1:KALEIDOSCOPE W
  ITH DOTS IN 4 DIVISIONS
20 HR = 279:VR = 191: HGR2
30 HCOLOR= RND (1) * 8
```

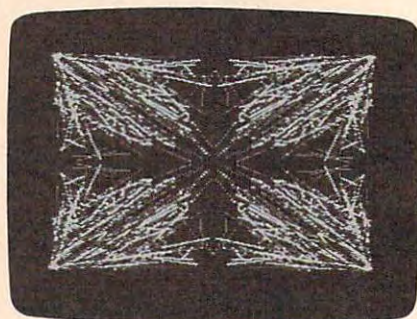
```
40 X = RND (1) * HR / 2:Y = RND
  (1) * VR / 2
60 HPLLOT X,Y: HPLLOT HR - X,VR -
  Y
70 HPLLOT HR - X,Y: HPLLOT X,VR -
  Y
100 GOTO 30
```

Note lines 60 and 70. These two lines do the actual plotting. See how the variables HR and VR are used as offsets for plotting mirrored points. The variables HR and VR contain the maximum horizontal and vertical coordinates available on the Apple's hi-res screen. By using these two values for offsetting point coordinates, the program generates symmetrical displays.

The second example offers a slight variation on the first: Instead of plotting random points, this program draws random lines. Lines are specified by their beginning and end points. So, instead of picking just one random point, this program picks two points and draws a line between them.

```
10 REM PROGRAM 2:KALEIDOSCOPE W
  ITH LINES IN 4 DIVISIONS
20 HR = 279:VR = 191: HGR2
30 HCOLOR= RND (1) * 8
40 X1 = RND (1) * HR / 2:Y1 = R
  ND (1) * VR / 2
50 X2 = RND (1) * HR / 2:Y2 = R
  ND (1) * VR / 2
60 HPLLOT X1,Y1 TO X2,Y2: HPLLOT
  HR - X1,VR - Y1 TO HR - X2,V
  R - Y2
70 HPLLOT HR - X1,Y1 TO HR - X2,
  Y2: HPLLOT X1,VR - Y1 TO X2,V
  R - Y2
100 GOTO 30
```

To draw the actual lines, this program uses Apple's TO option.



Four-way symmetry creates beautiful, colorful patterns in "Apple Kaleidoscope."

When used in conjunction with HPLLOT, the TO statement informs the computer to draw a line from one point to another. See lines 60 and 70 for an example.

Eight Images

If you think four-image patterns were impressive, try eight-image designs. By diagonally splicing each rectangular section of the four-image display, we create eight separate triangles. This doubles the number of quadrants for a spectacular display.

Add the following lines to the first example for an eight-image kaleidoscope program with dots:

```
10 REM PROGRAM 3:KALEIDOSCOPE W
  ITH DOTS IN 8 DIVISIONS
25 XY = VR / HR:YX = HR / VR
40 Y = RND (1) * VR / 2:X = RND
  (1) * Y * YX
80 HPLLOT Y * YX,X * XY: HPLLOT H
  R - Y * YX,VR - X * XY
90 HPLLOT HR - Y * YX,X * XY: HP
  LOT Y * YX,VR - X * XY
```

As with the first program, points are mirrored to the original four quadrants. Next, lines 80 and 90 mirror points to the remaining four triangles by switching the horizontal and vertical coordinates and then scaling them.

The same mirroring of points can be applied to the line-drawing example. For an eight-quadrant line kaleidoscope, add the following lines to the second example, replacing the original program lines where necessary:

```
10 REM PROGRAM 4:KALEIDOSCOPE W
ITH LINES IN 8 DIVISIONS
25 XY = VR / HR:YX = HR / VR
40 Y1 = RND (1) * VR / 2:X1 = R
ND (1) * Y1 * YX
50 Y2 = RND (1) * VR / 2:X2 = R
ND (1) * Y2 * YX
80 H PLOT Y1 * YX,X1 * XY TO Y2
* YX,X2 * XY
85 H PLOT HR - Y1 * YX,VR - X1 *
XY TO HR - Y2 * YX,VR - X2
* XY
90 H PLOT HR - Y1 * YX,X1 * XY T
O HR - Y2 * YX,X2 * XY
95 H PLOT Y1 * YX,VR - X1 * XY T
O Y2 * YX,VR - X2 * XY
```

The best way to learn how each of these kaleidoscope algorithms work is to experiment with them. There's no telling what you may come up with. For example, try merging the first and fourth examples above, or the second and third.

Use On Other Computers

The programs listed in this article can be easily converted to work on other computers with hi-res point-plotting and line-drawing commands.

To begin translation, change line 20 to set the variables HR and VR equal to your computer's maximum horizontal and vertical resolution, respectively. Also, alter line 20 to enter hi-res mode and set up any color palettes necessary.

Line 30 randomly selects the current drawing color. If your computer specifies its colors from within the line or point commands, set a variable equal to the random-color number and use this variable in the plotting statements.

Lines 60-95 contain either point or line commands. Change these lines to match the syntax required by your computer. All other statements in the kaleidoscope programs are fairly generic and should run fine without modification. ©

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Mindscape has announced a special Holiday Stocking Software Classics promotion for its Thunder Mountain line. The promotion consists of five different packages of software, each containing three separate programs. There are three packages for the Commodore 64, and two for IBM PC and compatibles.

The first Commodore 64 package contains *Pac-Man*, *Rambo*, and *Scott Adams' Adventureland S.A.G.A. I*; the second package holds *Pole Position*, *Dig Dug*, and *Maxi Golf*; third in the Commodore 64 series is a package consisting of *Top Gun*, *Ms. Pac-Man*, and *Cyrus Chess*.

For IBM and compatibles owners, the first holiday package holds *Top Gun*, *Ms. Pac-Man*, and *Mind Dance, Volume I*; the second IBM package contains *Pac Man*, *Dig Dug*, and *Mind Dance, Volume 2*.

Suggested retail for the packages is \$24.95.

Mindscape, 3444 Dundee Rd., Northbrook, IL 60062

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Atari ST And Apple II Conquered By PBI

PBI Software has released an Atari ST and Apple II version of *Strategic Conquest*, a war strategy game. The game was previously available only on the Macintosh.

As Commander in Chief of an army, navy, and air force, players must explore and conquer an unknown world. The computer is the opponent and has the same objective. Each player begins with just one city in an unexplored world and must capture and take over a range of cities and continents, aided by an arsenal including armies, bombers, submarines, aircraft carriers, and battleships. Producing and commanding these pieces efficiently insures survival and expansion of the player's domain.

Playing time can vary from half an hour to over ten hours, depending on the players' skill and organization, and on the computer's level of aggressiveness, which the players can determine. There are over two billion possible

world scenarios available. Both versions utilize the Macintosh interface complete with mouse support, windows, and pull-down menus.

The program for the Atari ST has a suggested retail price of \$39.95 and requires 512K of memory. The Apple II version retails for \$49.95 and runs on the Apple IIe with 128k, IIc, or IIgs.

PBI Software, 1163 Triton Dr., Foster City, CA 94404

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The City, Updated For Atari ST

DataSoft's IntelliCreations has announced the availability of Version 3.0 of *Alternate Reality—The City* for the Atari ST. The update features graphics that were recently developed for other 16-bit computers. The interior scenes were designed on the EGA IBM and the three-dimensional exterior effects were first used on the Macintosh.

Game play is the same on Version 3.0, and characters created on Version 2.0 can be used in Version 3.0.

Owners of Version 2.0 for the Atari ST can obtain 3.0 upgrades by sending their 2.0 disks and a check or money order for \$10 to Intellicreations.

IntelliCreations, 19808 Nordhoff Pl., Chatsworth, CA 91311

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Educational Organizer

MindPlay has announced the release of an educational computer program designed as a planning tool for teachers and students. With *Pacesetter*, users can break assignments into individual steps, create a personal schedule, and then track their progress. The program, recommended for students grade 3 and up, includes 13 templates for homework and reports; ten types of progress reports, including bar graphs; monthly and annual calendar printouts; and a Certificate of Completion for printing. *Pacesetter* also includes "Challenge Upgrade" options for customizing the program.

Also available for use with the program is *Projects I*, which contains 14 ready-to-use assignments for practice with planning.

Pacesetter is available for the Apple II Series, including the IIgs, and retails for \$69.99. A backup disk is included and lab packs are available. Suggested retail for *Projects I* is \$24.99.

MindPlay, 82 Montvale Ave., Stoneham, MA 02180

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Scientific Puzzles

M-ss-ng L-nks: Science Disk is the latest in the series of language games released by Sunburst Communications. Designed for students from grades 5-9, the program teaches science through word puzzles. Scientific passages are presented with letters or words missing. The students are challenged to reconstruct the passages by filling in the blanks.

There are 63 passages covering nine scientific topics and their properties. The passages may be called up by topic or property. The program also features a change option that allows teachers to create their own formats.

M-ss-ng L-nks: Science Disk comes with a program disk, a backup, and a teacher's guide. The program is available for the Apple II family of computers and retails for \$65.

Sunburst Communications has also released updates for the Apple versions of three other *M-ss-ing L-nks* programs. Printer options, editor features, and two new puzzle formats have been added to *Classics Old and New*, *MicroEncyclopedia*, and *Young People's Literature*. Teachers can now enter their own formats to focus on particular areas of language. Free updates are available to customers through Sunburst.

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

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Four New Programs From PAR Software

PAR Software has announced the release of *Express Paint* for the Amiga. The program combines the features of desktop publishing and paint programs into one package. Users can create newsletters, images, posters, and business reports.

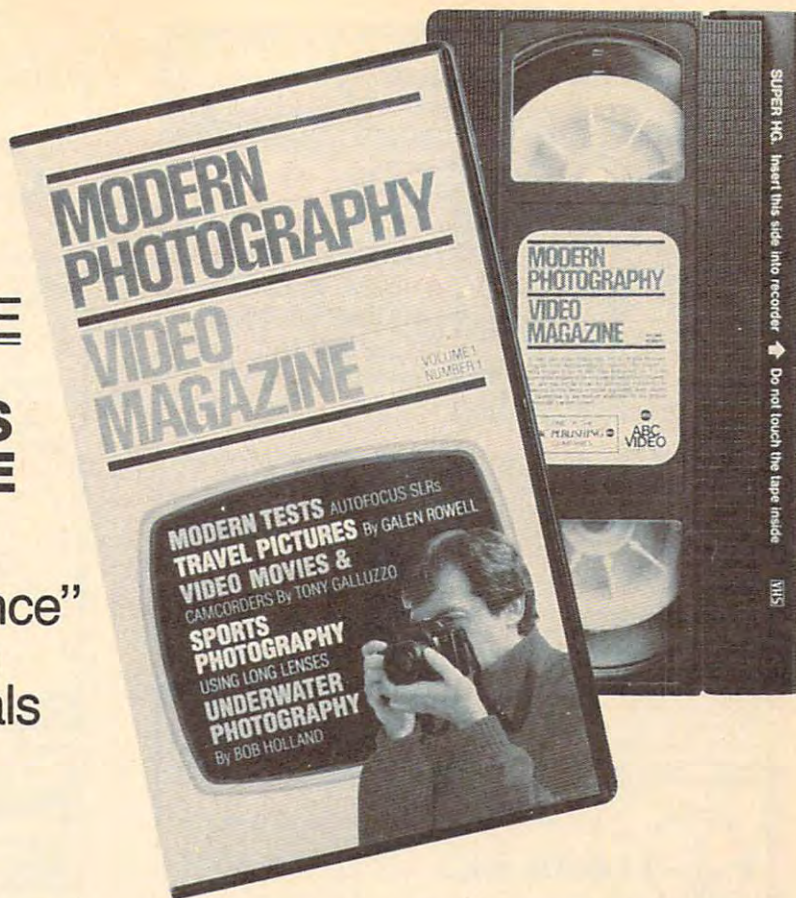
The program requires 512K and retails for \$79.95.

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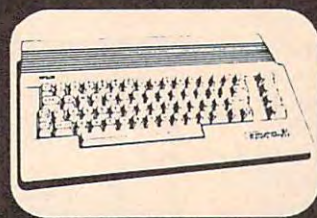
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Ea\$y Loan\$ has also been released for the Amiga from PAR Software. By using the interface capabilities of the Amiga, the program can aid users in loan and credit management for both private individuals and businesses. Features include customization of amortization schedules, view and print summary schedules, and a detailed printout of complete loan tables.

The program requires 256K and retails for \$39.95.

For PC compatibles, PAR Software has released *InQuest!*, which is an organizational database for managing information such as sales prospects, business contacts, employees, clients, customers, suppliers, and appointments. In addition to managing people-oriented information, the program can be used for other data management purposes as well.

The program is compatible with the IBM XT, AT, PC compatibles, WANG, NEC, DG portables and most other portable computers with at least 256K RAM and a hard disk, or two 1.2-meg floppy disks. Suggested retail is \$99.95.

PAR's first release for the Macintosh is *Ea\$y Check\$*, a desk accessory program that automates the process of checkbook management. Features include a built-in tracking program that automatically tracks tax-sensitive transactions. The user can also define and customize up to 30 different check formats for printing checks.

The program requires a minimum of 126K and retails for \$39.95.

PAR Software, P.O. Box 1089, Vancouver, WA 98666

Circle Reader Service Number 206.

Basic Math Blasts Off

Davidson & Associates has added *Math Blaster Plus* to its line of educational software. The program is designed for students in grades 1-6, and teaches basic math skills in addition, subtraction, multiplication, division, fractions, decimals, and percentages, through five learning activities. Over 750 basic math facts can be learned through both creative drill and practice, and problem-solving activities.

The program features Davidson's new student desktop interface with pull-down menus, double high-resolution graphics, and mouse or keyboard access. Features also include a test maker which allows users to choose and sort random problems from all the files on the disk to make up a review-type test. A record-keeping option that monitors students' progress and awards outstanding scores is also included.

The program is available for the

Apple IIGS, IIC, and IIE with extended 80-column card, and IBM PC with a minimum of 256K. Suggested retail price is \$49.95.

Davidson & Associates, 3135 Kashiwa St., Torrance, CA 90505
Circle Reader Service Number 207.

Tailless Mouse

Torrington has released the *Manager Mouse Cordless*, which operates up to 10 hours on a single charge. The infrared mouse works within four feet of its receiver, which mounts on any IBM PC or compatible.

Features include a two-wheel tracking design and Torrington's patented suspension system.

Suggested retail price is \$229.

The Torrington Company, 59 Field St., Torrington, CT 06790

Circle Reader Service Number 208.

Home Project Tool

Britannica Software has announced the release of *W.O.R.K. At Home*, which stands for write, organize, report, and "kalkulate." This program is the first software package released in the new Britannica DesignWare Plus product line, which is designed to provide users with tools for simplifying everyday home projects, such as preparing school reports, keeping track of expenses, maintaining an address book, and so on.

The *W.O.R.K. At Home* package includes a tutorial disk which takes users step by step through commands and keystrokes needed to use these integrated programs. Also included are two user booklets, a user's guide, and the *W.O.R.K. Book*, with illustrations and many application examples. The program contains help screens, pull-down menus, and prompt lines.

The program is available for Apple, MS/DOS formats, and the Commodore 64. Suggested retail price is \$59.95.

Britannica Software, 185 Berry St., San Francisco, CA 94107

Circle Reader Service Number 209.

Hi Tech Now Publishes Sesame Street

Hi Tech Expressions has acquired the publishing rights for a line of Sesame Street software developed by Children's Television Workshop. The first six preschool titles are now available, and each package includes a free Sesame Street poster.

The programs are designed to allow children to experiment, solve problems, and practice skills while having fun.

Astro-Grover is a numbers game using counting, adding, and subtracting skills. The game is available for the Commodore 64, Atari XL/XE, Apple II, and IBM and compatibles. *Ernie's Magic Shapes*, a shape and color matching game, and *Big Bird's Special Delivery*, a matching game using object recognition, are both available for the Commodore 64, Atari XL/XE, and IBM and compatibles.

Three animated programs—*Pals Around Town*, a get-to-know the neighborhood activity; *Ernie's Big Splash*, a maze builder using planning, predicting, and problem-solving skills; and *Grover's Animal Adventures*, a visit to different animal environments—are all available for the Commodore 64, and IBM and compatibles.

All six programs carry a suggested retail price of \$9.95 each.

Hi Tech Expressions, 1700 N.W. 65th Ave., Suite 9, Plantation, FL 33313

Circle Reader Service Number 210.

Star Soft's New Programs

Star Soft International is introducing new computer software games created by Red Rat, Martec-Software, and Cascade Games, all of England; Andromeda of both the United States and Hungary; and Starsoft Development Laboratories of the U.S. These games are compatible with Atari, Atari ST, Commodore 64, and IBM, and have never been released in the United States or Canada.

Suggested retail prices of triple packs start at \$6.99.

Star Soft is also introducing *The Pirates Of The Barbary Coast*, which will be available in four languages on the international market. The game is available for the Commodore 64, Atari, and Atari ST, and will soon be available for IBM.

Suggested retail price is \$17.99.

Star Soft International, 50 Charles Lindbergh Blvd., Suite 400, Uniondale, NY 11553

Circle Reader Service Number 211.

Three New Math Programs

True BASIC has released three new programs in the Kemeny/Kurtz Math Series: *Arithmetic*, *Algebra I*, and *MacFunction*. The three programs are designed for use either as course supplements or for self-study and review of mathematical concepts. Each offers online help and a menu-driven interface which allows users to experiment with their own examples.

MacFunction allows students to examine graphs of three-dimensional functions, and lets them adjust eye lev-

el, show or remove hidden surfaces, plot partial derivatives, and show two-dimensional contour plots. The program requires a 512K Macintosh.

A general purpose calculator for evaluating numeric expressions, and routines for calculating distances on a number line are included with *Arithmetic*. The program includes routines for computations with fractions, percentages, and square roots. Users can also learn how to convert to and from scientific notation and the metric system.

Algebra I includes topics in beginning and intermediate algebra, and basic arithmetic concepts. Students can evaluate, plot, and simplify algebraic expressions; work with fractions, numeric expressions, radicals, and geometric measurement; and learn systems of quadratic and nonquadratic equations. The program also includes an illustration of finding roots.

Algebra I and *Arithmetic* are available for an IBM PC or compatible, Macintosh, Amiga, or Atari ST. Each of the three programs retails for \$49.95.

True BASIC, 39 S. Main St., Hanover, NH 03755

Circle Reader Service Number 212.

New Amiga Programs From Oxxi

Oxxi has developed a new *Modula-2* software construction set called *Benchmark* for Amiga Computers. The program integrates the editor, compiler, and linker.

The editor is based on an EMACS editor developed at the MIT Artificial Intelligence Laboratory and contains over 125 commands for dealing with multiple files, windows, and buffers. The compiler implements the entire *Modula-2* language and can be activated by pressing a key while in the editor. Compilation of densely packed programs takes place at an average speed of 10,000 lines per minute with speeds of up to 30,000 lines per minute possible. The editor automatically positions itself at the sight of any errors and displays an error message. Once the program has been completed, the linker is activated by pressing a single key while in the editor. The program is linked into a stand-alone executable file.

Suggested retail price is \$199.

The following add-on products are available for *Benchmark Modula 2* at a suggested retail price of \$99 each. *C Language Standard Library* implements many of the functions available in the C language standard library. *Simplified Amiga Libraries* is designed to help beginners access the complicated Amiga Libraries, and help more advanced programmers work more efficiently. *IFF*

Libraries, *Graphic Resource Management* is a set of libraries dealing with Interchange File Format files and the full documentation of the IFF format. It allows bitmapped images to be integrated into *Modula-2* programs as a resource.

Nimbus from Oxxi is a cash management accounting system for small businesses. The program allows access to the general ledger, accounts payable, and accounts receivable. When data is entered into either accounts payable or accounts receivable, the program automatically updates the general ledger. Customers and vendors are tracked by name rather than a number.

The program is written in C and allows over 450K of company data to be entered onto a single disk.

Suggested retail price is \$149.

Oxxi has also released two new versions of *MaxiPlan* for the new generation of Amiga computers. *MaxiPlan 500* is optimized for a 512K environment, while version 1.8 of *MaxiPlan Plus* includes new macros, faster recalculation speed, and a print spooler. Both versions offer X-Y (scatter), 3-D pie, 3-D bar, exploding pie, step, and hi-low chart styles. *MaxiPlan Plus* includes all the features of *MaxiPlan 500* along with a macro language facility similar to Microsoft *Excel*.

MaxiPlan 500 retails for \$149, while *MaxiPlan Plus* sells for \$199.

Oxxi, 1835-A Dawns Way, Fullerton, CA 92631

Circle Reader Service Number 213.

Two New Titles From Brøderbund

VideoWorks II is now available from Brøderbund Software. The program, published by a Brøderbund affiliate label, MacroMind, allows users to create slide shows and animated presentations for business, education, science, art, or entertainment, on either a Macintosh II, 512, Plus, or SE. One improvement over the original *VideoWorks* is a new overview window which helps users assemble shows with up to 24 images on the screen at once. Both art and animation can be moved with familiar Macintosh commands such as cut, copy, and paste.

The program comes with its own library of precreated movies and clip animation. Users can also take images from PICT, MacPaint, GLUE, or other sources and animate anything from a business presentation to a music video. Shows can include animation, wipes, fades, dissolves, timing options, sound effects, and music.

The program consists of three 3½-inch disks that include the program and tutorials, clip art, artwork and movies,

and a training disk. The suggested retail price is \$195.

Another MacroMind title, *MazeWars+*, is also available from Brøderbund, and is the first realtime, multi-player game for the AppleTalk network. Up to 30 people can play at once on a network, or 2 over a modem. The game can also be played against the computer. Suggested retail price is \$49.95.

Brøderbund Software, 17 Paul Dr., San Rafael, CA 94903-2101

Circle Reader Service Number 214.

Medieval Adventure For Eight-Bit Ataris

Artworx Software has released *Cycleknight* for the Atari line of eight-bit computers. The object of the program is to direct the armed Cycleknight to a medieval castle in search of the kidnapped Queen and her villagers. The player will meet up with the Blacknight and must barter with strange creatures by using the language simulator. One to four people can play the game, which features over 2000 castle chambers and five skill levels. Players can also construct their own castles.

Suggested retail price is \$19.95.

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

Circle Reader Service Number 215.

Four New Programs For Atari Eight-Bit

Clearstar Softechnologies has released four new titles for Atari eight-bit computers. An arcade game, *Time Bomb*, requires players to make their way to the top of a building where a time bomb is ticking away. On the way, players will encounter booby traps that will have to be overcome in order to reach the bomb in time. *Classy Chassy* is a pinball game that features the ability to add "English" to the ball. Each game retails for \$9.95.

The *Elite Personal Accountant* is a home accounting package. Eight menus guide the user through the program from setting up, to entering records, to producing the reports. All reports can be printed to the screen or to any printer. Suggested retail price is \$39.95.

Lightspeed C is a C compiler for the Atari that supports most standard C definition. It is designed to compile and link programs rapidly, diminishing the time needed to debug a program. The program requires a minimum of 48K and one disk drive. Suggested retail is \$39.95.

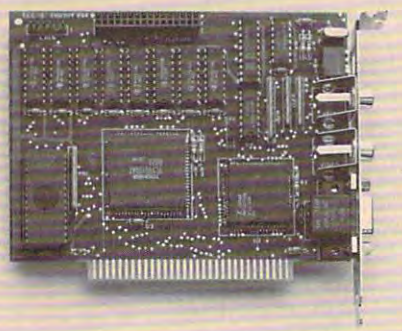
Clearstar Softechnologies, 1501 Wood Ave., #36, Sumner, WA 98390

Circle Reader Service Number 216.

Enhanced Graphics Adapter

BOCA Research has introduced the *EGA by BOCA*, a board that provides total emulation of the IBM Enhanced Graphics Adapter, Color Graphics Adapter, Monochrome Display Adapter, and Hercules Graphics Card. The board provides full compatibility with standard video modes, no matter which monitor is chosen.

EGA by BOCA displays 16 colors from a palette of 64 and features 640 x 350 resolution (EGA). With monochrome display, the resolution is 720 x 348 (HGC). The loadable character generator has capabilities of holding up to 512 displayable character codes.



The *EGA by BOCA* video board for the PC is compatible with the CGA, EGA, monochrome, and Hercules video boards.

The board operates with any current software packages that support the above-mentioned adapters. An IBM compatible feature adapter and two RCA external video jacks are provided for future expansion. The board also provides software that enables the selection of video output modes without opening the PC box. Diagnostics software and a light pen port are also included.

EGA by BOCA provides 256K of standard video memory and can be used for the IBM PC, XT, AT, and compatibles. Suggested retail price is \$199.

BOCA Research, 6401 Congress Ave., Boca Raton, FL 33487

Circle Reader Service Number 217.

Income Tax Help

HowardSoft's *Tax Preparer* software package has tax laws built in for incorporating more than the current year. The program includes revisions to the tax code that resulted from recent reforms. For 1988, the program automatically does calculations in accordance with the new tax laws. By typing in 1987 as the tax year, the program automatically adjusts the numbers to correspond to the 1987 tax laws. This forecasting ability applies not only to 1987, but for several years thereafter as

defined by the Tax Reform Act. The package can be used by individuals as well as professional tax preparers.

The program features onscreen guidance through the preparation process, unlimited record keeping to support any entry, automatic IRS-accepted printouts of more than 20 IRS forms and schedules, phone support, and a manual.

Available for the IBM and IBM compatibles, the program retails for \$295. The program is also available for the Apple II series for \$250.

HowardSoft, 1224 Prospect St., Suite 150, La Jolla, CA 92037

Circle Reader Service Number 218.

Quick File Reference

From Group L Corporation comes *Memory Lane*, which automatically tracks and indexes files whether created by *WordPerfect*, *dBase*, *1-2-3*, or any other program. To locate information, the user presses a "hot key" and types in the words or numbers to be located. The program then locates the information, and the user can cut and paste any part of the reference back into the active document or program.

The program requires 85K RAM and supports all versions of MS-DOS. For a limited time, the introductory price is \$99.

Group L Corporation, 481 Carlisle Dr., Herndon, VA 22070

Circle Reader Service Number 219.

IBM Compatibility For The Atari Eight-Bit

Happy Computers has released the *IBMXFR* program, which makes it possible for Atari eight-bit personal computer users to share files on floppy disk with an IBM PC or compatible. The program is included with version 7.10 *Warp Speed Software*.

Text files, data bases, and higher-level language programs may be shared, and the diskette file converter operates in both directions. IBM files may be converted to Atari format, and Atari files may be converted to IBM format. A built-in text conversion feature allows automatic bidirectional translation between ASCII used on the IBM, and ATASCII used on the Atari, allowing access to the same text files using a word processor on either computer.

The program operates with Atari 1050 disk drives that are equipped with Happy Computers' *1050 Enhancement*. The drive equipped with the enhancement is automatically reprogrammed to handle the different sector sizes and file structures. Both directions of the conversion process are performed using the

Atari. The IBM PC is not required to be present.

Atari owners that already have the enhancement hardware may obtain the newer version as an upgrade. Others will need the entire hardware/software package, which retails for a limited time at \$99.95.

Happy Computers, P.O. Box 1268, Morgan Hill, CA 95037

Circle Reader Service Number 220.

Romance On The High Seas

Users can determine their own fate in Infocom's interactive romance, *Plundered Hearts*. As the heroine, the user will find adventure aboard a ship sailing the Caribbean, in search of her ailing father. Author Amy Briggs created the characters and the setting, but the user must make the decisions that will control the main character's fate as she encounters pirates, crocodiles, and rough seas.

The package includes a letter from the heroine and a 50-guinea note from the Bank of St. Sinistra. Each package also includes a coupon for a discount on Infocom's *Cutthroats*, a deep sea adventure.

Plundered Hearts is available for the Atari XL/XE and Commodore 64/128 for a suggested retail price of \$34.95. The IBM PC series and MS-DOS compatibles, Apple II series, Macintosh, Atari ST, and Amiga versions are available for \$39.95.

Infocom, 125 CambridgePark Dr., Cambridge, MA 02140

Circle Reader Service Number 221.

New Pascal Development System For ST

Metacomco has released a new *Pascal 2* compiler and development system for the Atari ST, replacing the *MCC Pascal version 1.35*. The system was improved to provide an ISO standard compiler core, but with a range of extensions for programmers wishing to access all the features of the Atari ST's Motorola 68000 processor and GEM environment.

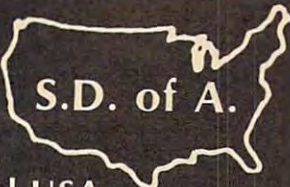
Features include new libraries, a new linking loader, a resource editor, a new screen editor, and a new make utility. The *Pascal 2* manual has also been rewritten to include full documentation examples and tutorial sections.

The system requires a minimum of a 520 ST with single disk drive. Suggested list price is \$99.95. Registered users may upgrade to the new version for \$62.

Metacomco, 26 Portland Square, Bristol BS2 8RZ, UK

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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 set of programs to check your typing—"The Automatic Proofreader."

Programs for the IBM and those in ST BASIC for 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 characters in curly braces; *do not type the braces*. For example, {CLEAR} or {CLR} instructs you to type the character 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 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.

For Commodore computers, 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, repeat the character the indicated number of times. For example, {5 RIGHT}, {6 S}, and [<8 Q>], mean, respectively, that you should enter five cursor rights, six shifted S's, and eight Commodore-Q's. On the Atari, inverse characters (white on black) should be entered with the inverse vid-

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	
			←	←	

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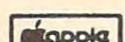
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eo key (Atari logo key on 400/800 models).

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 and Atari ST program listings in GFA BASIC contain only one special character, the left arrow (\leftarrow) symbol. This character marks the end of each program line. Wherever you see a left arrow, press RETURN to enter that line into memory. (For the Amiga, you can also enter the line simply by moving the cursor off the line.) 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 reenab le 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.

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.

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 reenab le 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.

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:RE
AD A:POKE I,A:CK=CK+A
: NEXT I
120 IF CK<>19072 THEN ? "
Error in DATA Stateme
nts. Check Typing.":
END
130 A=USR(1536)
140 ? :? "Automatic Proof
reader Now Activated.
"
150 END
160 DATA 104,160,0,185,26
,3,201,69,240,7
170 DATA 200,200,192,34,2
08,243,96,200,169,74
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 208,245,169,93,1
41,78,6,169,6,141
210 DATA 79,6,24,173,4,22
8,105,1,141,95
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 0,0,0,0,0,32,62,
246,8,201
260 DATA 155,240,13,201,3
2,240,7,72,24,101
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,
74,74,74,74,24,105
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: Commodore Proofreader

By Philip Nelson

```
10 VEC=PEEK(772)+256*PEEK(773)
:LO=43:HI=44
20 PRINT "AUTOMATIC PROOFREADE
R 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
```




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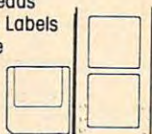
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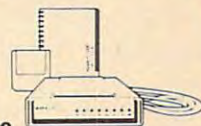


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```

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 3: IBM Proofreader

By Charles Brannon

```

10 'Automatic Proofreader Ver
sion 3.0 (Lines 205,206 ad
ded/190 deleted/470,490 ch
anged from V2.0)
100 DIM L$(500),LNUM(500):COL
OR 0,7,7:KEY OFF:CLS:MAX=
0:LNUM(0)=65536!
110 ON ERROR GOTO 120:KEY 15,
CHR$(4)+CHR$(70):ON KEY(1
5) GOSUB 640:KEY (15) ON:
GOTO 130
120 RESUME 130
130 DEF SEG=&H40:W=PEEK(&H4A)
140 ON ERROR GOTO 650:PRINT:P
RINT"Proofreader Ready."
150 LINE INPUT L$:Y=CSRLIN-IN
T(LEN(L$)/W)-1:LOCATE Y,1
160 DEF SEG=0:POKE 1050,30:PO
KE 1052,34:POKE 1054,0:PO
KE 1055,79:POKE 1056,13:P
OKE 1057,28:LINE INPUT L$
:DEF SEG:IF L$="" THEN 15
0
170 IF LEFT$(L$,1)=" " THEN L
$=MID$(L$,2):GOTO 170
180 IF VAL(LEFT$(L$,2))=0 AND
MID$(L$,3,1)=" " THEN L$
=MID$(L$,4)
200 IF ASC(L$)>57 THEN 260 'n
o line number, therefore
command

```

```

205 BL=INSTR(L$," "):IF BL=0
THEN BL=L$:GOTO 206 ELSE
BL$=LEFT$(L$,BL-1)
206 LNUM=VAL(BL$):TEXT$=MID$(
L$,LEN(STR$(LNUM))+1)
210 IF TEXT$="" THEN GOSUB 54
0:IF LNUM=LNUM(P) THEN GO
SUB 560:GOTO 150 ELSE 150
220 CKSUM=0:FOR I=1 TO LEN(L$
):CKSUM=(CKSUM+ASC(MID$(L
$,I)))*I AND 255:NEXT:LOC
ATE Y,1:PRINT CHR$(65+CKS
UM/16)+CHR$(65+(CKSUM AND
15))+" "+L$
230 GOSUB 540:IF LNUM(P)=LNUM
THEN L$(P)=TEXT$:GOTO 15
0 'replace line
240 GOSUB 580:GOTO 150 'inser
t the line
260 TEXT$="" :FOR I=1 TO LEN(L
$):A=ASC(MID$(L$,I)):TEXT
$=TEXT$+CHR$(A+32*(A>96 A
ND A<123)):NEXT
270 DELIMITER=INSTR(TEXT$," "
):COMMAND$=TEXT$:ARG$="":
IF DELIMITER THEN COMMAND
$=LEFT$(TEXT$,DELIMITER-1
):ARG$=MID$(TEXT$,DELIMIT
ER+1) ELSE DELIMITER=INST
R(TEXT$,CHR$(34)):IF DELI
MITER THEN COMMAND$=LEFT$(
TEXT$,DELIMITER-1):ARG$=
MID$(TEXT$,DELIMITER)
280 IF COMMAND$<>"LIST" THEN
410
290 OPEN "scrn:" FOR OUTPUT A
S #1
300 IF ARG$="" THEN FIRST=0:P
=MAX-1:GOTO 340
310 DELIMITER=INSTR(ARG$,"-")
:IF DELIMITER=0 THEN LNUM
=VAL(ARG$):GOSUB 540:FIRS
T=P:GOTO 340
320 FIRST=VAL(LEFT$(ARG$,DELI
MITER)):LAST=VAL(MID$(ARG
$,DELIMITER+1))
330 LNUM=FIRST:GOSUB 540:FIRS
T=P:LNUM=LAST:GOSUB 540:IF
P=0 THEN P=MAX-1
340 FOR X=FIRST TO P:N$=MID$(
STR$(LNUM(X)),2)+" "
350 IF CKFLAG=0 THEN A$="":GO
TO 370
360 CKSUM=0:A$=N$+L$(X):FOR I
=1 TO LEN(A$):CKSUM=(CKSU
M+ASC(MID$(A$,I)))*I AND
255:NEXT:A$=CHR$(65+CKSUM
/16)+CHR$(65+(CKSUM AND 1
5))+" "
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$="LLIST" THEN
OPEN "lpt1:" FOR OUTPUT A
S #1:GOTO 300
420 IF COMMAND$="CHECK" THEN
CKFLAG=1:GOTO 290
430 IF COMMAND$<>"SAVE" THEN
450
440 GOSUB 600:OPEN ARG$ FOR O
UTPUT AS #1:ARG$="":GOTO
300
450 IF COMMAND$<>"LOAD" THEN
490
460 GOSUB 600:OPEN ARG$ FOR I
NPUT AS #1:MAX=0:P=0
470 WHILE NOT EOF(1):LINE INP
UT #1,L$:BL=INSTR(L$," ")
:BL$=LEFT$(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$="NEW" THEN IN
PUT "Erase program - Are
you sure";L$:IF LEFT$(L$,
1)="y" OR LEFT$(L$,1)="Y"
THEN MAX=0:LNUM(0)=65536
!:GOTO 130:ELSE 130
500 IF COMMAND$="BASIC" THEN
COLOR 7,0,0:ON ERROR GOTO
0:CLS:END
510 IF COMMAND$<>"FILES" THEN
520
515 IF ARG$="" THEN ARG$="A:"
ELSE SEL=1:GOSUB 600
517 FILES ARG$:GOTO 130
520 PRINT"Syntax error":GOTO
130
540 P=0:WHILE LNUM>LNUM(P) AN
D P<MAX:P=P+1:WEND:RETURN
560 MAX=MAX-1:FOR X=P TO MAX:
LNUM(X)=LNUM(X+1):L$(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$:LNUM(P)=LNUM:RET
URN
600 IF LEFT$(ARG$,1)<>CHR$(34
) THEN 520 ELSE ARG$=MID$(
ARG$,2)
610 IF RIGHT$(ARG$,1)=CHR$(34
) THEN ARG$=LEFT$(ARG$,LE
N(ARG$)-1)
620 IF SEL=0 AND INSTR(ARG$,"
.")=0 THEN ARG$=ARG$+".BA
S"
630 SEL=0:RETURN
640 CLOSE #1:CKFLAG=0:PRINT"S
topped.":RETURN 150
650 PRINT "Error #";ERR:RESUM
E 150

```

Program 4: Apple Proofreader

By Tim Victor, Editorial Programmer

```

10 C = 0: FOR I = 768 TO 768
+ 68: READ A:C = C + A: PO
KE I,A: NEXT
20 IF C < > 7258 THEN PRINT "
ERROR IN PROOFREADER DATA
STATEMENTS": END
30 IF PEEK (190 * 256) < > 76
THEN POKE 56,0: POKE 57,3
: CALL 1002: GOTO 50
40 PRINT CHR$(4);"IN#A$300"
50 POKE 34,0: HOME : POKE 34,
1: VTAB 2: PRINT "PROOFREA
DER INSTALLED"
60 NEW
100 DATA 216,32,27,253,201,14
1
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

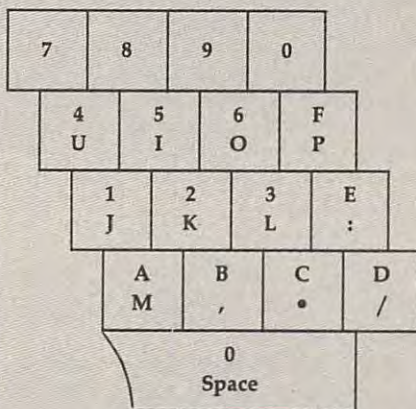
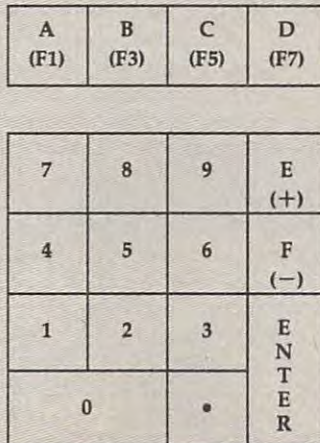


Figure 2: 128 MLX Keypad



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-RESTORE 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[4]";:GOSUB300:SA=A
D:GOSUB1040:IF F THEN18
0
GF 190 PRINT "{BLK}[2 SPACES]EN
DING ADDRESS[4]";:GOSUB
300:EA=AD:GOSUB1030:IF
{SPACE}F THEN190
KR 200 INPUT "{3 DOWN}{BLK}CLEA
R WORKSPACE [Y/N][4]";A
$:IF LEFT$(A$,1)<>"Y"TH
EN220
PG 210 PRINT "{2 DOWN}{BLU}WORK
ING...";:FORI=BS TO BS+
EA-SA+7:POKE I,0:NEXT:P
RINT"DONE"
DR 220 PRINTTAB(10)"[2 DOWN]
{BLK}{RVS} MLX COMMAND
{SPACE}MENU {DOWN}[4]":
PRINT T$"{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}[4]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$)-C4+
(A$>"0")*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
[4]";: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 POKEL98,0:GOSUB360:IF F
THEN PRINT IN$:PRINT"
{UP}[5 RIGHT]";
GC 450 FOR I=0 TO 24 STEP 3:B$
=S$:FOR J=1 TO 2:IF F T
HEN B$=MID$(IN$,I+J,1)
HA 460 PRINT "{RVS}"B$;:IF I<
24THEN PRINT "{OFF}";
HD 470 GET A$:IF A$=N$ THEN470
FK 480 IF (A$>"/"ANDAS<":)OR(A
$>"e"ANDAS<"G")THEN540
GS 485 A=- (A$="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$="
P")
CM 487 A=A-13*(A$=S$):IF A THE
N A$=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$;:GOTO540
GK 520 IF A$<>L$ AND A$<>D$ OR
((I=0)AND(J=1))THEN GOS
UB1060:GOTO470
HG 530 A$=L$+S$+L$:PRINT B$;:
J=2-J:IF J THEN PRINT
{SPACE}L$;: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$,I):GOSUB320:IF
I<25 THEN GOSUB380:A(I
/3)=A
PK 570 NEXT:IF A<>CK THEN GOSU
B1060:PRINT "{BLK}{RVS}
{SPACE}ERROR: REENTER L
INE [4]":F=1:GOTO440
HJ 580 GOSUB1080:B=BS+AD-SA:FO
R I=0 TO 7:POKE B+I,A(I
):NEXT
QQ 590 AD=AD+8:IF AD>EA THEN C
LOSE3:PRINT "{DOWN}{BLU}
** END OF ENTRY **{BLK}
[2 DOWN]":GOTO700
GQ 600 F=0:GOTO440
QA 610 PRINT "{CLR}{DOWN}{RVS}
{SPACE}DISPLAY DATA ":G
OSUB400:IF IN$=N$ THEN2
20
RJ 620 PRINT "{DOWN}{BLU}PRESS:
{RVS}SPACE{OFF} TO PAU
SE, {RVS}RETURN{OFF} TO
BREAK[4]{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 ONEGOTO630,660,630
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[4]";:IN$:IF IN$=N$
{SPACE}THEN220
PR 720 F=0:PRINT "{DOWN}{BLK}
{RVS}T{OFF}APE OR {RVS}
D{OFF}ISK: [4]";
FP 730 GET A$:IF A$="T"THEN PR
INT "T{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$(PEEK(BS+I));:IF ST T
HEN800
FC 790 NEXT:CLOSE1:CLOSE15:GOT
O940
GS 800 GOSUB1060:PRINT "{DOWN}
{BLK}ERROR DURING SAVE:
[4]":GOSUB860:GOTO220
MA 810 OPEN 1,8,8,IN$+"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 POKEL83,PEEK(FA+2):POKE
187,PEEK(FA+3):POKEL88,
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 POKEL47,0: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}[4]":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):POKEL93,AL:POKEL
94,AH
FF 1020 AH=INT(B/256):AL=B-(AH
*256):POKEL74,AL:POKEL
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:RETR
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$(8):COLOR 0,15:COLOR
4,15:COLOR 0,15
GQ 160 PRINT TAB(12){RED}
{RVS}{2 SPACES}{9 @}
{2 SPACES}RT$:TAB(12)"
{RVS}{2 SPACES}{OFF}
{BLU}128 MLX {RED}
{RVS}{2 SPACES}RT$:TAB
(12){RVS}{13 SPACES}
{BLU}"
FE 170 PRINT"{2 DOWN}
{3 SPACES}COMPUTE!'S MA
CHINE LANGUAGE EDITOR
{2 DOWN}"
DK 180 PRINT"{BLK}STARTING ADD
RESS[4]":GOSUB 260:IF
{SPACE}AD THEN SA=AD:EL
SE 180
FH 190 PRINT"{BLK}{2 SPACES}EN
DING ADDRESS[4]":GOSUB
260:IF AD THEN EA=AD:E
LSE 190
MF 200 PRINT"{DOWN}{BLK}CLEAR
{SPACE}WORKSPACE [Y/N]?
[4]":GETKEY A$:IF A$<>"
Y" THEN 220
QH 210 PRINT"{DOWN}{BLU}WORKIN
G...":BANK 0:FOR A=BS
{SPACE}TO BS+(EA-SA):7:
POKE A,0:NEXT A:PRINT"D
ONE"
DC 220 PRINT TAB(10){DOWN}
{BLK}{RVS} MLX COMMAND
{SPACE}MENU [4]{DOWN}":
PRINT TAB(13){RVS}E
{OFF}NTER DATA"RT$: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 A$:A=INSTR("EDLS
CQ",A$):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(A$=N
L$)THEN RETURN:ELSE 250
BG 260 A$=NL$:INPUT A$:IF LEN(
A$)=4 THEN AD=DEC(A$)
PP 270 IF AD=0 THEN BEGIN:IF A
$<>NL$ 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 A$=NL$ 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:B$
=SP$:FOR J=1 TO 2:IF F
{SPACE}THEN B$=MID$(L$,
I+J,1)
PS 380 PRINT"{RVS}"B$+LF$;:IF
{SPACE}I<24 THEN PRINT"
{OFF}";
RC 390 GETKEY A$:IF (A$>"/" AN
D A$<"") OR(A$>"e" AND
A$<"c") THEN 470
AC 400 IF A$="+" THEN A$="E":G
OTO 470
QB 410 IF A$="-" THEN A$="F":G
OTO 470
FB 420 IF A$=RT$ AND ((I=0) AN
D (J=1) OR F) THEN PRIN
T B$;:J=2:NEXT:I=24:GOT
O 480
RD 430 IF A$="HOME" THEN PRI
NT B$;:J=2:NEXT:I=24:NEX
T:F=0:GOTO 360
XB 440 IF (A$="RIGHT") AND F
THEN PRINT B$+LF$;:GOT
O 470
JP 450 IF A$<>LF$ AND A$<>DL$
{SPACE}OR ((I=0) AND (J
=1)) THEN GOSUB 950:GOT
O 390
PS 460 A$=LF$+SP$+LF$:PRINT B$
+LF$;:J=2-J:IF J THEN P
RINT LF$;:I=I-3
GB 470 PRINT A$;:NEXT J:PRINT
{SPACE}SP$;
HA 480 NEXT I:PRINT:PRINT"{UP}
{5 RIGHT}";:L$="
{27 SPACES}"
DP 490 FOR I=1 TO 25 STEP 3:GE
T#3,A$,B$:IF A$=SP$ THE
N I=25:NEXT:CLOSE 3:GOT
O 220
BA 500 A$=A$+B$:A=DEC(A$):MID$(
L$,I,2)=A$:IF I<25 THE
N GOSUB 320:A(I/3)=A:GE
T#3,A$

```

```

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 A$=NL$ 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
$(CK),2)
GR 600 F=1:AD=AD+8:IF AD>EA TH
EN PRINT"{BLU}** END OF
DATA **":GOTO 220
EB 610 GET A$:IF A$=RT$ THEN P
RINT BE$:GOTO 220
QK 620 IF A$=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 A$:IF A$="T" THE
N 850:ELSE IF A$<>"D" T
HEN 680
SP 690 PRINT"DISK{DOWN}":IF OP
THEN 760
EH 700 DOPEN#1,(F$+"P"),W:IF
{SPACE}DS THEN A$=D$:GO
TO 740
JH 710 BANK 0:POKE BS-2,FNLB(S
A):POKE BS-1,FNHB(SA):P
RINT"SAVING ";F$:PRINT
MC 720 FOR A=BS-2 TO BS+EA-SA:
PRINT#1,CHR$(PEEK(A));:
IF ST THEN A$="DISK WRI
TE ERROR":GOTO 750
GC 730 NEXT A:CLOSE 1:PRINT"
{BLU}** SAVE COMPLETED
{SPACE}WITHOUT ERRORS *
*":GOTO 220
RA 740 IF DS=63 THEN BEGIN:CLO
SE 1:INPUT"{BLK}REPLACE
EXISTING FILE [Y/N][4]
";A$:IF A$="Y" THEN SCR
ATCH(F$):PRINT:GOTO 700
:ELSE PRINT"{BLK}":GOTO
660:BEND
GA 750 CLOSE 1:GOSUB 950:PRINT
"{BLK}{RVS} ERROR DURIN
G SAVE: [4]":PRINT A$:G
OTO 220
FD 760 DOPEN#1,(F$+"P"):IF DS
THEN A$=D$:F=4:CLOSE
{SPACE}1:GOTO 790

```

```

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(BS):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$):BANK 1:A=PEEK(AD):A
L=PEEK(AD+1):AH=PEEK(AD
+2)
XX 860 BANK 15:SYS DEC("FF68")
,0,1:SYS DEC("FFBA"),1,
1,0:SYS DEC("FPBD"),A,A
L,AH:SYS DEC("FP90"),12
8:IF OP THEN 890
FG 870 PRINT:A=SA:B=EA+1:GOSUB
920:SYS DEC("E919"),3:
PRINT "SAVING ";F$
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
,FNHB(A):POKE 174,FNLB(
B):POKE 175,FNHB(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:EL
SE 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

```

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

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.

```

8# 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
8C 120 S = A

```

```

E3 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
2# 140 E = A
85 150 PRINT : PRINT "CHOOSE: (E)
NTER DATA": HTAB 22: PRI
NT "(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$; ",A"; S
A1 190 GOTO 150
3B 200 INPUT "FILENAME: "; A$: 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$; ": ";
NEXT : PRINT : IF PEEK (4
9152) < 128 THEN NEXT
94 260 POKE 49168,0: GOTO 150
CC 270 GOSUB 590: IF B = 0 THEN
150
4B 280 FOR B = B TO E STEP 8
A6 290 HTAB 1: A = B: L = 4: GOSUB
580: PRINT A$; ": "; 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$): 0$ = A$: 0 =
P: L$ = "": IF P > 0 THEN
L$ = LEFT$ (A$, P)
E8 350 R$ = "": 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
5B 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
8B 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
8B 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
2D 550 GOSUB 520: A = A * 16 + J:
NEXT : RETURN
2B 560 C = INT (B / 256): C = B -
254 * C - 255 * (C > 127
): C = C - 255 * (C > 255)
2B 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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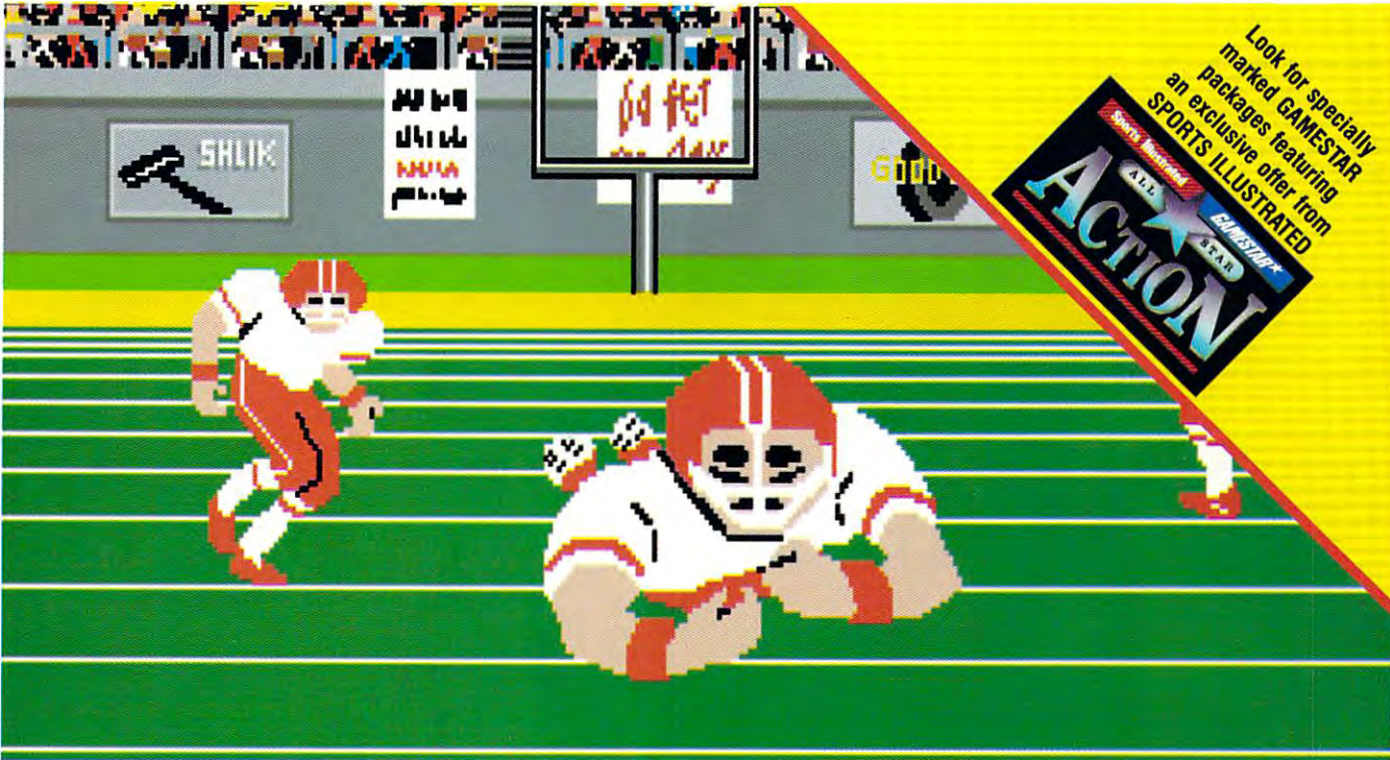
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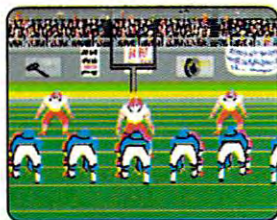
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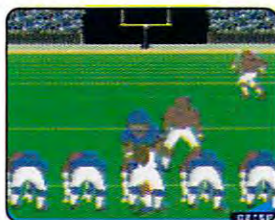
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Sometimes it's best to take a pass.

score — well, maybe it's time to take up bridge.

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TASTE THE THRILL OF VICTORY AND THE AGONY OF THE STREET.

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It's not like any basketball game you've ever played on a computer. But just like every basketball game you've ever played for real.

ANOTHER HIT.

It's bottom of the ninth. Batter's 0 and 2. The

first on your block.

After all, you'll have to cope with makeshift diamonds, bases made from spare tires and trashcans, bushes, rocks, even squealing cars.

Not to mention 16 neighborhood players. Each with their own personalities and skills in pitching, hitting and fielding. With the right combination, you could be the champs. With the wrong combination, the chumps.

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Notice that somebody just stole second base. Funny, it was here a minute ago.



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