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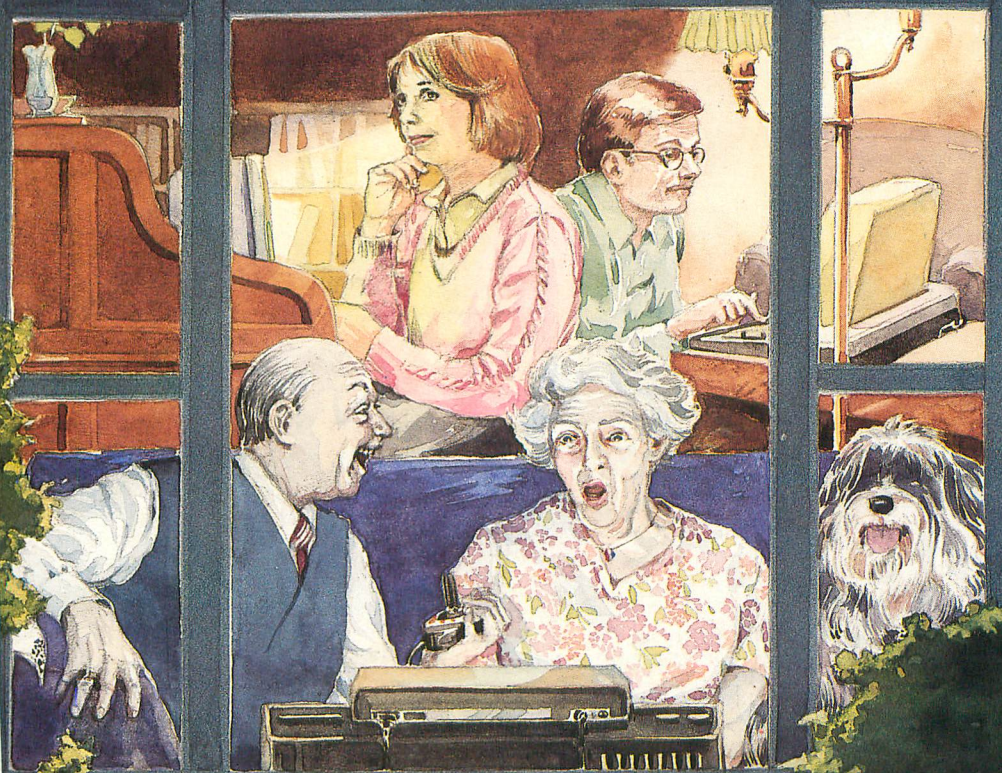
ANALOG

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HOME USE**

**Label Maker
Basic Diet on the ST
Troll War II**

Plus: reports from CES



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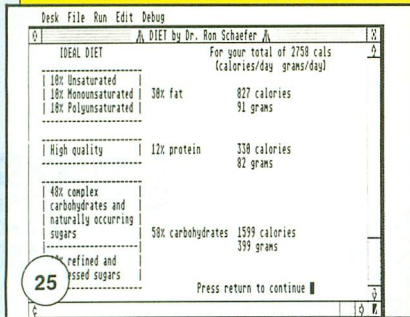
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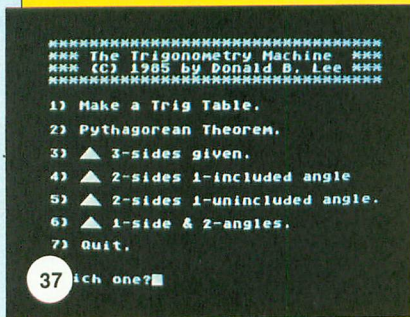
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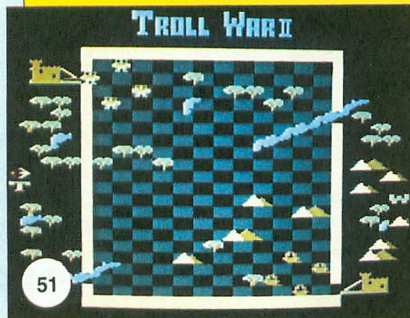
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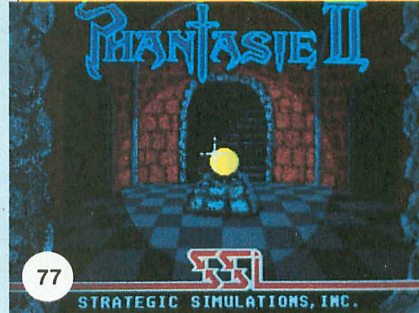
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U.S. newsstand distribution by
Eastern News Distributors, Inc.,
1130 Cleveland Rd., Sandusky, OH 44870

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All editorial material (programs, articles, letters and press releases) should be sent to: Editor, **ANALOG Computing**, P.O. Box 23, Worcester, MA 01603.

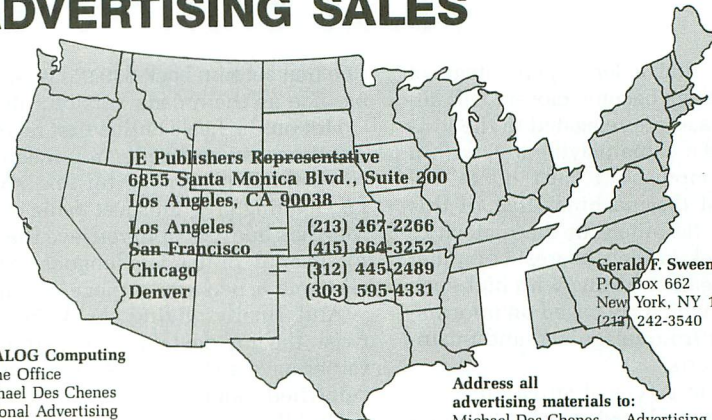
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This does not apply to programs which specifically state that they are not public domain and, thus, are not for public distribution.

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Editorial

It's a fact that a large percentage of home computers become closet shelf sitters (or, at least, are relegated to the lowly position of a game-playing toy) within months of purchase. I can't quote any numbers, but the machines that fit this category are definitely in the majority.

People flock to their nearest computer store, their heads whirling with high-tech hopes, all of which are based on information they got from misguided and misinformed "experts."

Let's look at a typical situation:

Tommy's second grade teacher tells parents that their children are destined for unemployment if they don't know the difference between BASIC and Pac-Man. The guy next door says home computers make ideal educational tools, stupendous home management systems, and are an absolutely outrageous entertainment value; in fact, he can't wait to get one next year when the prices come down.

The salesman at the computer shop insists that a home computer is this year's must-have item; that the only way to ensure survival in our technological world is to stay at the cutting edge, accept the reins of leadership and leave the rest of the neighborhood in the dark ages.

So, amid confusion and unrealistic expectations, a wad of bills changes hands. And several months later, another fine but misunderstood piece of equipment finds itself on a shelf behind closed doors.

Here's what happened:

Our new computer owner soon discovered the only thing Tommy had learned was that joysticks wear out too fast and the new version of Dungeon Devils (the

one that set him back \$39.95) wasn't quite as nice as the arcade version, after all.

Hot on the heels of this first revelation, a second was realized: "You mean I have to spend five minutes turning switches and loading programs just to dig out Aunt Martha's address or to retrieve the recipe for Peanut Butter Fandangoes? Phooey! Give me a pen and a piece of paper!"

And finally, giving the knife a firm twist, the guy next door decided that he'd rather have a stereo VCR than one of the "glorified game machines."

Huddle time. Just the two of us, okay?

You, my friend, are a computer enthusiast. As a member of this elite group, you're delighted to discover any excuse, no matter how trivial, to spend even an extra minute tapping binary messages into your machine's silicon innards. You'd eat pickle-flavored jello (with chocolate sauce!) before balancing your checkbook by hand—or getting caught without a blank, formatted disk.

Some people, however—brace yourself; this may be a shock—have about as much interest in computers as Leonard Bernstein has in Twisted Sister. Oh, they are interested in what the machines can do for them. They just have no use for "appliances" that require more attention than does a refrigerator or TV.

Let's get to the point. Someday, home computers will be seen as appliances—common machines that meet household needs, simply and conveniently. There's no stopping it. (Who'd want to, anyway?) In the interim, it's important that people understand what home computers can do for them—and what they can not.

Each closeted computer represents bad press and, thus, lost sales. Some of those sales would have only resulted in another disgruntled customer; it's just as well they were avoided. Others, however, would have been made to people harboring a yet undiscovered passion for computing, a passion that will never be realized because somebody told them, "I bought one of those things. It was a waste of money."

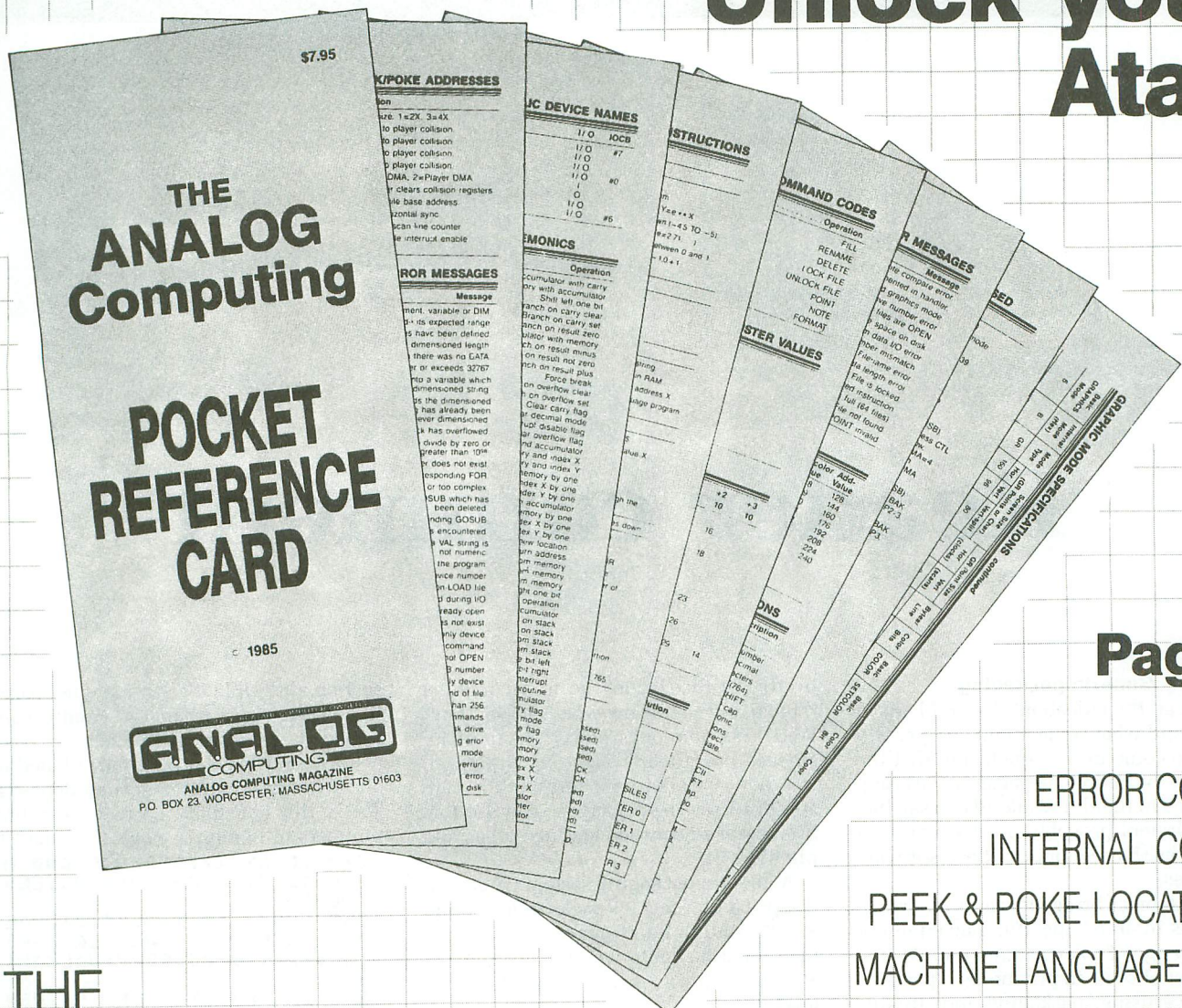
The facts: (1) Tommy's not going to be jobless if he can't program a computer; (2) yeah, a computer will do all that great stuff the guy next door mentioned, but unless a person likes to *fiddle* with these machines, he may find, at this time, that there are easier and cheaper ways to get the jobs done; (3) the "cutting edge" is reserved for those special people with the interest and drive to be there.

In future years, home computers will be built-in systems, with all software permanently installed in ROM, ready to spring into action at the touch of a button. No powering up. No scrambling for disks. No programs to load.

But for now, it's you and I. On the edge.

Clayton Walnum
Technical Editor
ANALOG Computing

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Reader comment

Generic packaging.

With all the talk about the problems of piracy and what some might call parasitism, I've come to the conclusion that the majority of people are against pirating. With this in mind, I would like to say that most pirates probably do it because of the prices that get put on these software packages.

This subject brings to mind an article that was in an ST-specific magazine not too long ago. The article mentioned that the order of costs in producing a package are: advertising, packaging and, finally, royalty fees.

Advertising in today's markets is not cheap, and the need for advertising is a justifiable expense which cannot be cut without diminishing the exposure of the product.

We're left with packaging and royalty fees to consider. Royalty fees cannot be lowered too drastically, as authors want to make a decent living. Without adequate compensation, authors may not be so anxious to produce more software.

This leaves the topic of packaging. The costs involved in producing a package for a product are extensive. My father, a commercial graphic artist of thirty-five years, said that packaging can be as much as forty percent of the total cost of the program. This cost could be drastically reduced by going to a system of generic packaging, with just the name and company of the product on a manila envelope.

Personally, I buy a software package through peer recommendation or advertising; I don't package shop. What I mean

by this is that I don't go to a computer retailer and say, "Now what should I buy? Well, this one looks pretty." In most instances I've already made up my mind; in other cases I order it through the mail and don't see the package except for that brief moment between tearing it open and pitching it!

A generic packaging system would cut the price of a \$39.95 package to around \$27.95. With a lot of packages at \$29.95, the reduction could well put costs below \$20.00—within reach of most of us poor folk!

In closing, I would like to say that, personally, the most I'll spend on a software package is \$49.95. This is due to the fact that rent isn't cheap, food isn't any cheaper, and my wife says the computer will sleep outside before she does!

Sincerely yours,

Ken Harvey

Angels Camp, CA

An easy fix for "HardCopy."

Thank you for pointing out the bugs in my program, "HardCopy" (issue 53). The two bugs can be corrected as follows:

(1) The E on the line with 01/10/87 DEPOSIT is caused by an error in the original article, "MicroCheck," which appeared on page 88 of issue 27. Listing 5 (CHECKBOO). Line 840 should be corrected as follows:

```
840 COL=N8:ROW=N8:IF CHNUM
$="DEP " THEN PAYEE$="DEPO
SIT                ":GOTO 90
0
```

The correction is to make the blank

section after DEPOSIT twenty-one spaces in length, rather than the twenty contained in the original article.

(2) In writing the program, I failed to allow for printing of cancelled deposits. To fix this oversight, correct these line numbers in Listing 3, page 43, issue 53:

```
220 IF CK$(2)="DEP " AND M
EMO$(1,6) <> SP$ THEN PAYEE$
=MEMO$
250 GOSUB 40:IF CK$(2)="DE
P " THEN PRINT #3;DLR$;SP$
;SP$(2);:DEPG=DEPG+VAL(AMT
$)
260 IF CK$(2) <> "DEP " THEN
PRINT #3;SP$;SP$(3);DLR$;
" ";:CKPG=CKPG+VAL(AMT$)
270 BALANCE=BALANCE+VAL(AM
T$)*CK$(2)="DEP " -VAL(AM
T$)*CK$(2) <> " DEP " :AMT$
=STR$(BALANCE):GOSUB 40:PR
INT #3;DLR
280 IF CK$(2) <> "DEP " AND
MEMO$(1,6) <> SP$ THEN PRINT
#3;SP$;SP$(2);MEMO$:L
INE=LINE+1
```

I also found another bug. To correct this one, make the following change to Listing 5, page 44, issue 53:

```
1720 IF UNCAN=0 THEN PRINT
#N3;B$(N15);"NONE":PRINT
#N3:PRINT #N3;B$(N15);TOTA
L;:GOTO 1740
```

Sincerely,

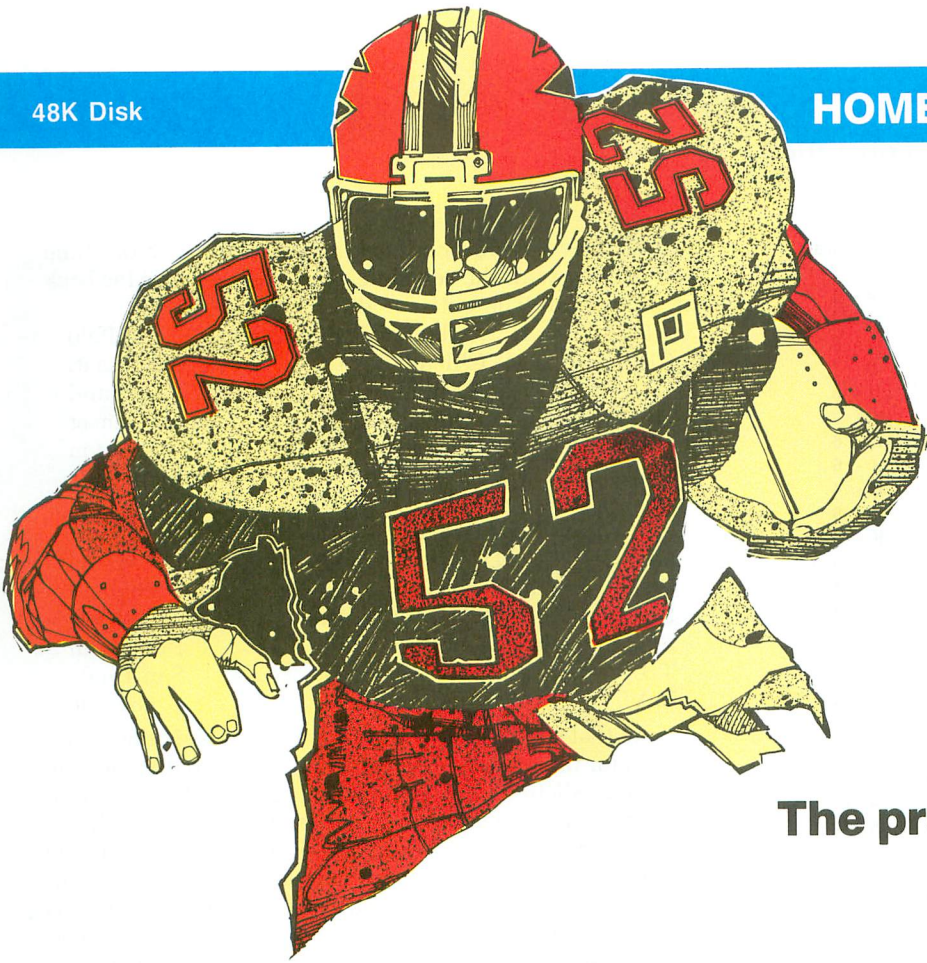
Boyd E. Arnold

York, PA

"Easy Find" correction.

There's a bug in the "Easy Find" program that appeared in the May issue of ANALOG Computing and on its disk ver-

(continued on page 76)



NFL Game Analyzer

The prognosticator to have.

by Gerry Genson

Football season is almost here. Time to stock up on cases of beer, dust off your favorite mug, and put on your thinking cap for the football pools.

Whether the pool you enter requires you to pick against the official point spread, or just pick the game winners, they all involve getting more correct picks than anybody else in the pool. There's even a pool in a local paper, where correctly picking the outcome of all the weekend games would result in a \$500 prize. The jackpot grows each week, until there's a winner. That's a powerful incentive for paying close attention to the football results each Monday morning.

We've all seen football handicapping programs advertised in the papers or in computer publications. I can't criticize their claimed percentage of correct picks, because I've never used one. However, I do feel they have a couple of major drawbacks.

The first is price. I have yet to see one advertised for under \$50. Second, they all require hours of tedious statistics entry.

The **NFL Game Analyzer** is different. If you're reading this article, you've already paid for the program. Also, there are no lengthy sessions at the keyboard. This program uses only the scores—that's right, *just* scores. Ten minutes of typing for even the slowest of typists.

I can hear the skeptics already. But aren't the scores just a measure of the differences between two teams? Throw all the other stats out the window; this program uses the scores to calculate a rate for each team. These rates are averaged to produce three mean rates, which are saved to disk: one

for the team's home games; one for away games; and the third is the average of all the games. The **NFL GA** uses these rates to predict future game scores.

This program also learns from its mistakes. It adjusts the rates for previous weeks each time new scores are entered. This is important, because, if the rates remained unchanged, they would throw off the average rates used in the predictions.

Here's an example. At the start of the season, all teams have the same rates that they ended the previous year with. This seems to work better than starting all teams as equal, because the computer needs only to adjust for improvements made during the off-season (or, in some cases, a team's decline).

Suppose team A had a rate of 90 at the end of last season, while team B was rated 94. In the first game of the season, team A lost to team B by fourteen points. Their rates after the first game would be 85 and 99, respectively. The difference is 14 points; so far so good. Now suppose, in subsequent weeks, team A and team B both continue to win. Their average rates climb to 97 for team A, and 101 for team B. Their rates for the first week are now out of line with the known data. At this point, the **NFL GA** will go back to that first week and adjust the rates, preserving the 14-point margin, yet raising their first-week rates to a more realistic level.

To show you how close this system comes to the expert's predictions, take a look at the following table. These are the final average rates for the 1986 season. While there may be a few discrepancies (especially for those living in Cincinnati or Kansas City), I think, for the most part, we could all agree with this program's results.



ID	Team	Rate	Record
1	San Francisco	107.7	10- 5-1
2	Chicago	107.3	14- 2
3	N.Y. Giants	106.9	14- 2
4	New England	106.5	11- 5
5	Minnesota	106.3	9- 7
6	Denver	105.9	11- 5
7	Washington	103.8	12- 4
8	L.A. Rams	102.2	10- 6
9	Seattle	102.2	10- 6
10	Cleveland	101.5	12- 4
11	Miami	101.2	8- 8
12	N.Y. Jets	100.5	10- 6
13	Atlanta	100.4	7- 8-1
14	L.A. Raiders	100.3	8- 8
15	New Orleans	99.6	7- 9
16	Dallas	99.6	7- 9
17	Kansas City	99.6	10- 6
18	San Diego	99.2	4-12
19	Pittsburgh	98.8	6-10
20	Cincinnati	98.4	10- 6
21	Houston	98.1	5-11
22	Philadelphia	96.9	5-10-1
23	Buffalo	96.3	4-12
24	Detroit	95.5	5-11
25	St. Louis	92.8	4-11-1
26	Green Bay	91.6	4-12
27	Indianapolis	90.9	3-13
28	Tampa Bay	87.3	2-14

Using NFL GA and P.

Begin by typing in Listing 2 and running it. This creates a data file containing the average rates for each team at the end of last season. Now type in Listing 1 and save it to disk.

If you have access to a computer art program, you can draw a title screen for the program and save it to disk with the filename TITLE.SCR. It must be converted to Micro-Painter format. If this file is not found, the program traps to its built-in title screen.

I have to tell you at this time that I lied about the scores being the only thing you'll have to type in. There's a small matter of the game schedule. Before this program can be used, the entire game schedule for the league must be on disk. To do this, run the program and select option five, "Enter Schedule."

Throughout the program, I've tried to eliminate unnecessary typing whenever possible. Because of this, I've used a two-letter code for each team. It may take some getting used to at first, but after the first two weeks of the schedule, you should have it memorized. Basically, it involves using the first two letters of teams having only a one-word city name (i.e., Buffalo is BU), and the first letter of each name for teams with two-word city names (i.e., Kansas City is KC).

There are exceptions, though—there are two New York and two Los Angeles teams. For these, I had to resort to the team names and take the first two letters of those. The New York Giants became GI, and the Jets became JE. A further problem arose with the L.A. teams. Both teams started with RA. This was solved by using RD for the Raiders and RM for the Rams. The four other problem entries, Detroit and Denver, Miami and Minnesota, became DETroit, DeNver, MIami and MiNnesota.

If all this has you confused, don't worry. By the time you're done with the schedule, you'll know it like the back of your hand. The entire code is as follows:

AT	Atlanta	BU	Buffalo
CH	Chicago	CI	Cincinnati
DA	Dallas	CL	Cleveland
DE	Detroit	DN	Denver
GB	Green Bay	HO	Houston
RM	LA Rams	IN	Indianapolis
MN	Minnesota	KC	Kansas City
NO	New Orleans	RD	LA Raiders
GI	NY Giants	MI	Miami
PH	Philadelphia	NE	New England
SL	St. Louis	JE	NY Jets
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TB	Tampa Bay	SD	San Diego
WA	Washington	SE	Seattle

Now that the hard part is finished, we need some data. Scores for the preseason games must be entered before any reliable predictions can be made or a game analysis performed. You'll find, when entering scores, the computer will display the team name on the appropriate home/visitor side of the screen and prompt you for the score for that team. Type in the points scored by that team only. When this is done, the opposing team name is displayed, and you can enter its score. The computer will want to go through the entire schedule of games for that week, so be sure that you don't try to enter the scores before the Monday night game, which is the last game in any week.


The game analysis option of the menu will graph the weekly rates of two opposing teams. Enter the home team and away team when prompted. Notice that you need only use the two-letter code for the teams. The program then graphs their individual weekly rates. The vertical axis represents the team rates in increments of five. The horizontal axis represents the weekly games, with the preseason games to the left of the vertical axis and the regular season to the right. Where the vertical axis is crossed by the horizontal axis, the rate is one hundred (the mean rate of all the teams).

Printed below the graph are the average rates for both teams, the home rate for the home team, and the away rate for the visiting team. Press any key except ESCAPE, and the predicted point spread will be displayed. The ESCAPE key will return you to the menu. If you wish to view just a single team's graph, enter that team as both the home and away team.

This brings us to the heart of the program—the predictions. The last three weekly rates of each team are averaged, then adjusted for home or away. This allows for momentum and gives a predicted point spread. The points scored by each team are added and then averaged, to provide a base score. These base scores are adjusted to reflect the predicted point spread. That's all there is to it. The scores are computed, then printed on the screen and printer (if it's turned on).

The "Sort Teams" option was added as an afterthought. I wanted to see how my program did in rating the teams. After doing it slowly on paper one afternoon, I decided to

make it part of the program. Now, anytime I want to find out how my hometown team is doing, I just call up this option and look at the bottom of the list (my hometown is Buffalo, New York).

This program was designed to be fun. I cannot guarantee any of the results, nor will I take any liability for monies lost while using this program. Sorry, but you'll have to use it at your own risk. I will tell you, though, that, because it's designed to learn from its mistakes, the predictions should get better as the season progresses. Last year, it predicted 63 percent of the winners, in its best week picking twelve out of the fourteen games. 

Employed by the U.S. Postal Service, Gerry Genson's interest in computers started seven years ago, while taking a Fortran course. He bought an Atari 800 shortly after that, and has been hacking away on it ever since, mainly in BASIC, with some Fortran, assembly and C.

The two-letter checksum code preceding the line numbers here is *not* a part of the BASIC program. For further information, see the "BASIC Editor II," in issue 47.

Listing 1.
BASIC listing.

```

CX 10 DIM S(588),SCR(588),RATE(28,21),AG(
28),HG(28),SCORE(28),HRATE(28),T$(56),
INDEX(28)
TU 20 DIM TTLHR(28),TTLAR(28),ARATE(28),T
EAM$(420),A$(40),LD$(117)
BI 30 TEAMS(1,1)=" ":TEAM$(420,420)=" ":T
EAM$(2)=TEAMS
RY 40 FOR I=0 TO 27:READ A$:TEAM$(I*15+1,
I*15+15)=A$:NEXT I
TL 50 READ A$:T$(1,28)=A$:READ A$:T$(29,5
6)=A$
CN 60 FOR X=1 TO 117:READ N:LD$(X)=CHR$(N
):NEXT X
CG 70 TIME=1000:TRAP 100:OPEN #1,4,0,"D:T
ITLE.SCR":TIME=0
OU 80 A=PEEK(559):GRAPHICS 24:SETCOLOR 2,
0,0:SETCOLOR 4,0,12:POKE 559,0:I=USR(A
DR(LD$)):POKE 559,A
FT 90 GET #1,C1:GET #1,C2:GET #1,C3:GET #
1,C4:CLOSE #1:POKE 712,C1:POKE 708,C2:
POKE 709,C3:POKE 710,C4:GOTO 250
KK 100 CLOSE #1:GRAPHICS 1+16:SETCOLOR 4,
0,12:SETCOLOR 0,8,4:SETCOLOR 1,3,4:SET
COLOR 2,0,0:SETCOLOR 3,13,12
FR 110 POSITION 4,6:PRINT #6;"pro footbal
1"
FT 120 POSITION 3,8:PRINT #6;"GAME ANALY
SIS"
AP 130 POSITION 8,10:PRINT #6;"and"
TX 140 POSITION 2,12:PRINT #6;"PROGNOSTIC
ATIONS"
OD 150 GOTO 250
RO 160 REM -SORT TEAMS BY RATE
VT 170 FOR I=0 TO 27
RG 180 A=INDEX(I)
KH 190 FOR T=I TO 27
PX 200 IF RATE(A,0)>=RATE(INDEX(T),0) THE
N GOTO 220
TT 210 A=INDEX(T):INDEX(T)=INDEX(I):INDEX
(I)=A
KC 220 NEXT T
FY 230 NEXT I

```

```

ZG 240 RETURN
VE 250 OPEN #4,4,0,"K":C0=0:C1=1:C28=28:C
15=15
VM 260 TIME=TIME+1000:TRAP 400:OPEN #1,4,
0,"D:SCHEDULE.DAT":TIME=TIME-1000
NF 270 FOR W=C1 TO 20
MD 280 FOR G=C0 TO 27
NT 290 INPUT #1,A:5(W*C28+G)=A
EZ 300 NEXT G
LF 310 NEXT W
YG 320 CLOSE #1:W=C1:TRAP 390:OPEN #1,4,C
0,"D:SCORES.DAT"
MY 330 FOR W=C1 TO 20
LW 340 FOR G=C0 TO 27
EZ 350 INPUT #1,A:5CR(W*C28+G)=A
FL 360 NEXT G
LR 370 NEXT W
TX 380 POP
ME 390 WEEK=W-C1
EO 400 CLOSE #1:OPEN #1,4,C0,"D:FBPICKS.D
AT"
MJ 410 FOR I=C0 TO 27
RM 420 INPUT #1,A:HRATE(I)=A
NQ 430 INPUT #1,A:ARATE(I)=A
HM 440 INPUT #1,A:RATE(I,C0)=A
VV 450 INPUT #1,A:INDEX(I)=A
GG 460 NEXT I
LO 470 CLOSE #1
XK 480 IF WEEK=C0 THEN GOTO 810
QO 490 REM -CALCULATE RATES
TG 500 FOR I=C0 TO 27:HG(I)=C0:AG(I)=C0:T
TLHR(I)=C0:TTLAR(I)=C0:SCORE(I)=C0:NEX
T I
DS 510 FOR W=C1 TO WEEK
JQ 520 FOR G=C0 TO 27 STEP 2
CZ 530 VT=W*C28+G:HT=VT+C1:H=5(HT):V=5(VT
)
WH 540 HG(H)=HG(H)+C1:AG(V)=AG(V)+C1
EZ 550 SCORE(V)=SCORE(V)+SCR(VT):SCORE(H)
=SCORE(H)+SCR(HT)
VX 560 DIFF=(SCR(HT)-SCR(VT))-(HRATE(H)-A
RATE(V))
PM 570 RATE(H,W)=DIFF*0.5+HRATE(H)
UU 580 TTLHR(H)=TTLHR(H)+RATE(H,W)
PC 590 RATE(V,W)=DIFF*0.5+ARATE(V)
TG 600 TTLAR(V)=TTLAR(V)+RATE(V,W)
AB 610 RATE(H,W)=RATE(H,W)*RATE(H,0)/HRAT
E(H)
TC 620 RATE(V,W)=RATE(V,W)*RATE(V,0)/ARAT
E(V)
FI 630 NEXT G
LO 640 NEXT W
MT 650 FOR I=C0 TO 27
MI 660 TTLHR(I)=TTLHR(I)+HRATE(I)*3
IU 670 HRATE(I)=TTLHR(I)/(HG(I)+3)
ZO 680 TTLAR(I)=TTLAR(I)+ARATE(I)*3
WP 690 ARATE(I)=TTLAR(I)/(AG(I)+3)
KO 700 RATE(I,C0)=(TTLHR(I)+TTLAR(I))/(WE
EK+6):SCORE(I)=SCORE(I)/WEEK
FZ 710 NEXT I
TQ 720 GOSUB 160
TV 730 OPEN #1,8,0,"D:FBPICKS.DAT"
MS 740 FOR I=C0 TO 27
EF 750 PRINT #1;HRATE(I)
AN 760 PRINT #1;ARATE(I)
DL 770 PRINT #1;RATE(I,C0)
HW 780 PRINT #1;INDEX(I)
GP 790 NEXT I
LE 800 CLOSE #1
WA 810 REM -MAIN MENU
AA 820 FOR T=0 TO TIME:NEXT T
NS 830 GRAPHICS 0:POKE 752,1:SETCOLOR 2,1
2,2:SETCOLOR 1,0,12:SETCOLOR 4,12,2
IG 840 POSITION 8,2:PRINT "NATIONAL FOOTB
ALL LEAGUE"
EB 850 POSITION 13,5:PRINT "GAME ANALYSIS
"
UX 860 POSITION 18,6:PRINT "and"

```




NFL Analyzer *continued*

```

JX 870 POSITION 12,7:PRINT "PROGNOSTICATI
ONS"
ZX 880 POSITION 9,10:PRINT "
"
YI 890 POSITION 9,11:PRINT "
"
SZ 900 POSITION 9,12:PRINT " 1) ENTER SC
ORES
"
ZB 910 POSITION 9,13:PRINT "
"
HQ 920 POSITION 9,14:PRINT " 2) ANALYZE
A GAME
"
AN 930 POSITION 9,15:PRINT "
"
GD 940 POSITION 9,16:PRINT " 3) MAKE PRE
DICTIONS
"
BZ 950 POSITION 9,17:PRINT "
"
FG 960 POSITION 9,18:PRINT " 4) SORT TEA
M5
"
DL 970 POSITION 9,19:PRINT "
"
ZT 980 POSITION 9,20:PRINT " 5) ENTER SC
HEDULE
"
YZ 990 POSITION 9,21:PRINT "
"
SE 1000 POSITION 9,22:PRINT "
"
LJ 1010 POKE 764,255:GET #4,A:A=A-49
XZ 1020 ON A GOTO 1580,1200,2310,2030
GK 1030 IF A<>C0 THEN GOTO 1010
IP 1040 REM -KEY ENTRY OF SCORES
PR 1050 WEEK=WEEK+C1:IF WEEK=C1 THEN OPEN
#1,8,0,"D:SCORES.DAT":CLOSE #1
WY 1060 OPEN #1,9,0,"D:SCORES.DAT"
KX 1070 GRAPHICS 0:SETCOLOR 2,C0,4:SETCOL
OR C1,C0,12:SETCOLOR 4,C0,4:POSITION 2
,2:POKE 752,C1
ZC 1080 PRINT "KEY ENTRY OF SCORES: ";:IF
WEEK>4 THEN PRINT "WEEK #";WEEK-4
UE 1090 IF WEEK<5 THEN PRINT "PRESEASON #
";WEEK
JJ 1100 PRINT "
"
PB 1110 FOR G=C0 TO 27 STEP 2
GJ 1120 HT=WEEK*C28+G+C1:VT=WEEK*C28+G
ZW 1130 H=5(HT):V=5(VT)
GC 1140 POSITION 2,G/2+5:PRINT TEAM$(V*C1
5+C1,V*C15+13);" <+";
RR 1145 TRAP 1140:INPUT #16;A:SCR(VT)=A:P
RINT #1;A
JW 1150 POSITION 20,G/2+5:PRINT TEAM$(H*C
15+C1,H*C15+13);" <+";
BB 1155 TRAP 1150:INPUT #16;A:SCR(HT)=A:P
RINT #1;A
EN 1160 NEXT G
NG 1170 CLOSE #1
CA 1180 POSITION 9,G/2+7:PRINT " ONE MOME
NT PLEASE "
TG 1190 GOTO 490
GU 1200 REM -PREDICTIONS
BU 1210 GRAPHICS C0:SETCOLOR 2,8,2:SETCOL
OR 4,8,2:SETCOLOR 1,0,12:POKE 752,C1
GC 1220 P=C0:CLOSE #3:TRAP 1230:OPEN #3,8
,0,"P";:P=C1
IC 1230 POSITION 2,2:PRINT "PRO FOOTBALL
PREDICTIONS";:IF WEEK>3 THEN PRINT "--W
EEK #";WEEK-3
IO 1240 IF WEEK<4 THEN PRINT "--PRESEASON
"
JV 1250 PRINT "
"
EB 1260 IF WEEK<4 THEN POSITION 10,5:PRIN
T "INSUFFICIENT DATA":GOTO 1490
TX 1270 IF P=1 THEN PRINT #3;"PRO FOOTBAL
L PREDICTIONS FOR WEEK #";WEEK-3:PRINT
#3
CI 1280 FOR I=C0 TO 27
RF 1290 RATE(I,WEEK+C1)=RATE(I,WEEK-2)
NM 1300 RATE(I,WEEK+C1)=RATE(I,WEEK+C1)+R
ATE(I,WEEK-C1)
LC 1310 RATE(I,WEEK+C1)=RATE(I,WEEK+C1)+R
ATE(I,WEEK)
LD 1320 RATE(I,WEEK+C1)=RATE(I,WEEK+C1)/3
FE 1330 NEXT I
PO 1340 FOR G=C0 TO 27 STEP 2
ZX 1350 HT=(WEEK+C1)*C28+G+C1:VT=(WEEK+C1
)*C28+G
AJ 1360 H=5(HT):V=5(VT)
AL 1370 GOSUB 1510
BY 1380 I=DIFF-INT(SCORE(H)-SCORE(V))
FB 1390 H5=INT(SCORE(H)+I/2+0.5):V5=H5-DI
FF
EC 1400 IF H5<3 THEN V5=3-H5+V5:H5=3
NJ 1410 IF V5<3 THEN H5=3-V5+H5:V5=3
YY 1420 POSITION 2,G/2+5
JR 1430 PRINT TEAM$(V*C15+C1,V*C15+13);"
";V5
PE 1440 POSITION 21,G/2+5
PP 1450 PRINT TEAM$(H*C15+C1,H*C15+13);"
";H5
OX 1460 IF P=C1 THEN PRINT #3:PRINT #3;TE
AM$(V*C15+C1,V*C15+13);" ";V5,TEAM$(H
*C15+C1,H*C15+13);" ";H5
EM 1470 NEXT G
CB 1480 IF P=1 THEN PRINT #3:PRINT #3:PRI
NT #3
OP 1490 POSITION 12,20:PRINT "PRESS ANY K
EY"
RX 1500 GET #4,A:GOTO 830
QF 1510 REM -COMPUTE SPREAD
OU 1520 RATE(H,WEEK+C1)=RATE(H,WEEK+C1)*H
RATE(H)/RATE(H,C0)
YW 1530 RATE(V,WEEK+C1)=RATE(V,WEEK+C1)*A
RATE(V)/RATE(V,C0)
PW 1540 DIFF=RATE(H,WEEK+C1)-RATE(V,WEEK+
C1)
OZ 1550 IF DIFF>C0 THEN DIFF=INT(DIFF+0.5
)
QU 1560 IF DIFF<C0 THEN DIFF=INT(DIFF-0.5
)
BE 1570 RETURN
DY 1580 REM -GAME ANALYSIS
JL 1590 GRAPHICS 7:SETCOLOR 2,8,2:SETCOLO
R 1,1,12:SETCOLOR 0,8,8:SETCOLOR 4,8,1
4:POKE 752,C1
BQ 1600 COLOR 2:PLOT 30,C0:DRAWTO 30,89:P
LOT C0,55:DRAWTO 159,55
YM 1610 FOR I=5 TO 85 STEP 5:PLOT 29,I:PL
OT 31,I:NEXT I
QU 1620 IF WEEK<4 THEN PRINT "INSUFFICIEN
T DATA-PRESS ANY KEY":GET #4,A:GOTO 83
0
WX 1630 PRINT "KHOME TEAM ? ";:GOSUB
2200
JZ 1640 PRINT "<+";TEAM$(T*C15+C1,T*C15+C
15):H=T
LQ 1650 PRINT "VISITING TEAM ? ";:GOSUB 2
200
BD 1660 POKE 752,1:PRINT "<+";TEAM$(T*C15
+C1,T*C15+C15):V=T
YZ 1670 FOR T=C0 TO 100:NEXT T
RZ 1680 POKE 752,C1:PRINT "KTEAM
AVG.RATE HOME/AWAY"
ZX 1690 PRINT "BL-";TEAM$(H*C15+C1,H*C15+
13);
IS 1700 A=INT(RATE(H,C0)*10):GOSUB 2280
JZ 1710 FOR I=C0 TO C1+(6-LEN(A$)):PRINT
" ";NEXT I
HB 1720 PRINT A$;
CQ 1730 A=INT(HRATE(H)*10):GOSUB 2280
AP 1740 FOR I=C0 TO 4+(6-LEN(A$)):PRINT "
";NEXT I
BQ 1750 PRINT A$
DU 1760 PRINT "BK-";TEAM$(V*C15+C1,V*C15+

```



```

13);
SR 1770 A=INT(RATE(V,C0)*10):GOSUB 2280
KU 1780 FOR I=C0 TO C1+(6-LEN(A$)):PRINT
" ";NEXT I
HW 1790 PRINT A$;
IV 1800 A=INT(ARATE(V)*10):GOSUB 2280
AI 1810 FOR I=C0 TO 4+(6-LEN(A$)):PRINT "
";NEXT I
HD 1820 PRINT A$;
NV 1830 FOR W=C1 TO WEEK:COLOR C1
DM 1840 PLOT (W*7)-3,78:DRAWTO (W*7)-3,15
5-INT(RATE(H,W))
BP 1850 PLOT (W*7)-2,78:DRAWTO (W*7)-2,15
5-INT(RATE(H,W))
HK 1860 COLOR 3:PLOT (W*7)-1,78:DRAWTO (W
*7)-1,155-INT(RATE(V,W))
FB 1870 PLOT (W*7),78:DRAWTO (W*7),155-IN
T(RATE(V,W))
MB 1880 NEXT W
DN 1900 GET #4,A
AH 1910 IF A=27 THEN GOTO 830
XQ 1920 RATE(H,WEEK+C1)=RATE(H,WEEK-2):R
ATE(V,WEEK+C1)=RATE(V,WEEK-2)
GM 1930 RATE(H,WEEK+C1)=RATE(H,WEEK+C1)+R
ATE(H,WEEK-C1):RATE(V,WEEK+C1)=RATE(V,
WEEK+C1)+RATE(V,WEEK-C1)
SG 1940 RATE(H,WEEK+C1)=RATE(H,WEEK+C1)+R
ATE(H,WEEK):RATE(V,WEEK+C1)=RATE(V,WEE
K+C1)+RATE(V,WEEK)
NI 1950 RATE(H,WEEK+C1)=RATE(H,WEEK+C1)/3
:RATE(V,WEEK+C1)=RATE(V,WEEK+C1)/3
AU 1960 GOSUB 1510
WG 1970 PRINT "K<PREDICTED POINT SPREAD,"
AY 1980 PRINT TEAM$(V*C15+C1,V*C15+13);"
";
OZ 1990 IF DIFF>C0 THEN PRINT "+";
JK 2000 PRINT INT(DIFF*2)/2;" ";TEAM$(
H*C15+C1,H*C15+13)
HR 2010 GET #4,A:IF A=27 THEN GOTO 830
TD 2020 GOTO 1580
JA 2030 REM -NEW SCHEDULE
VH 2040 GRAPHICS C0:POKE 752,C1:SETCOLOR
2,13,0:SETCOLOR 4,13,0:SETCOLOR 1,0,10
FS 2050 POSITION 6,5:PRINT "OK TO ERASE 0
LD SCHEDULE (Y/N)"
VD 2060 GET #4,A:IF A<>89 THEN GOTO 830
KG 2070 CLOSE #1:OPEN #1,8,0,"D:SCHEDULE.
DAT"
CZ 2080 FOR W=C1 TO 20
HQ 2090 PRINT "K":POSITION 2,3:PRINT "ENT
ER SCHEDULE - ";IF W<5 THEN PRINT "PR
ESEASON WEEK #";W
TJ 2100 IF W>4 THEN PRINT "WEEK #";W-4
KN 2110 POSITION 2,5:PRINT "VISITOR
HOME"
XF 2120 FOR G=C0 TO 13
IS 2130 POSITION 2,G+7:GOSUB 2280
ZB 2140 PRINT #1;T:5*((W*C28)+(G*2))=T:POS
ITION 2,G+7:PRINT TEAM$(T*C15+C1,T*C15
+C15);" ";
UL 2150 POSITION 20,G+7:GOSUB 2280
NT 2160 PRINT #1;T:5*((W*C28)+(G*2)+C1)=T:
POSITION 20,G+7:PRINT TEAM$(T*C15+C1,T
*C15+C15)
ER 2170 NEXT G
LO 2180 NEXT W
AP 2190 CLOSE #1:GOTO 810
GK 2200 REM -CODED INPUT OF TEAMS
HW 2210 T=100:A$=""
LA 2215 POKE 752,C0:TRAP 2215:GET #4,A:IF
A=27 THEN GOTO 810
HP 2220 IF A<65 OR A>90 THEN GOTO 2215
AK 2225 PRINT CHR$(A);A$(C1,C1)=CHR$(A)
KY 2230 TRAP 2230:GET #4,A:IF A=27 THEN G
OTO 810
TJ 2235 IF A<65 OR A>90 THEN GOTO 2230
GE 2240 PRINT CHR$(A);A$(2,2)=CHR$(A)

```

```

KM 2245 FOR I=C1 TO 55 STEP 2:IF A$=T$(I,
I+C1) THEN T=INT(I/2)
FJ 2250 NEXT I
IP 2260 IF T=100 THEN PRINT "←← ←←";:GOT
0 2215
AZ 2270 RETURN
PZ 2280 REM ** RIGHT JUSTIFIED OUTPUT **
KN 2290 A$=STR$(A):A$(LEN(A$)+C1)=A$(LEN(
A$),LEN(A$)):A$(LEN(A$)-C1,LEN(A$)-C1)
=","
AG 2300 RETURN
MG 2310 REM -PRINT TEAM RANKS
UE 2320 GRAPHICS C0:POKE 752,C1:SETCOLOR
2,1,0:SETCOLOR 4,1,0:SETCOLOR 1,1,10
UR 2330 PRINT "K":POSITION 3,2:PRINT "TEA
M RANK - SORTED BY AVG. RATE
"
EY 2340 POSITION 9,5:PRINT "ONE MOMENT PL
EASE"
YN 2350 GOSUB 160
GY 2360 POSITION 3,5:PRINT "RANK TEAM
AVG. RATE":PRINT
EC 2370 FOR W=C0 TO 13
AB 2380 T=INDEX(W):IF W<9 THEN PRINT " ";
UR 2390 PRINT " ";W+C1;" ";TEAM$(T*C15
+C1,T*C15+C15);
OJ 2400 A=INT(RATE(T,C0)*10):GOSUB 2280
OG 2410 FOR I=C0 TO 8-LEN(A$):PRINT " ";:
NEXT I
BC 2420 PRINT A$
LF 2430 NEXT W
PN 2440 POSITION 12,22:PRINT "PRESS ANY K
EY"
DT 2450 GET #4,A
UC 2460 PRINT "K":POSITION 3,2:PRINT "TEA
M RANK - SORTED BY AVG. RATE,"
HD 2470 POSITION 3,5:PRINT "RANK TEAM
AVG. RATE":PRINT
BP 2480 FOR W=14 TO 27
LU 2490 T=INDEX(W)
UU 2500 PRINT " ";W+C1;" ";TEAM$(T*C15
+C1,T*C15+C15);
OO 2510 A=INT(RATE(T,C0)*10):GOSUB 2280
OL 2520 FOR I=C0 TO 8-LEN(A$):PRINT " ";:
NEXT I
BH 2530 PRINT A$
LK 2540 NEXT W
PS 2550 POSITION 12,22:PRINT "PRESS ANY K
EY"
DY 2560 GET #4,A
SH 2570 GOTO 830
TP 2580 DATA ATLANTA,CHICAGO,DALLAS,DETRO
IT,GREEN BAY,L.A. RAMS,MINNESOTA,NEW O
RLEANS,N.Y. GIANTS,PHILADELPHIA
DI 2590 DATA ST. LOUIS, SAN FRANCISCO,TAMP
A BAY,WASHINGTON,BUFFALO,CINCINNATI,CL
EVELAND,DENVER,HOUSTON,INDIANAPOLIS
UA 2600 DATA KANSAS CITY,L.A. RAIDERS,MIA
MI,NEW ENGLAND,N.Y. JETS,PITTSBURG,SAN
DIEGO,SEATTLE
OP 2610 DATA ATCHDADEGBRMMNOGIPHSL5FTBWA
NR 2620 DATA BUCICLDNHOINKCRDMINEJEPI5D5E
NR 2630 DATA 216,104,173,48,2,24,105,3,13
3,203,173,49,2,105,0,133,204,160,0,177
,203,201,79,208,21
OA 2640 DATA 169,78,145,203,165,203,24,10
5,2,133,203,165,204,105,0,133,204,169,
0,240,14,201,15,208,6
PY 2650 DATA 169,14,145,203,208,4,201,65,
240,17,165,203,24,105,1,133,203,165,20
4,105,0,133,204,169,0
AZ 2660 DATA 240,198,162,16,169,7,157,66,
3,169,0,157,72,3,169,30,157,73,3,165,8
8,157,68,3,165
FZ 2670 DATA 89,157,69,3,32,86,228,189,67
,3,133,212,169,0,133,213,96

```




Listing 2. BASIC listing.

```

BY 10 OPEN #1,8,0,"D:FBPICKS.DAT"
KP 20 FOR I=0 TO 27
IQ 30 READ A:PRINT #1;A:REM HRATE(I)
BR 40 READ A:PRINT #1;A:REM ARATE(I)
LM 50 READ A:PRINT #1;A:REM RATE(I,0)
QP 60 PRINT #1;I:REM INDEX(I)-SORTED
JB 70 NEXT I:CLOSE #1
YH 80 DATA 100.0,100.8,100.4,103.7,111.1,
107.4,101.1,98.3,99.7,95.7,87.1,91.6,1
05.2,98.8,102.3
PV 90 DATA 111.8,100.9,106.3,100.2,99.2,9
9.7,110.0,103.8,106.9,97.5,96.4,96.9,9
2.3,93.3,92.9
UV 110 DATA 109.5,106.2,107.7,88.3,86.1,8
7.3,107.5,99.6,103.9,95.7,96.9,96.4,99
.3,97.7,98.5
MT 120 DATA 98.0,104.7,101.6,106.0,105.9,
105.9,100.8,95.5,98.1,93.1,88.7,90.9,1
05.3,93.9,99.6
PC 130 DATA 97.8,103.9,100.4,107.7,94.9,1
01.3,102.3,109.6,106.5,100.1,100.9,100
.6,100.3,97.6,98.9
YL 140 DATA 102.5,95.4,99.2,107.0,97.5,10
2.2,107.7,101.6,104.3

```

WHAT IS ST-CHECK?

Most ST BASIC program listings in this magazine are followed by a table of numbers appearing as data statements, called "ST CHECKSUM DATA." These numbers are to be used in conjunction with **ST-Check** (which appeared in **ANALOG Computing** issue 41).

ST-Check, written by Clayton Walnum, is designed to find and correct typing errors when readers are entering programs from the magazine. For those readers who would like copies of the article, you may send for back issue 41 of **ANALOG Computing** for \$4.00.

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- 16K RAM CX853
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ROM.....CO12499B
ROM.....CO14599B
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- POKEY....CO12294
- PIA.....CO14795
- GTIA.....CO14805
- ANTIC....CO12296
- CPU.....CO10745
- PIA.....CO10750
- CPU.....CO14377
- PIA.....6532

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CUSTOM 810 HAPPY DRIVE**
Fully operational 810 mounted on acrylic base. No case. Includes I/O cable, power supply and installed Happy V7.1

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- 810 Side with Data Sep. \$39.50
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- Data Separator.....\$15.00

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- 1050 Stepper Motor...\$14.50
- Numeric Keypad.....\$15.00
- 850 or PR printer cable \$12.50
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- 800XL Keyboard.....\$29.50

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- 800 4 PIECE BOARD SET**
Includes 800 Main, CPU, 10K ROM and Power Board \$28.50

- 810 BOARD SET**
Sideboard with Sep. Power and Analog Boards.....\$57.50

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Includes 400 Main, CPU and Power Board.....\$19.50
- 400 Keyboard.....\$12.50

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- SAMS Service Manuals for the following units: 800, 800XL, 130XE, 400, 1050 \$19.50 ea.
- 520ST Service Man...\$37.50

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- 810 Version 7.1 Enhan. \$89.95
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- I/O Cable Plug Kit....\$4.50
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- Graphics tablet with Designlab software. KOALA software compatible. 8 bit only...\$49.95

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- Basic Rev. "A" Cartridge works will all Atari Computers except ST. Includes manual.
- 800XL Owners Note! Use this cartridge while programming to eliminate the severe error in the built in "B" Basic...\$10.00

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- 1030 Power Pack....\$12.50

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- Inside Atari Basic.....\$5.00
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- 16K Eprom Board with case, uses two 2764's.....\$5.95
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- 800.....\$39.50
- 850.....\$39.50
- 810.....\$69.50
- 800XL.....\$49.50
- 1050.....\$85.00
- 800 KEYBOARD \$25.00
Include \$7.00 return shipping and insurance. Include \$4.00 shipping for 800 keyboard only

10K Rev. "B" Upgrade for older 800/400's

End printer/disk drive timeouts and other errors. Many new programs require Rev. B. Type the following peek in Basic to see if you have Rev. B.
PRINT PEEK(58383)

If the result equals 56 you have the old O.S. Three Chip ROM set with instr.\$7.50
Complete 10K module..\$9.50

GTIA Upgrade for 800/400

Add additional graphics modes and be compatible with the latest software.....\$4.50

810 Drive Upgrade

Change to Rear/Analog design for best performance \$39.50

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CIRCLE #102 ON READER SERVICE CARD



8-bit news!

PRINTER BUFFER

Microstuffer from Supra gives you and your computer 64K of buffer space that works with most parallel printers. Send all of your printing data to the buffer, then let the buffer do the work of sending the data to the printer. While the printer is doing its thing, you can be doing yours—with the buffer tied up, not your computer.

Microstuffer is installed between the printer and computer, by plugging the 36-pin Centronics parallel port into the buffer, then plugging the cable (supplied) from the buffer into the printer. This product is compatible with Star Micronics, Epson, Panasonic, Okidata, and many other printers.

Retail is \$69.95. Supra Corp., 1133 Commercial Way, Albany, OR 97321 — (503) 967-9075.

CIRCLE #103 ON READER SERVICE CARD

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WASHINGTON D.C.
Fairfax High School, Fairfax, VA (near Rt. 50)
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COMPUTER LEARNING MONTH

October has been officially slated for teachers and students as a **month for computer awareness**. Organized by leaders in the computer industry and education field, this theme month will provide an opportunity to run a series of contests nationwide, as well as "back-to-school" nights for parents, an exhibition of children's computer-inspired activities and the dedication of a time capsule to be reopened in the year 2001.

COMPUTER LEARNING MONTH



OCTOBER '87

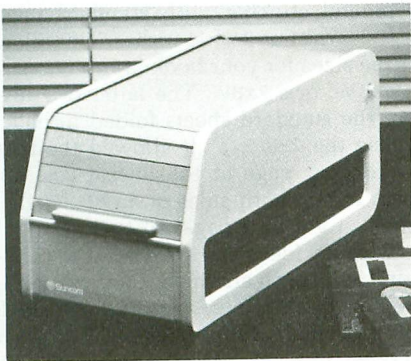
Contests involve computer-generated art, noncomputer art on a computer theme, essays, creative group projects and computer oriented lesson plans.

For students and teachers requiring additional information, contact Computer Learning Month, P.O. Box 19763, Washington, DC 20036-0763.

CIRCLE #107 ON READER SERVICE CARD

STORE YOUR DISKS

Diskit from Suncom is available in several formats capable of storing 3½- or 5¼-inch floppies. Each unit is designed to protect your disks from dust, moisture and static electricity.



The styles available now consist of: the **MicroDiskit 50**, which holds up to 50 micro floppies (\$17.95); the **MicroDiskit 100**, for as many as 100 micro floppies (\$24.99); the **FloppyDiskit 600**, to store up to 60 mini floppies (\$22.99); and the **FloppyDiskit 120**, which accepts a maximum of 120 disks (\$29.99).

From Suncom, Inc., 260 Holbrook Drive, Wheeling, IL 60090 — (312) 459-8000.

CIRCLE #104 ON READER SERVICE CARD

OTHER NEWS

Owners of the MPP C or E modems (including Supra) now have the option of running several **handlers for these modems**, such as a Hayes emulator, or Hayes and Atari 850 status code handler, or just straightforward handlers.

Also from the same company is an **XM301/1030 handler** that emulates the Hayes and 850 interfaces.

Cost is \$20.00 each. For more on either of these packages, contact Bitwise Computer Services, P.O. Box 2552, Sarasota, FL 33578.

CIRCLE #105 ON READER SERVICE CARD



Datasoft/Intellcreations, Inc. has announced the availability of **Video Title Workshop** for the Atari 8-bit line. Title and graphic effects can be created through your computer and VCR, giving you borders, text, fades, scrolling, fizzles, wipes and various graphic screens.

Graphics Companion I supports **Video Title Workshop** and provides twenty-five pre-designed screens covering all major holidays, plus additional support graphics. Further support disks are planned.

The **Video Title Workshop** lists for \$29.95, and the **Graphics Companion I** \$19.95. From Intellcreations, Inc., 19808 Nordhoff Place, Chatsworth, CA 91311 — (818) 886-5922.

CIRCLE #106 ON READER SERVICE CARD

Desktop publishing... in your own write

by William A. Benbow

Two thousand dollars! That's what it was going to cost to have one hundred copies of my 80-page book published. I had just written a biography of one of my more notorious ancestors, Admiral John Benbow, and wanted to give copies to relatives—and maybe even sell a few to other Benbows. But two thousand dollars? I had never imagined it would cost so much. This was certainly not in my budget. So I took another look at my Atari 130XE and Panasonic dot-matrix printer, and decided this was going to have to be a do-it-yourself job.

Most of us have a book or two in us. It could be a cookbook, a how-to book based on our favorite hobby, or maybe even a short story or our first novel. Then again, you may just be interested in publishing a newsletter, a small brochure or a report for work. What I discovered: we have the tools now to create and publish a professional looking product, right at our own desks. And it doesn't have to cost an arm and a leg.

Off on the right foot.

To start with, there are numerous word-processing programs on the market which are more than adequate for creating our masterpieces. I use AtariWriter Plus because I prefer a menu-driven program. For me, it's got to be simple. On such a pro-

gram you can not only write your text, but also design your overall work—with a table of contents, footnotes or endnotes, bibliography, even an index. There are programs coming out now to make this easier, like Print Tool by Marshall D. Abrams, but I did my work simply, with AtariWriter Plus.

You may find an outline processor (like Creative Process) helpful in getting started. Such a program enables you to develop an outline, briefly describe each point or chapter, and rearrange these headings until you're happy. Using a standard word processor you can research your work in an organized fashion, keeping separate files on each sub-point till you're ready to put it all together. Some word processors, like PaperClip, let you divide your screen into two windows. With this feature, you can load a research file into one and compose your finished product in the other.

Naturally, you'll polish your work, doing a fair bit of rewriting till it's "just right." You'll find a spelling checker quite helpful at this point. It will pick up typing errors and blatant spelling mistakes. But don't count on it to catch *everything*, especially words that sound the same or errors in grammar. Nothing beats having your spouse go over your creation. My wife is my best critic—and best support.

Once your work is written, the main task in desktop publishing is layout and

typesetting. For a small book (80 to 100 pages), this can easily cost a thousand dollars if done by a professional. That's just to *prepare* your work for the printer. The printer will then charge for paper, actual printing, collating, folding, trimming and binding.

To do it yourself, you need to decide, first, on the size of your book. Since we're doing this on a shoestring budget, I recommend sticking with standard paper sizes: 8½×11 or 8½×14 inches. This allows three sizes for your book: a full 8½×11, a 5½×8½, or a 7×8½. The latter two sizes are the standard sheets folded in half. I chose the 7×8½, as it allowed the most words per page at the lowest cost. By printing on both sides of an 8½×14-inch sheet, I got four pages of text.

Size decided, you then want to pick a type font, pitch and mode. My dot-matrix printer is extremely versatile. It can do both normal and italic letters. For pitch, it offers pica (10 characters per inch), elite (12 cpi), semi-compressed (15 cpi) and compressed (17 cpi). Pica and elite look like typewriter fonts, and compressed is quite small and hard to read, so I chose semi-compressed for my book. In NLQ (Near Letter Quality) mode, it looks great. Maybe a professional typesetter would sneer, but most of us would need a magnifying glass to tell it wasn't professionally set type. You can now get a rough idea of the number of pages you'll need, by



Some rules of the game and tips to get you started.

having your word processor do a word count. Better still, ask it to do a print preview once you've set up the size of type and the page margins.

Of course, in designing the look of your page, you'll want to think about justification. I prefer a straight right edge to copy, for a professional look. If you want a more casual piece, a ragged right edge might do the job best. You'll also need to decide on paragraph spacing and indentation.

Other print styling and formatting options are: bold print and elongated print for headings; underlining; centering portions of your text, or blocking some sections to the right for emphasis. If your printer has the capacity, you could choose double-column printing. You may want headers or footers. These can be added at this stage, including page numbering. Perhaps you'll want to repeat the chapter heading on each page, for easy reference.

Now your book is really taking shape. You need to give some thought to title page, artwork, graphics or photographs you want to include. Photos may require special treatment to be sharply and clearly reproduced. A professional printer can do this "screening" treatment (called "shooting a PMT") for about \$10. Of course, if you have some of the new graphic oriented programs, you can add graphics directly to your text.

With the "preview" option of your word processing program, you can view the appearance of your pages. Better still, if you

have a word processor like AtariWriter Plus, you can set the number of columns you want to work in. This lets you edit and design so that "What you see is [nearly] what you get." Granted, you do have to scroll your viewing window over the larger text page. Nevertheless, this is a tremendous improvement over having to print countless rough copies—or toggle back and forth between preview and edit functions. You can now further design individual pages, by leaving spaces for photos or artwork.

You'll need to use the preview option to break your text into pages. This allows you to see if you need to adjust paragraphs to make pages more presentable. Perhaps you don't want lists or certain quotes broken, so you can add a line or delete some words until the page breaks are suitable. The block move option of a word processor allows easy cutting, moving and pasting of text.

You really do need to see your words on paper to get a real picture of what your work will look like. So, when you're finished polishing your text and page design, print a draft copy. Although you'll be printing on standard 8½×11-inch paper, it's quite easy to set margins to suit your chosen page size and trim later.

If you're happy with the general shape and look of your book, you can print an NLQ copy. Use a good ribbon and monitor the printing to ensure that it's uniform in appearance. If your work is quite long,

you may need to re-ink or replace your ribbon.

Next, cut your pages to size and paste them on full sheets of paper (8½×11 or 8½×14). I used my draft copy to do a mock-up of my book, so I could get pages in order for pasteup. Remember, you're probably pasting four smaller pages onto one sheet of paper, two on each side. I learned from experience that, when you fold several sheets of paper together, the inner sheets fan out more than the outside ones. When you bind these sheets to form your book, they'll need to be trimmed. This will result in the inner pages having a narrower outer margin, unless you compensate when pasting them on the sheets for printing or photocopying. It takes a bit of experimenting, but the idea is to leave more of an outer margin on pages that will be in the center of your book. Photos and artwork can now be glued in place, and your manuscript is "camera ready."

I researched the cost of both printing and photocopying in my area, and decided to go with the latter. The difference in the finished product wasn't that great, and the cost for a small printed run was too rich for my blood.

Another decision you'll need to make at this stage is the weight of paper to use. Many printers suggested something in the range of "60-pound" paper. This paper is heavy enough so that print from one side won't show through to the other. Consider-

ably more expensive than the standard 20-pound stock, it does give a more professional look.

I've found the 20-pound quite satisfactory. It's the most commonly stocked paper in the two standard sizes, so it's available and affordable. I did go to a heavier paper for the cover of my book. Cover stock comes in a great variety of colors and weights, and, though you can't tell a book by its cover, this is one area I would not skimp on. First impressions are important. I believe it's worth considering printing or photocopying the cover in colored ink. If you're doing one-color copying (usually in black ink), a second color won't add much to the cost. On the other hand, full-color copying is quite expensive. I found I couldn't consider it, either for the cover or for inside photographs.

However, standard photocopying in bulk is not expensive. It cost me 3½ cents a page for the 4000 copies I needed (40 prints—2 pages per print—times 100 copies). I only used 2000 sheets of paper, because I photocopied each side. To this

\$140 charge was added \$60 for separately printing the cover in colored ink, on cover stock. In addition, I paid \$20 for folding, stapling and trimming, for a total cost of \$220. I got one hundred copies of my book, an average cost per book of \$2.20. Not bad, considering it would have cost me nearly \$2000 to have it done professionally. I could have had it bound more expensively. You can choose to have your book glued, rather than stapled, or even use other products—if you can pay one dollar or so more for each copy.

I've already sold enough copies of my book to cover expenses—and to start setting up for a second edition. My original 30,000 words have expanded to 40,000, and I plan on one hundred pages this time. All these changes can be done quite simply on a standard word processing program, just as the first edition was.

You may want to experiment with the up and coming desktop publishing software. Word Magic and Graphic Magic by Blue Collar Software is a graphics/text combination modeled on Macintosh programs. The Print Tool by Marshall D. Abrams works with these programs, and is designed to do footnotes, indexes, tables of contents and full text formatting. I feel we need more of these programs.

What to look for in the ready-made programs.

An ideal desktop publishing program should combine a number of features. You want to be able to easily choose page size, pick type fonts, stylize and format text, lay out multiple pages, and have the text quickly reformed when changes are made. Headers, footers and pagination must be easily set.

Such a program must be able to make suitable spaces in your text, to allow for photos and artwork. Margins should adjust automatically, so that your text is shaped to wrap around the space created. You'll also want a program that can insert graphics and picture files into any document. It should have the capacity to create such graphics, as well as load them from standard graphic programs such as The Print Shop, from Broderbund.

A good desktop publishing program will expand your choices of type fonts and add design features like borders and larger emphasized fonts for headings. Systems to handle footnotes, indexing and tables of contents would be an asset. I spent a lot of time renumbering my footnotes every time I added references in my book.


If a programmer wants to get fancy, he could add hyphenating and proportional

character spacing, for a professionally typeset appearance. Most important, a good desktop publisher should be compatible with standard word-processing programs, so that text files can be added and manipulated. No one wants to learn yet another word-processing program.

Such programs are coming to Atari. They've been around quite a while for the "big guns," like Apple and IBM, and include expensive laser printers and digitalized pictures. Their popularity and marketability is evidenced by their rapid growth throughout the whole field of personal computing.

Writing with a word-processing program is one of the most common uses for home computers. The field is about to be revolutionized, in much the way that spreadsheet programs transformed accounting. Programmers have a tremendous opportunity to be part of this development by bringing these enhancements to the 8-bit Atari world. There is an enormous market for this kind of program. In addition to current owners, who are heavy users of writing-related programs, buyers will be attracted to the 8-bit market if affordable desktop publishing systems are made available. This is high on the fast-growing list of practical uses for the home computer.

With existing software, we can not only write our reports, newsletters, short stories, and even full-length books; we can design and publish them, as well. With desktop publishing software we'll be in the same league as the "big boys." I'm looking forward to an 80-column enhancement and a high-resolution monitor. These will move me closer to the standard of "What you see is what you get."

We all have ideas and experiences that are worth writing about. Desktop publishing on an Atari means you and I can afford to publish what we write. 

William A. Benbow is a social worker and free-lance writer, who uses computers both at work and at home. Though his Masters degree is in social work, his avocation is his family's history. He's now working on a novel based on the life of his ancestor, Admiral John Benbow.

RAMROD XL/XE \$79.95

This upgrade for the XL and XE computers allows the use of three different operating systems. Comes with the OSNXL OS that includes the FASTCHIP floating point routines and the OMNIMON XL/XE machine language monitor. The OSNXL OS is compatible with the 400/800 OS, but has programmable cassette baud rates, increased keyboard speed, and all the graphic modes.

The OMNIMON XL is a resident monitor with all the debugging tools needed for any application. Interrupt and examine any program (including cartridges) easily. Includes read/write to disk, binary load, directory, assembler, disassembler, single step execution, drive control, change registers, hex conversion/math, search, display, alter, move, relocate, verify memory, Hex or character format and more.

RAMROD XL2 \$39.95

Same as above, but without OS.

OSNXL \$49.95

Operating System as described above.

OMNIVIEW as low as \$39.95

Get 80 columns for your computer. Available for 400, 800, 600XL, 800XL, 65XE, 130XE. Also comes with an 80 column word processor and terminal program.

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CIRCLE #108 ON READER SERVICE CARD



Label Maker

*The program you'll want
for all those labelling chores.*

by Jan Iverson

One of our user group members came to me and asked if there was any way to create a custom label—and have it printed 2000 times. Sure, I could have created a special BASIC program, putting a FOR-NEXT loop in it to print X number of times. I have a few of these routines on disk, for some of my own label requirements.

But I'm tired of having all these tiny programs on disks, each dedicated for just one label. So I sat down to write a multipurpose program that would allow me to create a label, and either save it to disk or print it immediately. Also, I wanted to be able to call that label up later and change it if needed.

The result of this effort is **Label Maker**.

Using it.

The program is configured for a standard 1-inch by 3-inch label. If you want to print larger labels, you might change the blank line printing on Line 1380 that's used for the spacing between labels. You'll still only be able to print four lines, though.

Let's get started. First, type in Listing 1 and save it to disk. Use the "Basic Editor II" (issue 47) to catch any errors.

Run the program, and you'll be presented with a main menu screen with three options. Use the SELECT button to highlight one of these options. For convenience, you'll always be able to abort any of the options by pressing ESCAPE.

Create a new label.

The first option you would select is "Create a New Label." Press START, and the screen changes color. A rec-

tangle that's the correct size for a one-inch label will appear on the screen.

You have four lines to type in the label information. Press RETURN after each line. **Label Maker** has an input mask, so you can't type beyond the rectangle borders. After the final RETURN, you'll be given the option of saving, doing over or printing the label. Press START if you want to save the label. You'll be asked for the name to be saved to disk. Type in the name (up to eight characters) and press RETURN.

After the label is saved, you'll be asked if you want to make another label, or print this label. Press SELECT to make another label, or OPTION to print the current label.

By using the CTRL key together with a letter key, you can print in expanded or condensed. This must be the first item, entered before you actually type your line in. To print in expanded mode, press CTRL-N. To print in condensed mode, hit CTRL-O. These are pretty universal printer control codes, and work with the Epson, Star and Atari printers.

If you have another printer, look in your manual for the expanded and condensed codes. Be aware also that, when you mix printer modes, you can't line them up on the screen and expect them to print out that way. Expanded print takes up twice the room, so you need to start at the leftmost portion of the rectangle. Condensed type will take up one-half the room of your normal font, so you need to adjust accordingly.

Edit/Print an old label.

When you choose this option, the familiar rectangle appears, with the message to type in the name of the label.

If you type in an incorrect name, **Label Maker** traps the error and tells you you've chosen an invalid label name. You then get another chance to type in the correct one.


```

YR 170 IF PEEK(53279)=5 OR PEEK(53279)=6
    THEN 170
IZ 180 POSITION 10,13:? "EDIT/PRINT A LAB
EL"
RG 190 IF PEEK(53279)=5 THEN POSITION 10,
13:? "EDIT/PRINT A LABEL":GOTO 220
LR 200 IF PEEK(53279)=6 THEN 570
PE 210 GOTO 190
RJ 220 IF PEEK(53279)=5 OR PEEK(53279)=6
    THEN 220
JA 230 POSITION 10,16:? "DISK DIRECTORY
EL"
ML 240 IF PEEK(53279)=5 THEN POSITION 10,
16:? "DISK DIRECTORY ":GOTO 120
LO 250 IF PEEK(53279)=6 THEN 1070
NV 260 GOTO 240
EF 270 ? "K":POKE 710,208:POKE 712,208:PO
KE 16,64:POKE 53774,64
DK 280 POSITION 2,1:? "analog computing"
FY 290 POSITION 10,6:? "CREATE A NEW LABE
L":GOSUB 1560:GOSUB 1610
AP 300 CLOSE #4:OPEN #4,4,0,"K:"
UU 310 X=4:Y=11:X1=4:X2=36:GOSUB 2050
PK 320 LINE1$=THIRTY$:GOSUB 2270
WK 330 X=4:Y=12:X1=4:X2=36:GOSUB 2050
PX 340 LINE2$=THIRTY$:GOSUB 2270
XA 350 X=4:Y=13:X1=4:X2=36:GOSUB 2050
QK 360 LINE3$=THIRTY$:GOSUB 2270
XQ 370 X=4:Y=14:X1=4:X2=36:GOSUB 2050
QX 380 LINE4$=THIRTY$:GOSUB 2270
WW 390 GOSUB 1660
IO 400 IF PEEK(53279)=6 THEN 450
PT 410 IF PEEK(53279)=5 THEN GOSUB 1520:G
OSUB 1610:GOTO 310
FR 420 IF PEEK(53279)=3 THEN 1220
GT 430 IF PEEK(764)=28 THEN POKE 764,255:
GOTO 20
MV 440 GOTO 400
PH 450 TRAP 40000:TRAP 450
UP 460 GOSUB 1820:POSITION 12,21:? "NAME:
":X=18:Y=21:X1=18:X2=26:GOSUB 2050
UC 470 LABEL$=THIRTY$:GOSUB 2270
EC 480 LABEL$(LEN(LABEL$)+1)=EXT$
OR 490 FILE$(3,15)=LABEL$
FM 500 CLOSE #2:OPEN #2,8,0,FILE$
SB 510 ? #2;LINE1$:? #2;LINE2$:? #2;LINE3
$:? #2;LINE4$:CLOSE #2
RB 520 GOSUB 2000
PY 530 IF PEEK(53279)=5 THEN GOSUB 1520:G
OSUB 1610:GOTO 310
FW 540 IF PEEK(53279)=3 THEN 1220
GY 550 IF PEEK(764)=28 THEN POKE 764,255:
GOTO 20
OR 560 GOTO 530
QU 570 ? "K":POKE 710,4:POKE 712,4:POKE 7
11,158:POKE 16,64:POKE 53774,64
DH 580 POSITION 2,1:? "analog computing"
MM 590 POSITION 10,6:? "EDIT/PRINT A LAB
EL":GOSUB 1560
LS 600 GOSUB 1920:CLOSE #4:OPEN #4,4,0,"K
:"
XY 610 X=18:Y=21:X1=18:X2=26:GOSUB 2050
TU 620 LABEL$=THIRTY$:GOSUB 2270
DU 630 LABEL$(LEN(LABEL$)+1)=EXT$
OJ 640 FILE$(3,15)=LABEL$
SQ 650 TRAP 40000:TRAP 760
BJ 660 CLOSE #1:OPEN #1,4,0,FILE$
EQ 670 INPUT #1,LINE1$:INPUT #1,LINE2$:IN
PUT #1,LINE3$:INPUT #1,LINE4$
JS 680 POSITION 4,11:? LINE1$:POSITION 4,
12:? LINE2$:POSITION 4,13:? LINE3$:POS
ITION 4,14:? LINE4$
PG 690 POSITION 10,21:? "
"
WI 700 GOSUB 1660
IC 710 IF PEEK(53279)=6 THEN 1040
PE 720 IF PEEK(53279)=5 THEN GOSUB 1520:G
OTO 810

```

```

FW 730 IF PEEK(53279)=3 THEN 1220
GY 740 IF PEEK(764)=28 THEN POKE 764,255:
GOTO 20
OP 750 GOTO 710
QB 760 FOR I=1 TO 8
LB 770 POSITION 8,22:? "INVALID LABEL N
AME":FOR J=1 TO 40:NEXT J
GW 780 POSITION 8,22:? "
":FOR J=1 TO 40:NEXT J
GP 790 NEXT I
TM 800 TRAP 40000:POSITION 15,20:? "
":POSITION 17,21:? " ":G
OTO 600
LI 810 CLOSE #4:OPEN #4,4,0,"K":GOSUB 16
10
WB 820 X=4:Y=11:X1=4:X2=36:GOSUB 2050
PR 830 LINE1$=THIRTY$:GOSUB 2270
AD 840 X=4:Y=12:X1=TA5C0X2=36:GOSUB 2050
QE 850 LINE2$=THIRTY$:GOSUB 2270
XH 860 X=4:Y=13:X1=4:X2=36:GOSUB 2050
QR 870 LINE3$=THIRTY$:GOSUB 2270
XX 880 X=4:Y=14:X1=4:X2=36:GOSUB 2050
RE 890 LINE4$=THIRTY$:GOSUB 2270
WK 900 GOSUB 1660
PC 910 IF PEEK(53279)=6 THEN 960
AK 920 IF PEEK(53279)=5 THEN GOSUB 1520:G
OSUB 1610:GOTO 810
FY 930 IF PEEK(53279)=3 THEN 1220
HA 940 IF PEEK(764)=28 THEN POKE 764,255:
GOTO 20
PL 950 GOTO 910
GC 960 CLOSE #2:OPEN #2,8,0,FILE$
SR 970 ? #2;LINE1$:? #2;LINE2$:? #2;LINE3
$:? #2;LINE4$:CLOSE #2
XA 980 GOSUB 1660
PS 990 IF PEEK(53279)=6 THEN 960
ZK 1000 IF PEEK(53279)=5 THEN GOSUB 1520:
GOSUB 1610:GOTO 810
TM 1010 IF PEEK(53279)=3 THEN 1220
FD 1020 IF PEEK(764)=28 THEN POKE 764,255
:GOTO 20
UP 1030 GOTO 990
VI 1040 CLOSE #2:OPEN #2,8,0,FILE$
UL 1050 ? #2;LINE1$:? #2;LINE2$:? #2;LINE
3$:? #2;LINE4$:CLOSE #2
QK 1060 GOTO 710
RX 1070 ? "K":POKE 710,244:POKE 712,244:P
OKE 711,204:POKE 16,64:POKE 53774,64
VA 1080 POSITION 3,1:? "Disk directory"
MD 1090 X=2:Y=4:Z=0
LT 1100 TRAP 40000:TRAP 1190
YJ 1110 CLOSE #1:OPEN #1,6,0,"D:*.LBL"
ZT 1120 INPUT #1,DIR$
TW 1130 IF Z=1 THEN X=X+12
UK 1140 IF Z=2 THEN X=X+12
FY 1150 IF Z=3 THEN Y=Y+1:X=2:Z=0
NP 1160 IF DIR$(16,16)="S" THEN POSITION
X,Y:? DIR$:GOTO 1170
OS 1165 POSITION X,Y:? DIR$(1,10)
UE 1170 Z=Z+1
PA 1180 GOTO 1120
DU 1190 POSITION 2,21:? " ESC =
Main Menu "
FB 1200 IF PEEK(764)=28 THEN POKE 764,255
:GOTO 20
NT 1210 GOTO 1200
HA 1220 POKE 710,64:POKE 712,64:POKE 711,
170
QN 1230 POSITION 10,6:? "PRINT A LABE
L":GOSUB 1870
CE 1240 IF PEEK(53279)=6 THEN 1270
FQ 1250 IF PEEK(764)=28 THEN POKE 764,255
:GOTO 20
QI 1260 GOTO 1240
NL 1270 TRAP 40000:TRAP 1470
GN 1280 CLOSE #4:OPEN #4,4,0,"K":CLOSE #
2:OPEN #2,8,0,"P:"
PL 1290 TRAP 1220:TRAP 1290

```



```

nt this label.
LL 1720 POSITION 2,19:? " SELECT will ab
ort this printing.
OU 1730 POSITION 2,20:? "
PQ 1740 POSITION 2,21:? "
IO 1750 POSITION 2,22:? " ESC =
Main Menu
BF 1760 RETURN
JK 1770 POSITION 2,18:? " Enter the numb
er of times you
RR 1780 POSITION 2,19:? " want to print
this label
ZL 1790 POSITION 10,21:? "NUMBER:
"
IB 1800 POSITION 2,22:? " ESC =
Main Menu
AS 1810 RETURN
YP 1820 POSITION 2,18:? " Now that you ha
ve created your label "
ON 1830 POSITION 2,19:? " What name do yo
u want to save it as?"
OP 1840 POSITION 2,20:? " Input up to an
8 character name."
IQ 1850 POSITION 2,22:? " ESC =
Main Menu
BH 1860 RETURN
CJ 1870 POSITION 2,18:? " Insert your lab
els in your printer.
YB 1880 POSITION 2,19:? " Position your p
rint head properly.
US 1890 POSITION 2,20:? " When you are re
ady, press START "
ID 1900 POSITION 2,22:? " ESC =
Main Menu
AU 1910 RETURN
AW 1920 POSITION 2,18:? "Enter the name o
f the label you want "
OH 1930 POSITION 2,19:? "to read from the
disk and to print.
ZL 1940 POSITION 12,21:? "NAME: ":POSITIO
N 12,22:? "ESC = Main Menu"
BG 1950 RETURN
NJ 1960 POSITION 2,18:? " START will pri
nt this label again.
VA 1970 POSITION 2,19:? "
PO 1980 POSITION 2,20:? "
BS 1990 RETURN
XC 2000 POSITION 2,18:? " Do you want to
make another label?
HD 2010 POSITION 2,19:? " SELECT will cr
eate another label
WC 2020 POSITION 2,20:? " OPTION will pr
int this label ":POSITION 10,21:?
"
HU 2030 POSITION 2,22:? " ESC =
Main Menu
AM 2040 RETURN
LX 2050 I=0:POSITION X,Y:? "█"
AY 2060 GET #4,THIRTY
WX 2070 IF THIRTY=28 OR THIRTY=29 OR THIR
TY=30 OR THIRTY=31 OR THIRTY=125 OR TH
IRTY=255 THEN 2060
VE 2080 IF THIRTY=155 THEN 2250
AJ 2090 IF THIRTY=27 THEN POP :GOSUB 2270
:GOTO 20
NJ 2100 IF THIRTY=126 AND X=X1 THEN 2060
EK 2110 IF THIRTY=126 AND X>X1 THEN POSIT
ION X,Y:? " ":X=X-1:POSITION X,Y:? "█"
:THIRTY$(I)=" ":I=I-1:GOTO 2180
LO 2120 IF X=X2 THEN 2200
ZO 2130 LET I=I+1
AB 2140 POSITION X,Y:? CHR$(THIRTY):LET T
HIRTY$(I)=CHR$(THIRTY):LET X=X+1

```

```

UV 2150 IF X=X2 THEN POSITION X,Y:? "█":G
OTO 2060
JR 2160 POSITION X,Y:? "█"
QX 2170 GOTO 2060
FU 2180 IF X+1<>X2 THEN POSITION X+1,Y:?
" "
RD 2190 GOTO 2060
AK 2200 GET #4,THIRTY
GR 2210 IF THIRTY=27 THEN POP :GOTO 20
UQ 2220 IF THIRTY=155 THEN 2250
OI 2230 IF THIRTY=126 THEN 2110
OO 2240 GOTO 2200
TF 2250 IF X<>X2 THEN POSITION X,Y:? " ":
RETURN
VB 2260 POSITION X,Y:? " ":RETURN
JR 2270 THIRTY$(32)="█":THIRTY$(2)="":THI
RTY$=" ":RETURN

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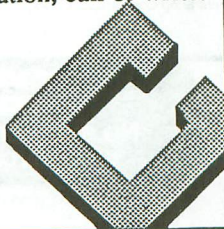
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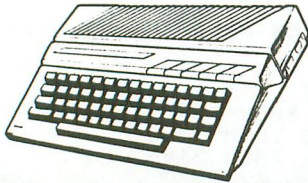
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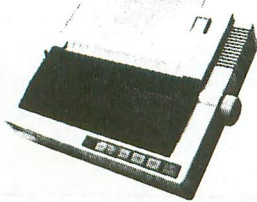
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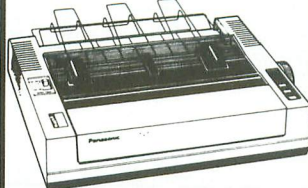
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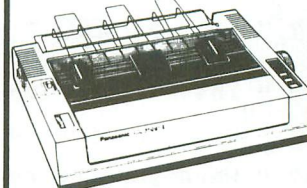
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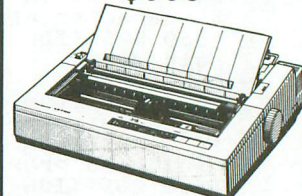
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M/L Editor

For use in machine language entry.

by Clayton Walnum

M/L Editor provides an easy method to enter our machine language listings. It won't allow you to skip lines or enter bad data. For convenience, you may enter listings in multiple sittings. When you're through typing a listing with M/L Editor, you'll have a complete, runnable object file on your disk.

There is one hitch: it's for disk users only. My apologies to those with cassette systems.

Listing 1 is M/L Editor's BASIC listing. Type it in and, when it's free of typos, save a copy to disk, then run it.

On a first run, you'll be asked if you're starting a new listing or continuing from a previously saved point. Press S to start, or C to continue.

You'll then be asked for a filename. If you're starting a new listing, type in the filename you want to save the program under, then press RETURN. If there's already a file by that name on the disk, you'll be asked if you wish to delete it. Press Y to delete the file, or N to enter a new filename.

If you're continuing a file, type in the name you gave the file when you started it. If the program can't find the file, you'll get an error message and be prompted for another filename. Otherwise, M/L Editor will calculate where you left off, then go on to the data entry screen.

Each machine language program in ANALOG Computing is represented by a list of BASIC data statements. Every line contains 16 bytes, plus a checksum. Only the numbers following the word DATA need be considered.

M/L Editor will display, at the top of the screen, the number of the line you're currently working on. As you go through the line, you'll be prompted for each entry. Simply type the number and press RETURN. If you press RETURN without a number, the default is the last value entered.

This feature provides a quick way to type in lines with repetitions of the same number. As an added convenience, the editor will not respond to the letter keys (except Q, for "quit"). You must either enter a number or press RETURN.

When you finish a line, M/L Editor will compare the entries' checksum with the magazine's checksum. If they match, the screen will clear, and you may go on to the next line.

If the checksums don't match, you'll hear a buzzing sound. The screen will turn red, and the cursor will be placed back at the first byte of data. Compare the magazine listing byte by byte with your entries. If a number's correct, press RETURN.

If you find an error, make the correction. When all data's valid, the screen will return to grey, and you'll be allowed to begin the next line.

Make sure you leave your disk in the drive while typing. The data is saved continuously.

You may stop at any time (except when you have a red screen) by entering the letter Q for byte #1. The file will be closed, and the program will return you to BASIC. When you've completed a file, exit M/L Editor in the same way.

When you've finished typing a program, the file you've created will be ready to run. In most cases, it should be loaded from DOS via the L option. Some programs may have special loading instructions; be sure to check the program's article.

If you want the program to run automatically when you boot the disk, simply name the file AUTORUN.SYS (make sure you have DOS on the disk).

That's M/L Editor. Use it in good health. 

The two-letter checksum code preceding the line numbers here is *not* a part of the BASIC program. For further information, see the "BASIC Editor II," in issue 47.

Listing 1.
BASIC listing.

```

AZ 10 DIM BF(16),NS(4),A$(1),B$(1),F$(15)
      F$(15)
LF 11 DIM MOD$(4)
BN 20 LINE=1000:RETRN=155:BACKSP=126:CHK$
      UM=0:EDIT=0
GO 30 GOSUB 450:POSITION 10,6:?"Start or
      Continue? ";GOSUB 500:?" CHR$(A)

```

```

ZG 40 POSITION 10,8:?"FILENAME";INPUT F
      $:POKE 752,1:?" "
FE 50 IF LEN(F$)<3 THEN POSITION 20,10:?"
      "":GOTO 40
NF 60 IF F$(1,2)<"D:" THEN F1$="D:";F1$(
      3)=F$:GOTO 80
KL 70 F1$=F$
TN 80 IF CHR$(A)="5" THEN 120
FD 90 TRAP 430:OPEN #2,4,0,F1$:TRAP 110
HQ 100 FOR N=1 TO 16:GET #2,A:NEXT #1:LINE
      =LINE+10:GOTO 100
MH 110 CLOSE #2:OPEN #2,9,0,F1$:GOTO 170
VT 120 TRAP 160:OPEN #2,4,0,F1$:GOSUB 440
      :POSITION 10,10:?"FILE ALREADY EXISTS
      !":POKE 752,0
ZU 130 POSITION 10,12:?"ERASE IT? ";:GOS
      UB 500:POKE 752,1:?" CHR$(A)
      V# 140 IF CHR$(A)="N" OR CHR$(A)="n" THEN
      CLOSE #2:GOTO 30
RG 150 IF CHR$(A)<"Y" AND CHR$(A)<"y" T
      HEN 130
BH 160 CLOSE #2:OPEN #2,8,0,F1$
      IE 170 GOSUB 450:POSITION 10,1:?"NOH ON
      [RETRN]";:LINE:CHKSUM=0
      GH 180 L=1:FOR N=1 TO 16:POSITION 13*(N<
      10)+12*(N<9),N+2:POKE 752,0:?"BYTE #
      "":N:?"":GOSUB 310
      KH 190 IF EDIT AND L=0 THEN BYTE=BF(N):GO
      TO 210
      FY 200 BYTE=VAL(NS)
      OZ 201 MOD$(N)=
      DU 210 POSITION 22,N+2:?" BYTE:" "
      VZ 220 BF(N)=BYTE:CHKSUM=CHKSUM+BYTE*N:IF
      CHKSUM>9999 THEN CHKSUM=CHKSUM-10000
      MS 230 NEXT N:CHKSUM=CHKSUM+LINE:IF CHK$
      UM<9999 THEN CHKSUM=CHKSUM-10000
      IG 240 POSITION 12,N+2:POKE 752,0:?"CHEC
      KSUM:"":L1=4:GOSUB 310
      EH 250 IF EDIT AND L=0 THEN 270
      BH 260 C=VAL(NS)
      SY 270 POSITION 22,N+2:?" C:" "
      IL 280 IF C=CHKSUM THEN 300
      DI 290 GOSUB 440:EDIT=1:CHKSUM=0:GOTO 180
      LH 300 FOR N=1 TO 16:PUT #2,BF(N):NEXT N:
      LINE=LINE+10:EDIT=0:GOTO 170
      FU 310 L=0
      KZ 320 GOSUB 500:IF (A=ASC("Q")) OR A=ASC(
      "q")) AND N=1 AND NOT EDIT THEN 420
      PO 330 IF A<RETRN AND A<BACKSP AND (A<4
      8 OR A>57) THEN 320
      DX 331 IF A=RETRN AND NS="" THEN NS=MOD$
      TD 335 IF A=RETRN AND L=0 AND N>1 THEN 35
      0
      JR 340 IF (A=RETRN AND NOT EDIT) OR A=B
      ACKSP) AND L=0 THEN 320
      DH 350 IF A=RETRN THEN POKE 752,1:?"":R
      ETURN
      GG 360 IF A<BACKSP THEN 400
      SA 370 IF L>1 THEN NS=NS$(L,L-1):GOTO 390
      AS 380 NS=""
      RE 390 ? CHR$(BACKSP):L=L-1:GOTO 320
      BB 400 L=L+1:IF L>11 THEN A=RETRN:GOTO 35
      0
      HK 410 NS$(L)=CHR$(A):?" CHR$(A):GOTO 320
      KN 420 GRAPHICS 0:END
      YT 430 GOSUB 440:POSITION 10,10:?"NO SUC
      H FILE!":FOR N=1 TO 1000:NEXT N:CLOSE
      #2:GOTO 30
      FD 440 POKE 710,48:SOHND 0,100,12,8:FOR N
      =1 TO 50:NEXT N:SOHND 0,0,0,8:RETURN
      MY 450 GRAPHICS 23:POKE 16,112:POKE 53774
      ,112:POKE 559,0:POKE 710,4
      XR 460 DL=PEEK(560)+256*PEEK(561)+4:POKE
      DL-1,70:POKE DL+2,6
      HM 470 FOR N=3 TO 39 STEP 2:POKE DL+N,2:N
      EXT #1:FOR N=4 TO 40 STEP 2:POKE DL+N,0
      :NEXT N
      ZW 480 POKE DL+41,65:POKE DL+42,PEEK(560)
      :POKE DL+43,PEEK(561):POKE 87,0
      AC 490 POSITION 2,0:?"analog ml editor"
      POKE 559,34:RETURN
      HZ 500 OPEN #1,4,0,"K1":GET #1,A:CLOSE #1
      :RETURN

```




Basic Diet



How should you be eating? This program can help you find out.

by Ron Schaefer, M.D.

Over 40 percent of Americans are overweight. They run an increased risk for the development of diabetes, heart disease, stroke, cancer and infections. In other words, many of you probably won't live as long as someone who is not overweight.

The **Basic Diet** program will help with planning a diet, either to gain or lose weight. [Remember, the word *diet* is from the Greek *diaita*, meaning "manner of living." A diet is a plan for everyday life.] It will calculate your daily caloric requirements and show you what your ideal diet should consist of. It will tell you what your ideal body weight should be. It can calculate how long it will take for you to lose a given amount of weight, and how many calories are expended for a variety of athletic activities. First, though, a few things should be said on diet and weight loss.

There exists a tremendous amount of misinformation on this material in the lay press. This is a field that has more quacks than a duck pond. The actual concept behind weight loss is quite simple: you must burn off more calories than you take in. Hence, there are two aspects that can be modified: (1) you can increase the amount of calories you ex-

pend by increasing your level of activity, for instance with exercise; or (2) you can decrease the amount of calories you take in. This seems quite obvious, and yet many diets fail to stress this point. I recall one so-called diet claiming that "Calories Don't Count." In fact, they are how you keep score in the diet game.

One pound of fat is equal to 3500 calories, or about five pieces of German chocolate cake. Most people will expend fewer than 3000 calories per day. Simple mathematics would say that it would be impossible to lose more than a pound a day, yet this happens all the time. The answer is that what you're losing is not fat, but water. As soon as your system is stabilized on the diet, all this water loss will return—and so will the pounds represented.

Losing weight should be a gradual process, and crash diets should be avoided for numerous health reasons. The best method I know is to take smaller portions of all the foods you normally eat, then leave about a third of that untouched on your plate. I know leaving food on the plate is wasteful, but look at it this way: you would have normally eaten/wasted it, anyway.

In 1981 the Senate Select Committee on Human Nutrition made guidelines for the "Ideal American Diet." This differed from the usual American diet by having fewer

// Basic Diet *continued*

calories, more fiber, less simple sugars and fats (especially saturated fats and cholesterol), less salt, and proportionately more complex carbohydrates. These recommendations are included in the **Basic Diet**, and when calculating your daily caloric requirements, you'll see how many grams of each type of food you should eat.

About the program.

The first line sets up the title bar, replacing the word **OUTPUT** with the value of the string **TITLE\$**. A subroutine called **MKTITLE** then uses a **GEMSYS** call to accomplish this. This subroutine can easily be used in other programs you write, to give them a professional touch.

Next, the **SPORTCAL** array is filled. This is used later to see how many calories are burned up for fifteen different athletic activities. A second subroutine, **SUBTITLE**, is then called. This takes the string **SUBTITLE\$** and uses two **VDISYS** calls to create an enlarged, underlined subtitle. Next comes the main menu, with your five choices. These five choices will send the program to four different subroutines, or will quit the program.


The first subroutine calculates the "Ideal Body Weight." It's called **IBW** and starts on Line 200. It in turn calls the subroutines **WEIGHT**, **HEIGHT** and **SEX**, then it calculates the **IBW**.

The second subroutine, **DCR**, will calculate your Daily Caloric Requirements and display your ideal diet. You must

estimate your usual level of activity, which can change your caloric requirements by as much as 100 percent. For instance, computer programming should be considered light work, whereas ditch digging would be heavy work.

The next subroutine, **Weight Loss** or **WL**, will ask you how much weight you want to lose or gain, and over what period of time you wish this change to take place. If it's impossible to lose the requested weight in the given period of time, the computer will tell you how long you would have to starve to lose the weight. This is not the recommended way to lose weight, as I've tried to make clear above. It's included more for curiosity about the limits than for anything else. The weight loss subroutine will ask you for your daily caloric requirement, which can be calculated using the **DCR** subroutine (if you remember your **DCR**, you can enter it here manually).

The final subroutine, **ECR** (for Exercise Caloric Requirements), will tell you how much you burn up per hour, or fraction of an hour, for fifteen different athletic activities. It will allow you to see the effects of an exercise program on your diet. This is done by adding the amount of calories you burn during exercise to your usual daily caloric requirements, and then entering this number manually in the **Weight Loss** subroutine.

Use it in good health. 

Ron Schaefer is a third-year resident at the University of Hawaii, specializing in Internal Medicine. He's been programming for almost eighteen years, and has published computer research on three-dimensional molecular modeling of proteins and DNA. All his previous experience has been with mainframes (mostly VAX 11/70s, 11/750s and the Evans and Sutherland picture system). The Atari 520ST is his first personal computer.

Listing 1. ST BASIC listing.

```


10 title$ =" // DIET by Dr. Ron Schaefer // ":gosub MKTITLE
20 dim sportcal(15)
30 for loop=1 to 15:read sportcal(loop):next loop
40 data 900,660,600,600,490,420,360,350,350,300,300,300,250,210,210
50 fullw 2 :clearw 2:wtloss$="n"
60 subtitle$="MAIN DIET MENU":gosub SUBTITLE
70 ?"This program will calculate your ideal body weight, your daily energy requirement, predict how long it will take to lose a given amount of weight, and tell you how much energy you use up doing various exercises"
100 ?:"Enter the type of calculation you wish do to":?
110 ?"          1) Ideal Body Weight"
120 ?"          2) Daily Caloric Requirements (Ideal Diet)"
130 ?"          3) Weight Loss"
140 ?"          4) Exercise Caloric Requirements"

```

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```

150 ?"          5) Quit"
160 ?:"input;"Enter type";x
170 on x gosub IBW,DCR,WL,ECR,OVER
180 goto 50
190 OVER:end
200 IBW:'##### IDEAL BODY
WEIGHT #####
210 clearw 2
220 subtitle$="IDEAL BODY WEIGHT":gosu
b SUBTITLE
230 ?"The ideal body weight can be cal
culated by the following equations"
240 ?:" for males      IBW = 50 kg + 2.
3 kg per inch over 5 feet"
250 ?" for females  IBW = 45 kg + 2.3
kg per inch over 5 feet"
260 ?:"gosub WEIGHT
270 gosub HEIGHT
280 gosub SEX
290 if sx$ = "m" then basewt = 50 else
basewt = 45
300 ibwkg% = basewt+2.3*(iht%-60):ibwp
ounds% =ibwkg%*2.2
310 ?:"The actual weight is";pwt%:"lb
s or";kwt%:"kg, while the ideal body w
eigh
320 ?:"is";ibwpounds%:"lbs or";ibwkg%:"
kg. There is a difference";
330 ?" of";pwt%-ibwpounds%:"lbs or";IN
T(pwt%/ibwpounds%*100)-100;"percent."
340 input;"Hit return ",q$;return
350 DCR:'##### DAILY CALO
RIC REQUIREMENTS #####
360 subtitle$="DAILY CALORIC REQUIREME
NTS"
370 INDCR:gosub SUBTITLE
380 ?"The daily caloric requirement ca
n be estimated using the following":?
390 ?"Males Calories/day = 66+13.7x(w
t in kg) + 5x(ht in cm) - 6.8x(age)"
400 ?"Females Cal/day = 655+9.6x(wt in
kg) + 1.7x(ht in cm) - 4.7x(age)"
410 ?:"This is then multiplied by a s
tress factor to obtain the amount of"
420 ?"calories needed to maintain the
same weight"
430 ?:"input"Enter the age in years";ag
e
440 gosub WEIGHT:gosub HEIGHT:gosub SE
X
450 if sx$ = "m" then 470
460 beex%=655 + 9.6*kwt% + 1.7*cht% - 4
.7*age:goto 480
470 beex%=66 + 13.7*kwt% + 5*cht% - 6.8
*age
480 gotoxy 0,10:for n = 1 to 7
490 ?"
":next n
500 gotoxy 0,10:"Range of activity fa
ctor levels"
510 ?"      Sedentary, bed ridden  1.2
x "
520 ?"      Light work  1.5x "
530 ?"      Moderate mechanical work  1
.75x"
540 ?"      Prolonged heavy labor or ex
ercise  2.5x"
550 ?:"input;"Enter level of activity (
1.2 through 2.5)";act

```

```

560 beeact%=bee%*act
570 gotoxy 0,10:for n = 1 to 7
580 ?"
":next n
590 gotoxy 0,11
600 ?"The daily caloric requirements w
ould be";beeact%:"calories/day"
610 if wtloss$="y" then input;"press r
eturn ",q$;return
620 ?:"input;"Hit return to see Ideal D
iet ",x$
630 cal=beeact%:gosub IDEAL
640 return
650 WL:'##### WEIGHT LO
SS #####
660 subtitle$="WEIGHT LOSS":gosub SUBT
ITLE:wtloss$="y"
670 ?"Each pound of fat is equal to 35
00 calories. To lose weight your"
680 ?"expenditure of energy must excee
d the amount of calories you eat, if"
690 ?"it is more you will gain weight.
Exercise can increase your caloric"
700 ?"requirements and speed weight lo
ss."
710 ?:"How much weight do you wish to
lose (negative number) or"
720 input;"gain (positive number)";wtc
hange
730 input;"Do you need to calculate yo
ur daily caloric requirements (y or n)
";y$
740 if y$="y" then gosub INDCR:cal = b
eeact%:col=beeact%
750 if y$<>"y" then input;"Enter daily
caloric requirements";cal
760 input;"Over how many days do you w
ant to change your weight";days
770 totalcal=3500*wtchange:daycal=tota
lcal/days:calloss%=cal+daycal
780 if calloss% < 0 then 790 else 820
790 ?"You would have to increase your
daily caloric expenditure to make make
"
800 ?"that possible, or starve for";IN
T(-totalcal/cal);"days to lose the wei
ght"
810 input;"press return ",q$;return
820 ?"You would have to eat";calloss%;
"calories per day to reach your goal"
830 input;"hit return ",q$;return
840 ECR:'##### EXERCISE
CALORIC REQUIREMENTS #####
850 subtitle$="EXERCISE CALORIC REQUIR
EMENTS":gosub SUBTITLE
860 ?"Calories per hour expended in ce
rtain sports, choose the number of"
870 ?"the sport, then the hours, or fr
action of (ie .25 = 15min) to determin
e"
880 ?"amount of calories expended. Th
is number can then be added to your"
890 ?"daily caloric requirement helpin
g to estimate the effects of an"
900 ?"exercise program on weight loss.
":?
910 ?"1) Running 10mph =900  2) Bicy
cling 13mph =660  3) Handball =60
0

```


// Basic Diet *continued*

```

920 ?"4) Skiing 10mph =600 5) Clim
bing 100ft/h =490 6) Tennis =42
0
930 ?"7) Ping-pong =360 8) Roll
er-skating =350 9) Volleyball =35
0
940 ?"10) Walk 3.7mph =300 11) Swim
ming 0.25mph =300 12) Rowing =30
0
950 ?"13) Golf =250 14) Walk
ing 2.5mph =210 15) Bike 5.5mph =21
0
960 ?;input;"Enter sport number";sport
:exercal=sportcal(sport)
970 gotoxy 0,15
980 input;"Enter duration of sport in
hours";hours:exercal=exercal*hours
990 ?"That would burn";exercal;"calori
es. ";input;" press return";q$
1000 return
1010 CHARSIZE:'##### C
HANGES CHAR SIZE #####
1020 poke contrl,106:poke contrl+2,0:p
oke contrl+6,1:poke intin,seffect
1030 vdisys(1)
1040 poke contrl,107:poke contrl+2,0:p
oke contrl+6,1:poke intin,size
1050 vdisys(1):return
1060 SUBTITLE:'##### CRE
ATES THE SUBTITLE #####
1070 clearw 2

```

```

1080 sublength=LEN(subtitle$):start=35
-.5*sublength
1090 size=15:seffect=9:gosub CHARSIZE
1100 gotoxy start,1?:subtitle$:?
1110 size=9:seffect=0:gosub CHARSIZE:r
eturn
1120 MKTITLE:'##### CREAT
ES A TITLE #####
1130 a#=gb
1140 gintin=peek(a#+8)
1150 poke gintin+0,peek(systab+8)
1160 poke gintin+2,2
1170 s#=gintin+4
1180 poke s#,varptr(title$)
1190 gemsys(105)
1200 return
1210 WEIGHT:'##### GETS THE
WEIGHT #####
1220 input;"Do you want to use pounds
or kilograms (p or k)";p$
1230 input;"Enter how much you weigh";
wt
1240 if p$ = "p" then pwt%=wt:kwtx=wt/
2.2
1250 if p$ = "k" then pwt%=wt*2.2:kwtx
=wt
1260 return
1270 HEIGHT:'##### GETS TH
E HEIGHT #####
1280 input;"Do you want to use inches
or centimeters (i or c)";h$
1290 input;"Enter your height";ht
1300 if h$ = "i" then iht%=ht:cht%=ht*
2.54
1310 if h$ = "c" then iht%=ht/2.54:cht
%=ht
1320 return
1330 SEX:'##### GETS TH
E SEX #####
1340 input;"Enter the sex, male or fem
ale (m or f)";sx$
1350 return
1360 IDEAL:'##### COMPOSITION
OF IDEAL DIET #####
1370 clearw 2:gotoxy 0,0
1380 ?" IDEAL DIET
" For your total of";cal;"cals
"
1390 ?"
(calories/day grams/day)"
1400 ?" | 10% Unsaturated |
1410 ?" | 10% Monounsaturated | 30%
fat ";INT(cal*.3);"calories
"
1420 ?" | 10% Polyunsaturated |
";INT(cal*.3/9);"grams"
1430 ?"
"
1440 ?"
"
1450 ?" | High quality | 12%
protein ";INT(cal*.12);"calorie
s"
1460 ?"
";INT(cal*.12/4);"grams
"
1470 ?"
"
1480 ?"
"
1490 ?" | 48% complex
carbohydrates and
1500 ?" | naturally occurring
1510 ?" | sugars | 58%

```

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```

carbohydrates ";INT(cal*.58);"calorie
s"
1520 ?" |-----|
          ";INT(cal*.58/4);"grams
1530 ?" | 10% refined and
1540 ?" | processed sugars |
1550 input;"-----|
          Press return to continue "
,q$
1560 return

```

ST CHECKSUM DATA.
(see page 12)

```

10 data 49, 356, 530, 635, 221, 76,
586, 180, 833, 51, 3517
110 data 897, 910, 840, 543, 576, 70
, 511, 357, 586, 184, 5474
210 data 371, 587, 103, 916, 802, 37
9, 104, 717, 824, 797, 5600
310 data 237, 241, 872, 92, 363, 299
, 630, 12, 998, 249, 3993
410 data 898, 609, 533, 346, 65, 715
, 118, 87, 915, 25, 4311
510 data 174, 818, 831, 626, 127, 21
4, 86, 914, 164, 579, 4533
610 data 95, 312, 424, 736, 767, 711
, 215, 300, 45, 514, 4119
710 data 658, 453, 771, 841, 561, 7,
294, 352, 484, 258, 4679
810 data 388, 263, 99, 595, 300, 872
, 838, 312, 285, 484, 4436
910 data 930, 812, 937, 752, 80, 640
, 786, 337, 389, 437, 6100
1010 data 710, 359, 697, 950, 706, 8
35, 537, 880, 861, 456, 6991
1110 data 929, 106, 9, 573, 226, 427
, 890, 401, 861, 443, 4865
1210 data 35, 748, 631, 720, 742, 44
9, 513, 693, 826, 568, 5925
1310 data 665, 832, 990, 699, 451, 5
3, 799, 52, 375, 141, 5057
1410 data 210, 334, 958, 259, 287, 2
72, 262, 934, 834, 423, 4773
1510 data 688, 971, 276, 606, 750, 4
58, 3749

```

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The latest 8-bit developments from Chicago.

by Matthew J.W. Ratcliff

At the June 1987 CES, we were all "Flying High with Atari." D.F. Scott covered corporate Atari with his usual flair, and Art Leyenberger searched high and low for new ST software and explored the Atari PC potential. Remaining loyal to the Atari 8-bits, I found something new next to subLOGIC's Piper Cherokee on the Atari booth—the XE Game System.

The XE Game System consists of a console slightly larger than that of the 2600. It has large, round, pastel console keys (called the "Miami Vice" keys by some) and power button. It has the sleek diagonal lines of the XE and ST computers, and even a diagonally oriented cartridge slot. The Atari logo and company name are sculptured in large relief lettering on the console. Hidden at the base and to the right are two joystick ports, slanted forward at a 45-degree angle. Even the words on the console keys are offset at this angle. There are familiar looking connectors at the rear of the computer—oops, XE Game System—to attach a disk drive, for those who prefer disk-based games.

At the bottom left is another recessed angled connector for a "detachable game playing keyboard," which looks remarkably like the 130XE and 65XE mechanisms. This system will be shipped with a light gun and **Bug Hunt**, Atari's first light gun shoot-'em-up. With the new Atari cartridge bank switch technology comes **Flight Simulator II** in the cartridge form



Flying high with Atari—Piper Cherokee above and Cessna Flight Simulator II setup below.



A CES report

(which will load FSII scenery disks, if a disk drive is connected). Also built into the machine is the new XE-specific self test module, Atari BASIC Rev C and Missile Command.

So what is this new *game system*, after all? It's simply a repackaged, enhanced 65XE computer system—an excellent marketing idea, and what the 5200 should have been. John Skruch of Atari sees it as a final opportunity to generate a new interest in the 8-bit line.

I've always been an advocate of bank switch cartridge technology, a technique that OSS has been using for several years. It makes a program virtually pirate proof, although it is more expensive to produce. If Atari will be pushing a new XE Game System, it's a sure bet they'll be pushing cartridge-based games again (something that has already caught the interest of Epyx, Electronic Arts, Broderbund, Exidy, Accolade, Lucasfilm Ltd. and others). Atari will be using new bank switch cartridges that can go up to 256 kilobytes. Flight Simulator II is in a 128K ROM. I flew it at CES.

The new XE Game System is the first computer—oops, there I go again, *game machine*—that I can honestly call *cute*. It has a slick, untraditional package, but could easily pass as a simple game machine in any toy store. Any salesperson can plunk a cartridge into the machine and hand the customer a joystick. The XE Game System will then sell itself.

The average consumer will be pleasantly surprised to find that his "game system"

is also a *real computer* with BASIC built in and a *standard* keyboard. Toys 'R' Us and all the big toy chains are talking seriously with Atari about marketing this system alongside the Nintendos. With Atari's reputation for the best arcade games in the business, we *know* which will sell the most. And, since it's compatible, guess who else will reap the benefits? We computer nuts who don't want to see the Atari 8-bit die—ever!

In case you think I sound excited about this new little "toy," you're correct. John Skruch tugged my sleeve and sort of whispered in my ear, "Come on over here, I've got something to show you," as if he were going to open his jacket to display "slightly used" watches. He pulled out a disk with a handwritten label. "Battle something" was scrawled on it. He booted it up and, sure enough, it was **Battlezone** on the new XE Game System. (Hint: it runs on 400-130XE computers too!)

In a final beta test, it was very fast and playable, and true to the arcade classic. John tells me that whenever the developer of Battlezone comes into the Atari offices with an update, his man doesn't get out of there without spending a couple hours on the Battlezone coin-op. This will be an instant hit!

Some of our long-lost classics are coming back in cartridge for the XE Game System, including **Donkey Kong** and **Donkey Kong Jr.**, licensed from Nintendo. (Now *there's* a twist.) Newer 8-bit Atari owners may have found that these games have been very hard to come by. The cartridges

will be completely compatible with all other 8-bit Ataris.

Cross Bow has been licensed from Exidy. Cartridge versions of **Hardball!** and **Fight Night** from Accolade, and **One-on-One Basketball** and **Archon** from Electronic Arts have been licensed, also. We may hope to see **Ballblazer** (the sleeper of the century) and **Rescue on Fractalus** in cartridge, licensed from Lucasfilm. **Lode Runner**, **Blue Max** and **David's Midnight Magic** from Broderbund can be expected, as well.

GATO, one of the first submarine simulations, is a classic on many of the other competing systems. It will be coming to the 8-bit Ataris in a cartridge soon, along with **Food Fight**, **Star Raiders II** and **Battlezone**, Atari's own development projects.

Bug Hunt, the former Troubleshooter (due to copyright conflicts), is Atari's first light gun game. In it you must blast frogs, spiders, flies and bugs that are eating away at the microcircuits of your computer. The final name for this game may be Blast 'Em, but whatever the name, it'll be good. Despite glare from the glass fronts of the booth and the bright overhead mercury vapor lights above their CES exhibit, the Atari light gun performed very well, up to about 6 feet from the display.

Remember K-Byte, the people who brought us K-Razy Shootout? They're still around, and still blasting. Author James Zalewski gave us a brief demo of an early alpha copy of **Barnyard Blaster** at CES. In

this game you're a sharpshooter, knocking bottles off the back fence. I'm sure there will be much more to it when it's finished, but it's reassuring to see development for the system even before it hits the market.

Speaking of market, John Skruch tells me that Atari is shooting for an August release date of the XE Game System and most of the cartridges mentioned above. Surprisingly, Atari has been more open about release dates (open, not glib), and has said "we don't know" occasionally, instead of throwing out bogus dates and numbers. I think this attests to the fact that Atari has a new public relations firm.

You may have heard by now that Atari has dropped all development of the 3½-inch disk drive for the 8-bit. Neil Harris told me that "it never really was a logical choice to begin with" and that Atari had begun to develop it "only because it was a less expensive mechanism than the 5¼-inch drive."

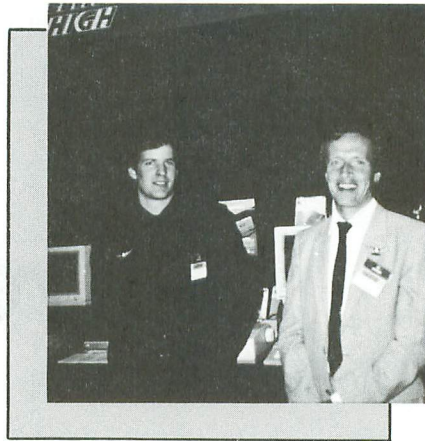
Enter the new **XF551**, a double-sided, double-density 5¼-inch unit from Atari. It's 2.9 times faster than the old 1050, and will come with the ADOS, developed by OSS. With 360K drives on the 8-bit and a higher transfer rate, productivity will improve, also.

When I asked John Skruch about future enhancements to the 8-bit line—such as more memory (256K or 512K XEs)—he told me these weren't likely. John went on to explain that ICD is doing a great job with RAM upgrades and the MIO add-on for the XL/XE machines. He drove the point home by stating, "If we improve the XE computer any more, you'll soon be paying as much for a complete color XE system as you would for a monochrome 520ST"; and that wouldn't be logical.

Atari hopes to get the XF551 out by August, or September. Two units were at the show—both in fine working condition. One system was loading and displaying Koala pictures continuously from the XF551—a fast and impressive demonstration. This drive appeared in a matter of weeks after Atari quietly admitted the 3½-inch drive had been dropped. It's a much more reasonable choice.

ICD.

ICD was demonstrating **DiskRx**, the perfect prescription for hard or floppy disk problems. It's a handy disk editor, that's fast and easy to use. Those of you with an XM301, 1030 or MPP joystick connect modem may want a more affordable printer interface than the P:R: Connection. ICD's **Printer Connection** is a



Mike Gustafson (left) and Tom Harker demonstrated ICD's wares.

high quality P: interface cable for the 8-bit Atari. At one end is the serial bus connector, at the other a Centronics connector for your printer. Inside the plastic housing of the printer connector is a microelectronic wonder including CPU, ROM, RAM and all connections necessary to convert the Atari serial bus into a complete Centronics printer interface. This cable lists for \$59.95.

The **SpartaDOS X** cartridge is still under development. A disk-based version 4.0 of SpartaDOS may be released first. The 80-column add-on for the MIO board is on hold because of this development.

ICD has developed some **new ST hard drives** that will be competitively priced. In their tradition of "innovative computer designs," these units will come complete with a real-time clock, two DMA interfaces (one for the ST, another for daisy chaining your old Supra or Atari hard drive), and an SCSI interface for connecting additional *slave* hard drives (or tape backup, or Bernoulli box units). ICD will market single and dual units (they subscribe to the double hard drive configuration philosophy, for software backup) in 20-, 30- and 40-meg configurations. Their first unit was supposed to go to the FCC for approval shortly after CES.

Xetec.

Xetec also manufactures an interface for the 8-bit, similar to the Printer Connection from ICD. It has a larger housing at the printer end of the cable, with a small opening to eight DIP (Dual In-Line Package) switches. These are used to control special features of the interface, which includes the standard 8-bit font for starters. The Xetec **Graphix AT**, which lists at \$69.95, comes with a full lifetime warranty.

The **Printer Enhancer** also comes from Xetec. This device resides between your computer (8-bit or ST) and dot-matrix printer. It has eight internal font styles: Typewriter (Courier), Italic (most printers can do this on their own), Script, News (Times), Manhattan, Shadow, Block and Tech. They are all software or switch selectable. The Enhancer also acts as an intelligent printer switch, allowing the operation of one or two printers, with independent selection of fonts and printer types. Nearly all families of dot-matrix printers are supported with special switch settings. The Enhancer can be programmed from the front panel, and buffers up to 64K of print data. This nifty box lists for \$249.95.

A new program called **SCAD** is under development at Xetec. It is yet another entry into the growing desktop publishing and computer-aided design ST market. SCAD is a drawing program that has multiple-page capability, allowing you to work on sixteen drawings at once. It uses the GEM interface, with keyboard command equivalents for power users.

This system is purported to be accurate to within .001 of an inch, and can reduce or enlarge drawings in 0.1 percent increments. Drawings can be defined in page sizes up to 32 inches square. Very flexible zoom features are supported, with the ability to save a DEGAS "snapshot" of any view. Laser printer drivers and GDOS support are in its repertoire, as well. It's not copy protected and lists for \$99.95.

Mastertronic—the world's fastest-growing game company.

We've reviewed several Mastertronic 8-bit games in these pages, and haven't been particularly impressed. There's virtually no documentation, other than the fine print on the back of the packages. But their products are very affordable, and sometimes do redeem themselves in the playability department.

For the 8-bit, the \$4.99 titles include **One Man and His Droid**, **Crystal Raider**, **Dispatch Rider**, **Los Angeles SWAT**, **Master Chess** and **Molecule Man**. I've found some of the Mastertronic games at the local Children's Palace, a fairly large chain of toy stores. You may be able to find the above titles there soon.

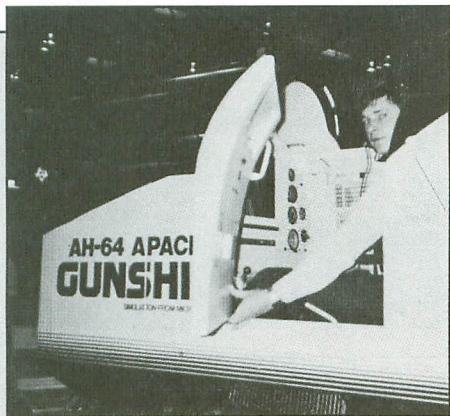
Check Mate is not another chess game, but a general-ledger-style accounting system for XL/XEs. It's entirely disk based, including instructions. BASIC is required to run this program, so it may not be very fast compared to SynCalc and other general purpose spreadsheet applications.

In response to the popular new 500X joystick from Epyx, Mastertronic has introduced the **Magnum**, for \$19.99. You hold it in your hand like a pistol. The fire button, engaged with your thumb, is where the hammer of the gun would be. The short, fat handle stick sits atop a small, rectangular platform above and in front of the fire button. According to Mastertronic the Magnum is a "revolutionary blend of advanced ergonomic styling and innovative electronic design."

MicroProse.

The biggest attraction at the MicroProse booth was **Gunship**, the helicopter simulation Bill Stealy delayed for over a year because "it just wasn't good enough." Well, I think it's worth the wait.

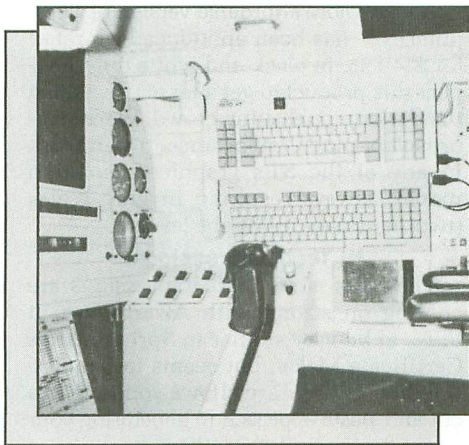
Gunship is based on the AH-64 Apache helicopter, "the modern Army's most lethal weapon." MicroProse had a complete simulator set up in their booth, including a cockpit, computer, console with HUD (Heads Up Display) simulation, weapons, targeting and mapping systems selection switches. It was like sitting in a dark room, atop a whirling dervish simulator of a mechanical bull (if you were aggressive enough at the controls).



The author in MicroProse's AH-64 simulator setup.

This helicopter is produced by Hughes Helicopter, now owned by the company I work for, McDonnell Douglas (makers of the often-simulated F-15 and Harrier, and the AV-8B fighter). I had to fly the simulator, and MicroProse was kind enough to fit me into their schedule.

It wasn't long before I was whipping along at 200 knots, zeroing in on an enemy base, and firing my missiles at one target, while selecting the next. The system was built around IBM PC XT or AT computers (two or more, I think), a spectacular simulation showing Gunship at its



The "Apache" cockpit interior as simulated in the MicroProse booth.

finest. This flight/combat simulator is to be out for both 8-bit (\$34.95) and ST (\$39.95) systems soon.

Larry Bond, an avid war gamer and primary technical advisor for Tom Clancy's chart-busting novel, *Red Storm Rising*, is now working closely with MicroProse on a microcomputer translation of the book. (I'm told that Mr. Clancy will be consulted on this project, as well.) This is a mammoth undertaking, but, given the reputation of MicroProse and Tom Clancy's uncanny ability to bring global events of epic proportion into clear focus, I suspect this may well become a game simulation classic.

Epyx.

"I wish they all could be California... games" was the Epyx booth's theme this year. Epyx has announced two new series of games, in the tradition of their Summer Games, called **California Games** and **Street Sports**. They'll be coming to the STs and, possibly, to the 8-bits.

In the "totally rad, awesome fer sure" California Games, you'll try to "shred the face of a totally tubular wave in the surfing event and 'tic tac' to the top of the skateboard half-pipe competition."

Other California-style games include BMX bike racing, rollerskating, footbag (hackey-sack) and flying disk competitions. Don't forget your loud Hawaiian shirt and dark shades, because it's time to get into a "gnarly bunch of games under the sun."

The Street Sports series will include basketball, baseball and football. These games will simulate playing in the streets and alleys "back home," where you can go against the pros of the future or "dweebies who have no dribble." These offerings attempt to reconstruct the locales and

moods—the playgrounds and playmates—of your childhood.

Maxx-out is a new line of entertainment software from Epyx, designed with fast game play, slick graphics and an offbeat sense of humor. The new titles in this line are **Rad Warrior**, **BoulderDash Construction Kit** and **Spy vs. Spy III: Arctic Antics**. Following in the Infocom tradition, this new software will come with comic-book-style instructions designed to be as entertaining as the programs.

Rad Warrior is reminiscent of Bounty Bob in *Miner 2049er*. In this realistic recreation of today's nuclear waste sights, you must "brave the mutated forest, enter the radioactive volcano and find your way to the hidden generator room..." The scenario has been played out before, but is it executed in the grandiose style and finesse that is an Epyx tradition? Steve Panak will answer that one for us when (if) Epyx brings it to our XE and ST computers. Currently, it seems to be slated for every machine that doesn't have an Atari logo on it. (This is getting frustrating, folks!)

Arctic Antics and BoulderDash Construction Kit are being marketed by Epyx under license from First Star Software, the people who brought us the very popular *Spy vs. Spy*. These should be out for all the Atari systems by fall.

Sub Battle from the Epyx Masters Collection is obviously in direct competition with *Silent Service*. It simulates submarines from the same time period (1940s, World War II). In fact, *Sub Battle* lets you select from over sixty different missions, and take command of one of six different American subs or German Kriegsmarine U-boats used from 1939 to 1945.

The ever-charming Noreen Lovoi tells me that **World Karate Championship** has sold surprisingly well for the 8-bits and has hit number one on several sales charts for the ST. We hope this is a *good omen*, indicating that we may see more fine works from Epyx on our favorite computers.

Avalon Hill.

In the realm of strategy games, Avalon is supporting the 8-bits with **T.A.C.** (Tactical Armor Command), in which you build armies of tanks and infantry to play out realistic battles of WWII. **Clear for Action** is a game for one to eight players, which allows you to play out epic sea battles from "the golden age of sailing ships." This product line is rounded out with **B-1 Nuclear Bomber** and **Combat Chess** (an introductory wargame simulation).

In the arcade and leisure simulations, the only Atari support to be found is in **Stocks and Bonds**, an educational simulation of playing the market and developing useful investment strategies. This was a little "stuffed shirt" for me.

Infocom.

In Infocom style—presenting their new products in a unique and entertaining way—this year, at Chicago's Field Museum of Natural History, the "Second City" troupe (where many "Saturday Night Live" greats got their start) was to be seen performing an **INFOprovisation**.

In the midst of being entertained, we were also subtly introduced to **The Lurking Horror**, Infocom's newest adventure by Dave Lebling. "Ever since you arrived at G.U.E. Tech, you've heard stories about the old campus. . . ." the story begins. You soon find yourself in an interactive horror story that will "feed your nightmares for weeks."

From the author of *Leather Goddesses of Phobos* comes **Stationfall**—another superbly crafted Infocom game in the bizarre, funny, and always interactively entertaining, style of Steve Meretzky. "Floyd is back in the boffoid sequel to Planetfall." In an interview with Brian Moriarity on Delphi recently, I asked if Infocom got many complaints about the "lewd mode" of *Leather Goddesses*. I was told: yes, there were a lot of complaints—that it wasn't lewd enough!

Infocom has announced special prices for classic favorites. The most notable is *Wishbringer* for a mere \$14.95. This one I've played (but alas, never had the time to solve), a must for any adventurer's collection. *Hitchhiker's Guide to the Galaxy* and *Enchanter* have been reduced to \$24.95, and the *complete Zork Trilogy*—the software series Infocom was built on—now sells in a single package for \$59.95 (\$69.95 for the ST).

Digital Vision.

John Pratt, Vice President of Marketing at Digital Vision, demonstrated **ComputerEyes**. This \$249 hardware/software combination captures images in full color or monochrome, from any standard NTSC composite video source such as a VCR or video camera. From the color menu you can capture either low or medium resolution pictures. The image capture process takes six seconds, so you'll need a fairly still subject or a good pause mode on your VCR. The software automatically detects the most dominant colors in your subject, and pseudo-colors it automatically. The results are stunning.

A new, more affordable version of **ComputerEyes** has been announced, to retail for \$149.95, in black-and-white only. I expect this product to get a lot of use among the desktop publishing crowd, where color isn't of much importance. It will work in any of the ST's graphics resolution modes, always resulting in gray scales (two to sixteen different levels).

Hi Tech Expressions.

The folks at Hi Tech Expressions are coming on strong with **AwardWare**. It looks to be very similar to Springboard's *Certificate Maker*, but seems to be more flexible. **AwardWare** allows you to take a cut-and-paste approach in generating your page designs. Rather than selecting a completed page, where you simply fill in the text, you put the page together from many different components.

AwardWare sells for a remarkably low \$14.95 for the 8-bits. (Sorry, ST owners, it isn't available for you.) Jeff Randall, my local Atari dealer, tells me that **AwardWare** has been selling like crazy.

Besides allowing you to create certificates, awards, licenses and announcements, **AwardWare** lets you build coupons, tickets, ribbons, checks and more. It supports many printers (including the 24-pin Epson LQ800), and has a built-in printer driver editor. To make things even more interesting, printer paper with multicolor themes (hearts for Valentine's day, snowflakes for Christmas, etc.) is also available from Hi Tech.

It's refreshing to see their product list, which shows support not only for all IBM, Apple and Commodore machines, but also for the 8-bit Ataris. That includes their newest **Love Note Maker** for your favorite sweetie. All the Atari software comes on *flippy* disks with the Commodore 64 versions. This is a blessing, since most toy stores continue to push Commodore software, even though they stopped Atari-specific support ages ago.

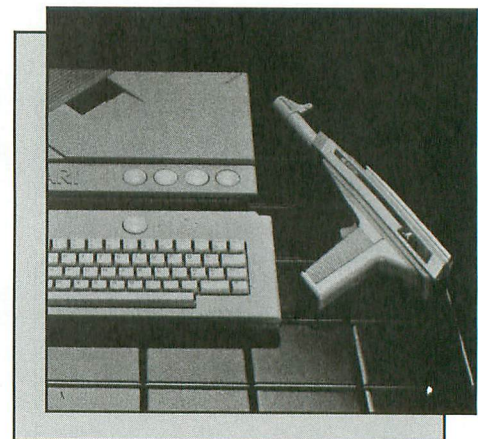
Hi Tech is now marketing **Children's Television Workshop** software for the Atari. Among these \$9.95 title, you'll find **Astro-Grover**, **Ernie's Magic Shapes**, **Big Bird's Special Delivery**, **Pals Around Town**, **Ernie's Big Splash** and **Grover's Animal Adventure**. If you have youngsters who enjoy learning from "Sesame Street," these programs may be the perfect way to introduce them to a new friend—your computer. These educational games are generally well executed, and have fascinated my sons for many hours, since they're so much more *interactive* than a simple television show.

Trends.

The current base of software for the 8-bit Atari is growing steadily, as the flippy trend gains popularity. Atari software is beginning to get onto shelves it hasn't occupied for nearly two years. As a result of this double packaging, production costs are lowered and software prices are coming down. Atari would do well to encourage other traditional Commodore software houses to jump on the flippy bandwagon, to increase their sales base—and our fun!

This Christmas will be a gamer's dream come true for 8-bit Atarians. As the XE Game System (XEGS as some call it) gets into full swing, Atari will be reviving all of their best 8-bit games in cartridge form, as well as releasing a few new ones.

It's obvious that Epyx, MicroProse and other companies are interested in this potential market (for example, Epyx is now making a 500XJ joystick compatible with the Nintendo game system) and are likely to put some of their hottest titles in cartridge form if the XEGS does well in the marketplace.



The XE Game System shown with its companion light gun.

Software simulations of wars past are on their way out. MicroProse has begun to simulate the latest fighter aircraft of the defense industry, and many others are following suit. With the immense popularity of Tom Clancy's books about modern war machines, expect to see simulations of nuclear submarines with the most sophisticated weapons technology of today. The coin-op games of yesterday are becoming the home video games of today—only they're better! **A**



The New Aladdin

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by Andy Eddy

We often take for granted the ways in which we receive our information these days. For example, just look at how you get the latest in Atari news; the fact that 99 percent of **ANALOG Computing** and **ST-Log** readers are reading the print edition of these magazines shows our reliance on printed materials for news and other information.

But there are other ways to procure information in the 80s. There are readers who get the articles and reviews contained in these pages *electronically*, downloading them by modem from **ANALOG's** Current Issue database on Delphi. Other methods, like the cable-TV-delivered X* Press data ticker service, are becoming popular, but are still not available to many people.

Now imagine the *entire* contents of a magazine on a disk (or disks), to be read on-screen. A company called Disk Publications has done just that for the Atari computers—8-bit and ST series—calling their product **The New Aladdin**.

We have to point out up front that they aren't in competition with **ANALOG** and **ST-Log** in providing Atari subject matter; **Aladdin's** dealings are of a general nature (as you'll see in a moment), along the lines of *Life* and magazines of that type. As a matter of fact, there's very little—aside from a few machine-specific software reviews and technical info on how the "magazine" is created—to tie it into

the computer field. The computer is simply the *medium*, not the focus of their writing.

My first impression, on hearing they had created a disk-based magazine, was that it would be an exercise in tedium. But this company does take it quite a bit beyond what you would expect for on-screen reading matter. Normally, it gets to be a strain to read text on-screen, as with disk-based documentation, for example. **Aladdin** took me by surprise, however, by sprinkling the text with smooth graphics and digitized photos. It's a lively and unique approach to publishing. With many computer users looking for something besides games and applications software to run, this is a somewhat fresh tack.

Most importantly, the writing is high quality, informative text, covering timely subjects. And each "issue" is packed with material. Here's a rundown of what was included in the issues I looked at:

ST—February/March '87

- “Meet The Pres.”: An interactive, animated press conference.
- “Delusions Of Romance”: A look at love (with a quiz).
- “Diamonds To Die For”: An article on the “cursed” Hope diamond.
- “Cycling Infinity”: A humorous piece on a computer come to life.

Atari 800/XL/XE series October/November '86

- “Russian Rendezvous”: A trip to Russia.

—“Nu-Fiction”: An interactive story called “The Count.”

—“The Wolf is Crying”: A nature tour of wolves.

—“G'day Mate”: A stroll through Australia.

This covers stories specific to these issues; there is also a slew of regular columns. Among these diverse offerings are: “The Reading Corner” (a children's reading column for parents); “Tastings” (a food column); “Now Showing” (movie reviews); “The Game's Afoot” (a playable contest); “Profiles by Chantal” (interviews with celebrities); and “My Opinion” (an editorial and opinion column by a different person each issue).

Not to lock out the computer user, each issue also includes: “Reference Shelf” (programming tips); “Warehouse” (machine-specific software and hardware reviews); and “New Paints For Old” (computer art with samples). As in many magazines there are also cartoons, called “Entering Laughing,” and a section for advertisements that often includes demos of programs and, for stores, coupons you can print out.

The ST version takes up two double-sided disks, and the 800/XL/XE version utilizes three double-sided disks. The user interface is very simplistic—a lamp-shaped mouse pointer on the ST; movable-cursor highlighting of selections on the 8-bit series—making it troublefree when moving from story to story and menu to menu.



The creation of each issue involves technical prowess the publishers plan to increase with every issue. Being available only (at this time) for Atari and Amiga computers, the company has a wide variety of high-quality software tools for building and manipulating graphic and sound/music segments. In fact, instead of producing two distinctly different issues for the ST and Amiga crowd, they do quite a bit of porting back and forth of sections between the two, to bring about the effects desired.

For example, as John Henson, editor of the publication, tells it, they may acquire an image with the ComputerEyes digitizer on the ST, then move the picture over to the Amiga for final enhancement with that computer's graphic utility. Other familiar names used in the ST development process include Neo-Chrome (from Atari), Music Studio and Paintworks (by Activision), in addition to an upgraded version of N-Vision (AudioLight's original paint program that later became Paintworks).

Of course, being a predominantly text product, the majority of the work is done with a word processor. It's interesting to note that most of Aladdin's word crunching is done using the PaperClip program for the 8-bit Atari. In fact, conversion programs have been created to port that material over to the 16-bit machines for use in 16-bit issues. Henson stated that the company has "yet to find a word processor for the 16-bit machines worth using," though they're planning to look into some up-and-coming word processing software when certain versions are released.

Beyond the support of off-the-shelf titles, Aladdin's engineers have also done quite a bit of work to program desirable utilities of their own, such as some of the animation routines needed to fit their requirements. In the future, they plan on breaking new ground with technical achievements like mixing medium-resolution text with low-resolution graphics, on the same screen.

It's reassuring that Aladdin's creators often spill the beans in their "Reference Shelf" column, giving the secrets to many of those special routines to their readers. The reason, Henson explains, is twofold: they hope to attract "techie" to their publication (though definitely not a technical journal); and they'd like to enlarge the number of contributors to the magazine. The Aladdin staff hopes that encouraging readers to use these routines in their own programs will prompt them to think of fresh ideas for future articles.

All in all, this is a class production through and through. The designers plan to expand it, enhance it and speed it up, with the intention of achieving 70 to 80 percent reader interaction. That goal will be brought closer with technological breakthroughs like CD-ROM, which allows the storage of sizable chunks of data on a compact disc. Using CDs, Aladdin could incorporate reader interaction with large motion-picture scenes, much as late-generation arcade games did in the past, and as MichTron is currently doing—coupling computer graphics with laser disc video playback.

Aladdin's target audience is the less-than-technically-minded user, providing a form of entertainment not available elsewhere. "We want the reader to be involved," Henson concluded, "to become an active participant." Certainly, his team means it when they say this could be "the end of reading as we know it."

Andy Eddy works as a cable TV technician in Connecticut, and has been interested in computers since high school. While his family's Atari 800 is four years old, he's been playing arcade games avidly since Space Invaders and is a former record holder on Battlezone.

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Trig Machine

A six-module helper for solving those mathematical dilemmas.

by Donald B. Lee

While taking one of the required Mechanical Engineering courses for my Electrical Engineering degree at Seattle University, I had to work out many problems that reduced down to triangle relationships. Let's use the following as an example:

Force A=25, Force B=10, and the angle between Forces A and B is 35 degrees. What is Force AB?

To solve this, I would set it up as a triangle. From there, I would divide the triangle into two right triangles and solve for the unknowns. While this method worked, it was very slow.

I needed a way to solve *all* triangle problems, not just right triangles. So I went into my den, sat down with my old friend Salas and Hille *Calculus*, and read the section on trigonometric relationships. It was there that I found the sine and cosine laws. With these, and some basic algebra, it's possible to solve any triangle problem.

The laws in hand, I started working out more problems. While the new method was faster, it still took a lot of steps to complete a problem.

This is about when I looked up at my Atari 800 and asked, "What are you doing just sitting there?" Well, that's how the **Trig Machine** came into being.

The **Trig Machine** has six modules within it: four triangle modules, one trigonometric table generator and a Pythagorean theorem solution module. The triangle modules can be broken down as follows: (1) three sides given (or SSS, as it's known in high school); (2) two sides and one included angle (or SAS); (3) two sides and one unincluded angle (or SSA); and (4) one side and two angles (or ASA).

How it works.

Now, let's take a look at the program's methods. Module 1 will make a trigonometric value table for sine, cosine and

tangent from 0 to 360 degrees, using the increment you supply. If you don't supply an increment, the module will default to 30-degree increments. The module uses pseudo-rounding to three places after the decimal point. This was included because Atari BASIC has no print-using command to format the printed table output.

Module 2 is the Pythagorean theorem portion. Not much special here; you supply the given values, and the program solves for the unknowns.

Modules 3 through 6 have a few tricks worth mentioning. You may have been asking: "How can we use the sine law $A/\sin(a)=B/\sin(b)=C/\sin(c)$ and the cosine law $C^2=A^2+B^2-2*A*B*\cos(c)$ when Atari BASIC doesn't have arcsine or arccosine functions?"

Well, with the aid of some minor calculus and some algebra that I won't go into here, we build them. Using Atari BASIC's arctangent function, I came up with $\arcsine(Q)=\text{ATN}(Q/\text{SQR}(1-Q^2))$ and $\arccosine(Q)=\text{ATN}(\text{SQR}(1-Q^2)/Q)$. Also, since Atari BASIC has no tangent function, $\text{tangent}(Q)=\text{SIN}(Q)/\text{COS}(Q)$.

For module 3, solve the triangle given three sides, I use the cosine law to find the largest angle. If the answer is negative, we know that we have to add 180 degrees to the answer. This is because of the way in which the arctangent function is defined. Next, I use the sine law for the remaining angles.

For module 4, solve the triangle given two sides and one included angle, I use the cosine law to get the remaining side. Next, I use the sine law to get the smaller remaining angle. I then subtract the two angles from 180 degrees to get the last angle.


For module 5, solve the triangle given two sides and one unincluded angle, I use the sine law to get one of the remaining angles. This is where it gets strange; there are two possible angles, because the unknown side can make the triangle complete in two places, forming two possible an-

gles. I use this angle and the other possible angle, 180-(angle), to get the two values for the third or last angle and the lengths of the missing side.

For module 6, solve the triangle given one side and two angles, I find the remaining angle by subtracting the two given angles from 180 degrees. I then use the sine law to get the remaining sides.

The last problem I had to overcome was how to standardize the data entry. Since triangles can be positioned in many different ways, and the sides and angles can have many different designations, I had to find a way to standardize the labeling of the sides and angles.

I used a picture of two typical triangles and labeled them the way that most math books do. Also, all angle measurements are to be expressed in degrees. If you must have radians, just divide the angle in degrees by the constant (180/pi) where pi=3.141592654. . . or you could just divide your angle in degrees by 57.3.

The program worked very well for me during fall quarter at school. I hope you get good use out of it, too. 

Donald B. Lee is an Engineering Aide with Boeing Commercial Airplane Co. He has worked in software and hardware development, electronic design, instrumentation design and operation. Currently working in model instrumentation, he holds five degrees in Electronics Technology and is working toward his BSEE.

The two-letter checksum code preceding the line numbers here is *not* a part of the BASIC program. For further information, see the "BASIC Editor II," in issue 47.

Listing 1.
BASIC listing.

```
PX 10 POKE 710,0:?"K"
WZ 15 ? " *****
**"
VL 20 ? " *** The Trigonometry Machine *
**"
BI 25 ? " *** (C) 1985 by Donald B. Lee *
**"
MO 30 ? " *****
**":?
MO 40 ? " 1) Make a Trig Table.":?
AZ 45 ? " 2) Pythagorean Theorem.":?
BZ 50 ? " 3) ▲ 3-sides given.":?
CP 55 ? " 4) ▲ 2-sides 1-included angle"
:?
VZ 60 ? " 5) ▲ 2-sides 1-unincluded angl
e.":?
CM 70 ? " 6) ▲ 1-side & 2-angles.":?
QT 75 ? " 7) Quit.":? :?
XB 80 TRAP 90:?"Q":? " Which one";:INPU
T X
DZ 81 IF X=1 THEN GOTO 1000
FF 82 IF X=2 THEN GOTO 2000
GL 83 IF X=3 THEN GOTO 3000
HR 84 IF X=4 THEN GOTO 4000
IX 85 IF X=5 THEN GOTO 5000
KD 86 IF X=6 THEN GOTO 6000
EG 87 IF X=7 THEN END
GW 90 ? "++":GOTO 80
KW 1000 REM *****
MA 1001 REM *** TRIG TABLE ***
LE 1002 REM *****
```

```
OY 1003 DIM X$(1):DEG
CG 1010 ? "K":X=0
AR 1020 ? "This module will generate a"
UV 1030 ? "trigonometric table of Sine,"
AM 1040 ? "Cosine, and Tangent values"
KE 1050 ? "for angles from 0-360 degrees"
KZ 1060 ? "in increments that you specify
.":?
NF 1080 TRAP 1210
UF 1090 ? "Angle increment please - ";:IN
PUT X
EF 1100 IF X>360 THEN GOTO 1010
ME 1110 TRAP 1200:?"K"
NO 1120 ? " Table of Values":?
IX 1130 ? " ANGLE SIN COS
TAN"
UV 1140 ? "-----
-----
-----":?
NI 1150 DEG :FOR A=0 TO 360 STEP X
IE 1160 S=5IN(A):X=5:GOSUB 7000:S=X:REM 5
INE
GN 1161 C=COS(A):X=C:GOSUB 7000:C=X:REM C
O5INE
DG 1162 T=5IN(A)/COS(A):X=T:GOSUB 7000:T=
X:REM TANGENT
ZI 1170 IF T>10 THEN GOTO 1200:REM ASYMPT
OTE CHECK
ES 1180 ? " ";A,,:IF S>=0 THEN ? "+";S,;
:GOTO 1182
IL 1181 ? S,;
SA 1182 IF C>=0 THEN ? "+";C,,:GOTO 1184
DV 1183 ? C,;
OJ 1184 IF T>=0 THEN ? "+";T:GOTO 1190
XL 1185 ? T
CI 1190 NEXT A
UI 1191 TRAP 1196
OT 1192 ? "Make another table? (Y/N)"::IN
PUT X$
NR 1195 IF X$="Y" THEN TRAP 40000:GOTO 10
10
ON 1196 RUN
ID 1197 TRAP 40000:GOTO 1010
JB 1200 TRAP 1200:?" ";A,,:IF S>=0 THEN
? "+";S,,:GOTO 1202
HP 1201 ? S,;
LW 1202 IF C>=0 THEN ? "+";C:GOTO 1204
RB 1203 ? C
BZ 1204 NEXT A
JK 1210 IF X<=0 THEN X=30:GOTO 1110
UX 1211 ? "Q":GOTO 1080
ID 2000 REM *****
TG 2001 REM *** PYTHAGOREAN THEOREM ***
IL 2002 REM *****
BS 2005 DIM X$(1)
KU 2010 ? "K"
UA 2020 ? "This routine uses the Pythagor
ean"
SI 2030 ? "Theorem to compute the missing
"
PU 2040 ? "sides of any right triangle gi
ven"
RC 2050 ? "in the following form:"
YI 2060 ? "
IB 2070 ? "
UT 2080 ? "A C C^2=A^2+B^2"
QF 2090 ? "
IB 2100 ? "
IW 2110 ? " B":?
ZW 2120 ? " B":?
MP 2125 A1=0:B1=0:C1=0
AV 2130 TRAP 2140:?"What is side A";:INP
UT A:GOTO 2150
HX 2140 A=0:A1=1
IV 2150 TRAP 2160:?"What is side B";:INP
UT B:GOTO 2170
IT 2160 B=0:B1=1
QV 2170 TRAP 2180:?"What is side C";:INP
UT C:GOTO 2190
```



```

UB 2180 TRAP 40000:C=0:C1=1
OZ 2190 TRAP 40000
WR 2195 IF A1=1 AND B1+C1=0 THEN GOTO 223
0
XN 2200 IF B1=1 AND A1+C1=0 THEN GOTO 225
0
AC 2210 IF C1=1 AND A1+B1=0 THEN GOTO 227
0
YC 2220 ? :? "There is nothing here to solve?" :GOTO 2290
WK 2230 TRAP 2400:X=SQRT(C^2-B^2):GOSUB 70
00
PQ 2240 ? "A=";X,"B=";B,"C=";C:GOTO 2290
UQ 2250 TRAP 2400:X=SQRT(C^2-A^2):GOSUB 70
00
VH 2260 ? "A=";A,"B=";X,"C=";C:GOTO 2290
TG 2270 TRAP 2400:X=SQRT(A^2+B^2):GOSUB 70
00
AK 2280 ? "A=";A,"B=";B,"C=";X:GOTO 2290
WU 2290 ? :? "Do you want to do another? (Y/N) " :INPUT X$
MB 2300 IF X$="Y" THEN GOTO 2010
MW 2310 RUN
WS 2400 TRAP 40000: ? :? "*** ERROR - Negative Side ***":FOR X=1 TO 200:NEXT X:GOTO 2010
UM 3000 REM *****
IC 3001 REM *** Solve 3-sides ***
VU 3002 REM *****
JY 3003 TRAP 3004: DIM X$(1)
ON 3004 TRAP 40000
DQ 3005 DEG

```

```

IH 3010 A=0:B=0:C=0
HY 3020 GOSUB 8000:REM INPUT PROMPT
AN 3030 TRAP 3030: ? "What is side A":INP
UT A
DZ 3040 TRAP 3040: ? "What is side B":INP
UT B
IB 3060 TRAP 3060: ? "What is side C":INP
UT C
OS 3070 TRAP 40000
TG 3080 X1=A:X2=B:X3=C
YK 3083 IF X2>X1 THEN X=X1:X1=X2:X2=X
BY 3085 IF X3>X1 THEN X=X1:X1=X3:X3=X
DR 3090 IF X3>X2 THEN X=X2:X2=X3:X3=X
OE 3100 TRAP 3500
SZ 3210 REM *** COSINE LAW ***
HU 3220 Q=(X2^2+X3^2-X1^2)/(2*X2*X3)
ZE 3230 X4=ATN(SQRT(1-Q^2)/Q):REM ARCCOSINE
E
BN 3240 IF X4<0 THEN X4=180+X4
MI 3250 REM *** SINE LAW ***
FK 3260 T=X1/SIN(X4):REM RATIO VALUE
NR 3270 Q=X2/T:REM SINE OF SECOND ANGLE
QO 3275 X5=ATN(Q/SQRT(1-Q^2)):REM ARCSINE
DZ 3280 X6=180-X5-X4:REM THE THIRD ANGLE
AP 3290 IF A=X1 THEN A1=X4
AZ 3300 IF A=X2 THEN A1=X5
CL 3310 IF A=X3 THEN A1=X6
AY 3320 IF B=X1 THEN B1=X4
CK 3330 IF B=X2 THEN B1=X5
DW 3340 IF B=X3 THEN B1=X6
CJ 3350 IF C=X1 THEN C1=X4
DU 3360 IF C=X2 THEN C1=X5

```

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Send programs to:
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Trig Machine *continued*

```

FH 3370 IF C=X3 THEN C1=X6
QH 3380 ? "K":? :? :?
BZ 3390 GOSUB 8040:?
SB 3400 ? " Side A=";A,"Angle a=";:X=A1:
GOSUB 7000:? X
WB 3410 ? " Side B=";B,"Angle b=";:X=B1:
GOSUB 7000:? X
AB 3420 ? " Side C=";C,"Angle c=";:X=C1:
GOSUB 7000:? X
QY 3425 ? :TRAP 3440
R5 3430 ? "Would you like to do another";
:INPUT X$
RJ 3440 TRAP 40000:IF X$="Y" THEN GOTO 30
10
NL 3450 RUN
GR 3500 ? "K":? :? "That Triangle is Impos-
sible!":?
QP 3510 ? "Side1^2 + Side2^2 > Largest Si-
de":FOR X=1 TO 300:NEXT X:GOTO 3010
UP 4000 REM *****
EJ 4001 REM *** Solve 2-Sides & ***
XZ 4002 REM *** 1-Included Angle ***
VB 4003 REM *****
BH 4004 DEG :TRAP 4005:DIM X$(1)
OS 4005 TRAP 40000
GT 4010 A=0:B=0:C=0:A1=0:B1=0:C1=0
FR 4020 GOSUB 8000:REM PROMPT INPUT
UG 4030 TRAP 4040:? "What is Side A";:INP
UT A
X5 4040 TRAP 4050:? "What is Side B";:INP
UT B
EK 4050 TRAP 4050:? "What is included ang
le c";:INPUT C1:GOTO 4060
OG 4060 TRAP 40000:IF C1>180 OR C1<=0 THE
M ? "*** ERROR c<=0 OR c>180 ***":GOTO
4050
IC 4070 C=5QR(A*A+B*B-2*A*B*COS(C1))
KX 4080 T=C/SIN(C1):REM RATIO VALUE
QX 4090 Q=A/T:A1=ATN(Q/5QR(1-Q^2)):REM SE
COND ANGLE
YR 4100 IF A1<0 THEN A1=180+A1
XQ 4110 B1=180-C1-A1
ZT 4120 ? "K":GOSUB 8040
SF 4130 ? " Side A=";A,"Angle a=";:X=A1:
GOSUB 7000:? X
WF 4140 ? " Side B=";B,"Angle b=";:X=B1:
GOSUB 7000:? X
WH 4150 ? " Side C=";:X=C:GOSUB 7000:? X
," Angle c=";C1
R5 4160 ? :TRAP 4180
RZ 4170 ? "Would you like to do another";
:INPUT X$
TK 4180 IF X$="Y" THEN GOTO 4005
MF 4190 TRAP 40000:RUN
CC 5000 REM *****
NQ 5001 REM *** Solve 2-Sides & ***
YQ 5002 REM *** 1-Unincluded Angle ***
CO 5003 REM *****
BY 5004 DEG :TRAP 5005:DIM X$(1)
OT 5005 TRAP 40000
GU 5010 A=0:B=0:C=0:A1=0:B1=0:C1=0
FS 5020 GOSUB 8000:REM PROMPT INPUT
US 5030 TRAP 5040:? "What is Side A";:INP
UT A

```

Some program listings reproduced in *ANALOG Computing* may contain "strange" characters not shown on the keyboards of earlier Atari models. These are special characters which use the CTRL, ESC and "ATARI LOGO" (inverse) keys. Shown below is a list of these characters and the keystrokes used to get them.

␣ --- CTRL ,	␣ --- CTRL Z	␣ --- INVERSE CTRL M
␣ --- CTRL A	␣ --- ESC ESC	␣ --- INVERSE CTRL N
␣ --- CTRL B	␣ --- ESC CTRL UP-ARROW	␣ --- INVERSE CTRL O
␣ --- CTRL C	␣ --- ESC CTRL DOWN-ARROW	␣ --- INVERSE CTRL P
␣ --- CTRL D	␣ --- ESC CTRL LEFT-ARROW	␣ --- INVERSE CTRL Q
␣ --- CTRL E	␣ --- ESC CTRL RIGHT-ARROW	␣ --- INVERSE CTRL R
␣ --- CTRL F	␣ --- CTRL ,	␣ --- INVERSE CTRL S
␣ --- CTRL G	␣ --- CTRL ;	␣ --- INVERSE CTRL T
␣ --- CTRL H	␣ --- ESC SHIFT CLEAR	␣ --- INVERSE CTRL U
␣ --- CTRL I	␣ --- ESC BACK 5	␣ --- INVERSE CTRL V
␣ --- CTRL J	␣ --- ESC TAB	␣ --- INVERSE CTRL W
␣ --- CTRL K	␣ --- INVERSE CTRL ,	␣ --- INVERSE CTRL X
␣ --- CTRL L	␣ --- INVERSE CTRL A	␣ --- INVERSE CTRL Y
␣ --- CTRL M	␣ --- INVERSE CTRL B	␣ --- INVERSE CTRL Z
␣ --- CTRL N	␣ --- INVERSE CTRL C	␣ --- ESC DELETE
␣ --- CTRL O	␣ --- INVERSE CTRL D	␣ --- ESC INSERT
␣ --- CTRL P	␣ --- INVERSE CTRL E	␣ --- ESC CTRL TAB (CLR)
␣ --- CTRL Q	␣ --- INVERSE CTRL F	␣ --- ESC SHIFT TAB (SET)
␣ --- CTRL R	␣ --- INVERSE CTRL G	␣ --- INVERSE SPACE
␣ --- CTRL S	␣ --- INVERSE CTRL H	␣ --- INVERSE _
␣ --- CTRL T	␣ --- INVERSE CTRL I	␣ --- INVERSE CTRL .
␣ --- CTRL U	␣ --- INVERSE CTRL J	␣ --- INVERSE CTRL ;
␣ --- CTRL V	␣ --- INVERSE CTRL K	␣ --- INVERSE
␣ --- CTRL W	␣ --- INVERSE CTRL L	␣ --- ESC CTRL 2
␣ --- CTRL X		␣ --- ESC CTRL BACK 5
␣ --- CTRL Y		␣ --- ESC CTRL INSERT


```

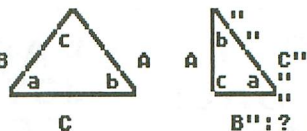
BA 5040 TRAP 5050:? "What is Side C";:INP
UT C
ZY 5050 TRAP 5050:? "What is included ang
le a";:INPUT A1:GOTO 5060
EM 5060 TRAP 40000:IF A1>180 OR A1<=0 THE
N ? "*** ERROR a<=0 OR a>180 ***":GOTO
5050
JG 5080 T=A/SIN(A1):REM RATIO VALUE
OZ 5090 Q=C/T:R1=1:IF Q<0 THEN R1=-1:Q=AB
S(Q)
YK 5091 IF Q>1 THEN ? :? "*** This Triang
le is not possible. ***":GOTO 5160
IH 5092 C1=R1*(ATN(Q/SQR(1-Q^2))):REM SEC
OND ANGLE
CW 5100 IF C1<0 THEN C1=180+C1
AQ 5110 B1=180-A1-C1:REM THIRD ANGLE
OI 5115 B=T*SIN(B1):REM SIDE B
OV 5120 ? "K":R=0:GOSUB 8040
SG 5130 ? " Side A=";A,"Angle a=";:X=A1:
GOSUB 7000:? X
LE 5140 ? " Side B=";:X=B:GOSUB 7000:? X
," Angle b=";:X=B1:GOSUB 7000:? X
AG 5150 ? " Side C=";C,"Angle c=";:X=C1:
GOSUB 7000:? X
WL 5151 IF R=1 THEN GOTO 5160
FI 5152 B1=180-(180-C1)-A1:REM OTHER POSS
IBLE ANGLE
XZ 5153 B=T*SIN((180-C1)):REM NEW SIDE B
EZ 5154 C1=180-C1
JL 5155 ? :? " --- OR ---":? :R=1:GO
TO 5130
SH 5160 ? :TRAP 5180
SA 5170 ? "Would you like to do another";
:INPUT X$
UL 5180 IF X$="Y" THEN GOTO 5005
MG 5190 TRAP 40000:RUN
KL 6000 REM *****
*
YP 6001 REM *** Solve 1-Side & 1-Angle ***
*
KT 6002 REM *****
*
CP 6004 DEG :TRAP 6005:DIM X$(1)
OU 6005 TRAP 40000
GV 6010 A=0:B=0:C=0:A1=0:B1=0:C1=0
FT 6020 GOSUB 8000:REM PROMPT INPUT
YA 6030 TRAP 6040:? "What is Side B";:INP
UT B
KT 6040 TRAP 4045:? "What is Angle b";:IN
PUT B1:GOTO 6050
LK 6045 TRAP 40000:IF B1>180 OR B1<=0 THE
N ? "*** ERROR b<=0 OR b>180 ***":GOTO
6040
MV 6050 TRAP 6060:? "What is included ang
le c";:INPUT C1:GOTO 6070
UI 6060 TRAP 40000:IF C1>180 OR C1<=0 THE
N ? "*** ERROR c<=0 OR c>180 ***":GOTO
6050
BL 6070 A1=180-C1-B1:REM THIRD ANGLE
KD 6080 T=B/SIN(B1):REM RATIO VALUE
EE 6090 A=T*SIN(A1):REM SECOND SIDE
BO 6100 C=T*SIN(C1):REM THIRD SIDE
ZV 6120 ? "K":GOSUB 8040
IB 6130 ? " Side A=";:X=A:GOSUB 7000:? X
,"Angle a=";:X=A1:GOSUB 7000:? X
WH 6140 ? " Side B=";B,"Angle b=";:X=B1:
GOSUB 7000:? X
WJ 6150 ? " Side C=";:X=C:GOSUB 7000:? X
," Angle c=";C1
SW 6160 ? :TRAP 6180
SB 6170 ? "Would you like to do another";
:INPUT X$
UM 6180 IF X$="Y" THEN GOTO 6005
WH 6190 TRAP 40000:RUN
US 7000 REM *****
5M 7001 REM *** ROUNDING ROUTINE ***
VA 7002 REM *****
IO 7003 REM

```

```

MU 7010 X1=ABS(INT(X*1000))
TO 7020 X2=ABS(INT(X*1000))
NH 7030 IF X1-(X2*10)>4 THEN X3=(X2+1)/10
80:GOTO 7035
OC 7032 X3=X2/1000
SR 7035 IF X=0 THEN X=X3:RETURN
LH 7040 IF X<0 THEN X3=X3*(-1)
OW 7050 X=X3:RETURN
TT 8000 REM *****
JZ 8001 REM *** Triangle Input ***
UB 8002 REM *****
LA 8010 ? "K"
SF 8020 ? "Please use the following forma
t"
SX 8030 ? "when answering the questions."
:?
ZV 8040 ? "
RT 8050 ? "
SP 8060 ? "B
XM 8070 ? "
TY 8080 ? "
HJ 8090 ? " C
AI 8100 RETURN

```



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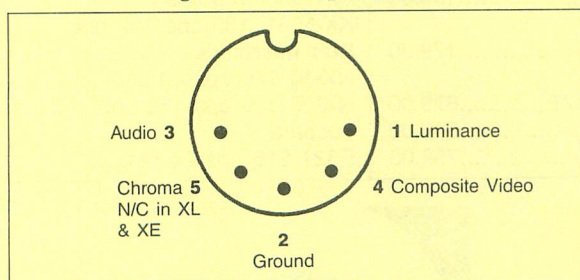
Sights and sounds.

by Lee S. Brilliant, M.D.

After you've all had a few months' respite, here's our hardware specialist back, with a new project.

This month, we'll look at the 5-pin audio/video port and see what kind of things you can do with the plug left over from issue 50's Rodent. Having said that, we can end this article—because there aren't too many interesting hardware-type things you can do with this port. So let's cover them quickly, then delve into some other material related to the port. There are two types of signals available at the port: the video and the sound, which you can use to build your own connector cables and save a few bucks. Take a look at figure 1, below.

Figure 1. — 5-pin plug.



Roll your own.

When a cable costs only about \$10 to buy, why would anyone want to *make* one? Well, a cable to hook your computer to your monitor should cost less

than \$5, and also allow flexibility in how and what you hook up to your computer.

For example, the standard cable is about 3 to 5 feet long and terminates in two RCA phono plugs, but if you have an old AMDEK monitor, the sound channel needs a mini phone plug instead. Or if you need an unusually long cable, you must build it yourself. You also gain some flexibility as to which signals you choose to use with different monitors. We'll ignore the TV signal that comes out on a separate cable to the TV antenna.

To make your own cable, go to Radio Shack and get a 6- or 12-foot audio patch cable with the proper audio plug on one end and the proper video plug on the other (such as R.S. 42-2368 or 42-2444). Cut it in half and strip the cut ends back about 1 inch. Twist the braided outer conductors together, slip the connector cover over the cables, and solder the braids to pin 2 and to the shield lug. The center wire for the audio plug must be soldered to pin 3, and the video center lead usually goes to pin 4. Some color video monitors work better when hooked up to pin 5 (not connected in the XL/XE series), while monochrome monitors should be hooked to pin 1.

What's the difference between these pins? Well, to answer this, we must understand something about video.

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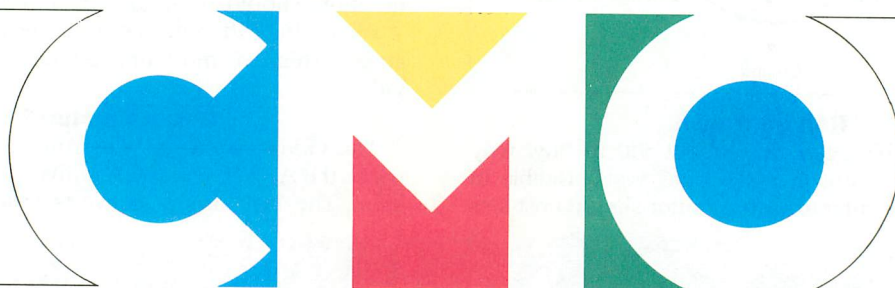
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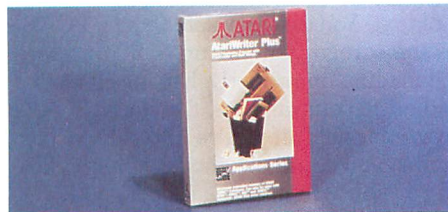
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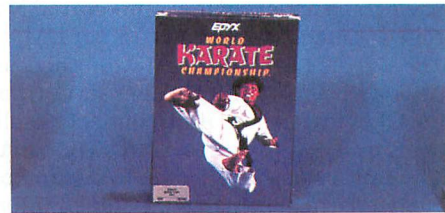


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you can PEEK back and get 60, because READ and WRITE both work for only one register.

In POKEY, however, you can POKE 53760(\$D200),100 to set sound channel 0, but PEEK the same address and you won't get 100 back. Instead, you get the value of POT counter 0. As you can see from Figure 5, virtually all of the POKEY registers are dual function. For the most part, registers 9 to 15 do not deal with sound. They'll be covered in the next article on the serial port. Registers 0 to 8 have split functions: read deals with POTS; write with sound generation. This is what we'll study now.

The first eight registers regulate POKEY's four sound channels, with each channel having a control register and a frequency register in alternate addresses. Let's look at the two registers for channel 0. AUDF1(\$D200,53760) is an 8-bit register that, when written to, sets the frequency of channel 0. The way this works is shown in Figure 6.

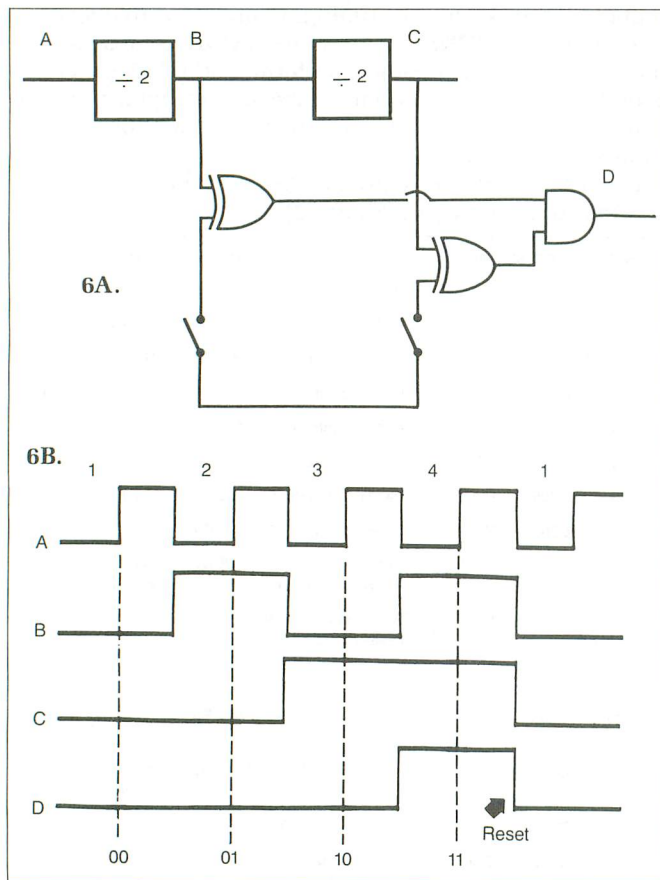


Figure 6. — Audio channel.

This shows a 2-bit sound channel, but the principle is the same for an 8-bit generator. The switches are actually data latches set by writing to AUDF1. The divide-by-two counters set up a string of pulses which convert the "decimal" count of clock pulses to binary codes. When the pattern of 1s and 0s in AUDF1 matches the pattern from the dividers at points B and C, then an output pulse is generated at D, to reset the dividers to 0 and feed another divide-by-two circuit called a flip-flop.

Note that this shift occurs one count greater than the setting of AUDF1, or, say, on the fourth pulse—when AUDF1 contains 3, and the final output frequency is really one-half cycle for each full count to the value in AUDF1. When you put this all together, the formula to calculate audio frequency is:

$$\text{Frequency} = \frac{\text{clock rate}}{2(\text{AUDF1}+1)}$$

The standard clock rate is 63,921 Hz or 64 KHz.

Every sound channel also has a control register like AUDC1(\$D201,53761). Each one is divided into three parts: volume control, forced output and distortion control (see Figure 7).

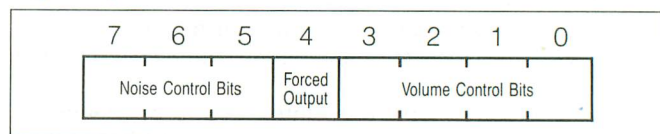


Figure 7. — Audio control register.

Bits 0 through 3 work to control volume level, by setting a variable attenuator so that 0 gives 0 volume, 15 gives full volume and 8 gives half. Bit 4 will force the sound channel's output flip-flop to 1 and the frequency to 0. The voltage output from the sound channel can now be varied from 0 to full by setting the volume bits of AUDC1. Type and run the following program to see how this works:

```
10 SOUND 0,0,0,0:AUDC1=53761
20 POKE AUDC1,31:POKE AUDC1,16:POKE AU
DC1,31
30 POKE AUDC1,16:POKE AUDC1,31:POKE AU
DC1,16
40 GOTO 20
```

Listing 4.

This program works by setting channel 0 (bit 4=16) to forced output and alternately setting the volume to 0 and 15. If you program in machine code, you can create your own special waveforms by varying the value of the volume bits.

Bits 5 through 7 combine various signals, allowing you to create all kinds of special sounds or noise. Noise is random sound, but, in computers, it's pulses at random intervals.

Basically, there are two types of circuits used to do this, the poly counter and the D-latch. The latter is a gate with a clock controlling the passage of the signal on the data line. If there is a 1 at the D line when the clock triggers it, then the output is 1. The same is true with a 0 on the D line. The D line is fed with noise, while the clock line is fed from the sound channel at a regular interval. This allows you to "cut off" noise above a certain frequency—or in other words, you have a "low pass" filter.

```
10 FOR S=255 TO 0 STEP -1:SOUND 1,5,8,
15:NEXT S
```

Listing 5.

Note that when AUDF1 (value of S) is large, the sound is like an irregular crackle, but becomes a hiss as the cut-off frequency increases.

The 3 noise control bits of AUDC1 set a total of six different sound modes. In some, random noise gets through

straight; in others, pure tones; and in the rest, random noise is clocked by the audio channel, then is used to clock another random noise channel.

Polly wanna crackle?

What is a poly counter? Basically, a shift register where some of the stages feed back through a bit processor, to create "random" pulses. A shift register is a row of bits whose values "shift" one place whenever a pulse appears on the clock line. A simple 5-bit poly counter is shown in Figure 8.

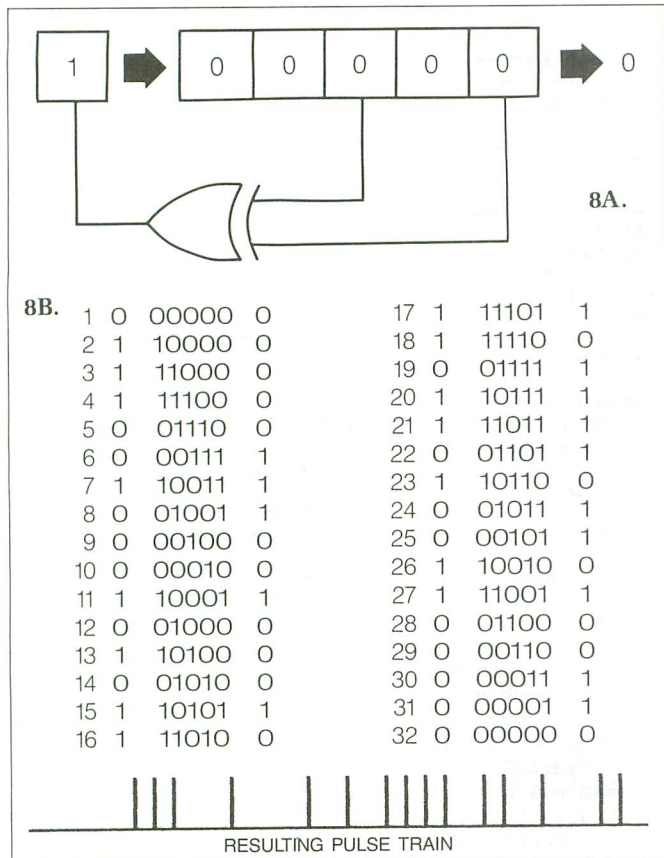


Figure 8. — Poly counter.

In our example, an Exclusive-Or gate feeds a 1 to the shift register input whenever bits 3 and 5 hold the same value. Actually, the signals are not truly random, but repeat at regular intervals which lengthen with the number of stages. In our example, the pattern repeats every thirty-two cycles. The largest poly counter in the Atari is seventeen stages and does not appear to have a repeatable pattern.

Additional goodies.

Besides straightforward sound and noise of various frequencies, several options are available through the AUDCTL (\$D20F) register:

BIT	FUNCTION
7Changes 17 bit poly to 9 bit
6Clock channel 1 with 1.79 MHz (1.78979 MHz)
5Clock channel 3 with 1.79 MHz
4Clock channel 2 with channel 1

- 3Clock channel 4 with channel 3
- 2High-pass filter into channel 1 clocked by channel 3
- 1Same for channels 2 and 4
- 0Clock all channels at 15 KHz (15.6999 kHz)

Some of these options can be combined, such as clock channel 1 with 1.79 MHz, then clock channel 2 with channel 1. Try the following simple programs to demonstrate the functions of some of these bits:

Bit 7: **SOUND 0,10,8,10**

now:

POKE 53768,128

This shows how the length of a poly counter affects the noise:

Bit 6: **SOUND 0,255,10,10**

now:

POKE 53768,64

In this mode, the frequency output is calculated by:

$$\text{Output} = \frac{\text{clock frequency}}{2(\text{AUDF1}+4)}$$

```
Bit 4: 10 SOUND 0,0,0,0: SOUND 1,0,10,
15
20 POKE 53768,64+16
30 FOR S=1 TO 255: POKE 53762,S
40 FOR P=1 TO 255: POKE 53760,P
50 NEXT P: NEXT S
60 STOP
```

This shows the wide spectrum of 16-bit sound.

```
Bit 2: 10 SOUND 0,10,8,15
20 SOUND 2,0,10,0
30 POKE 53768,4
40 FOR S=0 TO 15: POKE 53764,S:
NEXT S
50 FOR S=10 TO 0 STEP -2: POKE
53764,S
60 NEXT S: GOTO 40
```

Change Line 10 to:

10 SOUND 0,10,14,14

Sound effects using high-pass filter.

Bit 0: **SOUND 0,50,10,10**

now:

POKE 53768,1

Bits 3 and 4 place two sound channels in series, so the formula to calculate output becomes:

$$\text{Output} = \frac{\text{clock frequency}}{2[(\text{AUDF1})+(\text{AUDF2} * 256)+7]}$$

The signal output is roughly a square wave and is capacitively coupled to a buffer amplifier and then to the audio output. As the frequency decreases the waveform distorts and as frequency increases, the output level drops.

At low frequencies, these short spikes are heard as clicks from the TV speaker, and both the plus and minus spikes make clicks. Try the metronome program below:

```
10 INPUT RATE: REM 0-255
20 SOUND 0,255,10,0: SOUND 1,RATE,10,15
30 POKE 53768,17
40 GOTO 40
```

Using the previous formulae, you find a frequency range of 29.96 to .12 Hz. Because both cycle halves create clicks,

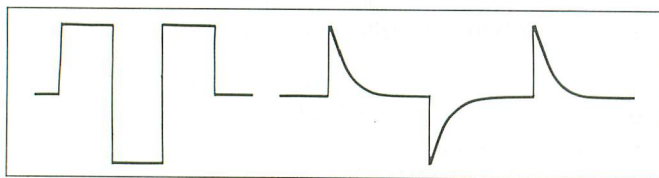


Figure 9. — Square wave on left; passing it through a capacitor yields the wave form on the right.

the click rate will be twice the output frequency, so the metronome above can tick down to once every 4.1 seconds. For the technical, the output voltage is between 20 and 30 millivolts in the audio range, but falls off rapidly above 64 KHz.

And that just about finishes the audio/video port. Now that you know all about how the computer generates sound and video, what can you do with the video generated? Not much, outside of sending it to the monitor.

I thought about creating a video titler, but the Atari system doesn't interlace its pictures—while the TV does—ergo, the two pictures cannot be mixed easily. As far as sound goes, you can plug the output into a stereo amplifier, or you could couple the output through an audio transformer to the telephone line, by placing it between the microphone wires and the computer output. An interstage audio transformer (1000 ohms to 2000 ohms) works well.

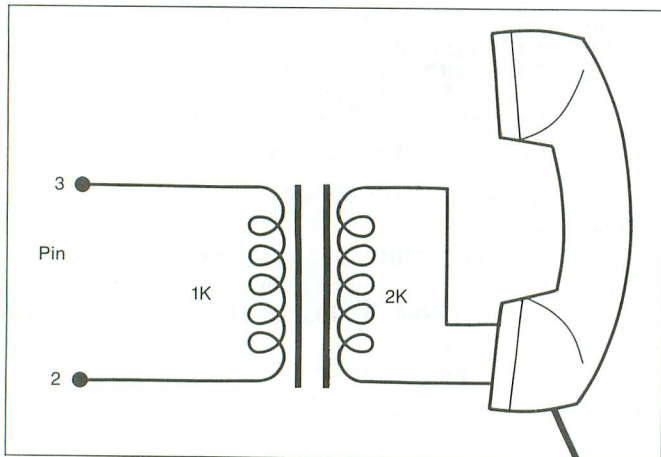


Figure 10.
Telephone connection.

You may need an amplifier to boost the level, but *always* use the transformer when connecting into the telephone. Using this and the Telephone Dialer (issues 19 and 21), your Atari can dial phone numbers for you or add voice with a speech synthesizer (see "Cheep Talk," issue 29). You could also amplify the signal and subject it to digital shaping, to create a programmable pulse generator.

Next time, we'll move on to the next port in this serial. (Or is that the serial port?) Stick with it; I promise the next project will be exciting! ☐

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TROLL WAR II

**Champion the cause
in hostilities between
the trolls and the wizards.**

by Scott Langston

When this game fell out of our mailbag one morning, we knew it was something we just had to offer our readers. There was one small problem, however. The object code was (and, of course, still is) over 10K. "That," we said, "is too big to put in the magazine." But somehow, we just couldn't put it back in the mail from whence it came. Neither did we want to offer it as a disk-only program, leaving some of our faithful readers out of the fun. So we're trying something a bit unusual. Bear with us, okay?

We've divided the "M/L Editor" data for this game into two parts. The first is presented here, and the second will be found in next month's issue. The complete game will be found on next month's disk version, for those of you don't wish to brave the wrath of digit paralysis (a common finger disease caused by typing over 10,000 pieces of data). Let us know what you think about this sort of thing. You're the boss, after all.

And please refer to "M/L Editor" for typing instructions.

Troll War II is a two-player game, in which trolls war with wizards. The game consists of each player taking a turn, during which armies may be moved, enemies may be attacked, and the opponent's castle may be stormed. The game is over when your opposition's king is captured. Trolls are controlled by joystick 0, and wizards by joystick 1. Trolls move first.

On the main screen, the troll's castle is located in the upper left, and the wizard's castle in the lower right.

Each turn consists of:

Movement phase: up to four armies may be moved.

To select an army, move the pointer to the position occupied by the army to be relocated.

(continued on page 55)



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Press the trigger, and the army is now controlled—to be moved up, down, left or right. Horizontal movement is unlimited. Vertical motion, however, is restricted to a maximum combination of three rows up or down.

Once an army is in the destination position, press the trigger. The pointer will reappear. An army may be selected, moved and reselected to be moved again. Movement of any four armies concludes a movement phase. (Selecting an army without movement does not count as part of a movement phase. This allows an army to be unselected if chosen by mistake. Also, increasing armies [see below] does not count as part of the movement phase.) After the movement phase is completed, your turn is over, and your opponent gets a chance.

Increasing armies: at the middle of the main screen, located on the left side, there is a *T*, and on the right side is a *W*. The *T* is used by the troll player, and the *W* by the wizard player.

If the two spaces in front of your castle are unoccupied, then, by positioning the pointer on the corresponding letter and pressing the trigger, you'll get another army to appear in front of your castle. A player may have up to ten armies on the board at one time.

Fighting: to attack your opponent's army, move your army into the opponent's men. The screen will then change to the fight area. Movement here is in any direction (including diagonal). Armies may hide behind any playfield.

To destroy the opponent, your army must fire and hit the opposition with a missile. These may be fired left, right, up or down, by pressing the trigger and moving in the corresponding direction. Missiles will not go through playfield, and only one missile may be on the screen at one time. Once an army is destroyed, the main screen will reappear; however, the losing army will be removed, while the winner's troops will remain in the position where they were at the time before the fight started.

Castle storming: storm the barricades by moving an attacking army into a castle. The screen will change, and attacking armies will race toward the castle's defenders. The attacking player controls the gun opposite the castle, and fires at the gun guarding the fortress, to temporarily destroy that gun.

The player defending the castle fires at the attacking armies, to destroy them and to protect his defending armies. This castle storming is timed and will end in: (1) castle successfully defended, and the main screen reappearing; or (2) twelve defenders out of sixteen are lost, and the main screen reappears with the defender's king appearing outside, in front of his castle.

When your opponent's king is in front of his castle, the opponent may not move that king. As a result, he may not increase his armies. To win the game, one of your armies must move into the king. With this accomplished, your triumphant forces will fill the screen. **A**

Scott Langston has his B.A. degree, with a major in Mathematics/Computer Science. As a hobby, he has programmed the Atari 800 home computer for a little over three years. He would like to credit Robert Ellingsworth as the design consultant on *Troll War II*.

Listing 1.
"M/L Editor" data listing.

```

1000 DATA 255,255,113,40,108,41,72,169
,1,141,10,212,141,27,208,169,7014
1010 DATA 116,141,196,2,169,156,141,19
7,2,169,136,141,198,2,104,64,6430
1020 DATA 162,0,138,157,0,36,157,0,37,
157,0,38,157,0,39,157,1036
1030 DATA 0,35,232,208,238,96,160,21,1
38,153,0,40,202,136,16,248,7672
1040 DATA 96,169,4,141,40,40,141,41,40
,169,71,141,48,2,169,112,3307
1050 DATA 141,49,2,169,32,141,7,212,16
9,62,141,47,2,169,3,141,3671
1060 DATA 29,208,169,20,141,111,2,169,
228,141,196,2,169,28,141,197,8327
1070 DATA 2,169,200,141,198,2,169,2,14
1,192,2,141,193,2,141,194,7434
1080 DATA 2,169,78,141,195,2,169,152,1
41,199,2,169,3,141,8,208,6374
1090 DATA 141,9,208,141,10,208,169,0,1
41,11,208,141,12,208,141,28,5908
1100 DATA 40,141,64,40,141,63,40,141,4
6,40,141,48,40,141,30,208,3478
1110 DATA 169,50,141,47,40,169,1,141,2
7,40,169,2,133,149,169,3,3263
1120 DATA 141,15,210,169,0,141,8,210,1
41,0,210,141,2,210,141,4,5595
1130 DATA 210,141,6,210,169,170,141,3,
210,141,5,210,141,7,210,141,8568
1140 DATA 1,210,96,169,80,141,0,208,16
9,112,141,1,208,169,144,141,9125
1150 DATA 2,208,160,48,162,7,169,204,1
53,0,36,153,0,37,153,0,2329
1160 DATA 38,169,109,41,104,42,51,153,
8,36,153,8,37,153,8,38,9942
1170 DATA 200,202,16,230,152,24,105,8,
168,192,202,144,219,96,24,165,9018
1180 DATA 0,109,102,40,133,0,165,1,105
,0,133,1,96,56,165,0,619
1190 DATA 237,102,40,133,0,165,1,233,0
,133,1,96,160,0,177,128,4420
1200 DATA 201,7,240,31,201,11,240,78,2
01,13,240,5,201,14,240,44,7386
1210 DATA 96,165,1,201,131,144,7,165,0
,201,112,144,1,96,169,40,4833
1220 DATA 76,217,41,165,1,201,131,144,
7,165,0,201,150,144,1,96,5435
1230 DATA 169,1,32,26,42,32,133,41,32,
41,42,96,165,1,201,128,2796
1240 DATA 144,14,240,3,76,248,41,165,0
,201,80,144,3,76,248,41,5716
1250 DATA 96,169,40,76,16,42,165,1,201
,128,144,244,240,3,76,14,5730
1260 DATA 42,165,0,201,41,144,233,169,
1,32,26,42,32,148,41,32,1222
1270 DATA 41,42,96,141,102,40,173,23,4
0,145,0,200,173,24,40,145,4107
1280 DATA 0,96,160,0,177,0,141,23,40,1
69,70,145,0,200,177,0,4023
1290 DATA 141,24,40,169,71,145,0,96,16
9,255,141,44,40,173,47,40,4705
1300 DATA 141,45,40,206,45,40,208,251,
206,44,40,208,240,96,165,0,8573
1310 DATA 133,140,165,1,133,141,177,12
8,201,15,240,29,141,25,40,201,6942
1320 DATA 7,240,105,42,100,43,39,201,1
1,208,3,76,239,42,201,14,4987

```


Troll War II *continued*

1330 DATA 208,3,76,62,43,201,13,208,3,
76,173,43,96,162,1,160,4493
1340 DATA 1,189,0,40,145,0,136,202,189
0,40,145,0,96,177,0,3052
1350 DATA 205,0,40,208,5,162,7,76,130,
42,205,6,40,208,5,162,4177
1360 DATA 9,76,130,42,205,8,40,208,42,
169,2,141,102,40,32,133,3372
1370 DATA 41,160,0,177,0,240,29,173,0,
40,201,1,208,7,32,101,2987
1380 DATA 53,32,162,51,96,201,23,208,7
,32,101,53,32,236,51,96,3849
1390 DATA 32,148,41,96,32,148,41,160,0
,169,0,145,0,160,2,162,3132
1400 DATA 7,32,132,42,169,1,141,102,40
,76,133,41,177,0,205,0,3140
1410 DATA 40,208,5,162,3,76,130,42,205
,2,40,208,5,162,5,76,2671
1420 DATA 130,42,205,4,40,208,40,169,1
,141,102,40,32,148,41,177,4301
1430 DATA 0,240,29,173,0,40,201,23,208
,7,32,108,53,32,236,51,3603
1440 DATA 96,201,1,208,7,32,108,53,32,
162,51,96,32,133,41,96,2230
1450 DATA 162,3,32,130,42,152,160,2,14
5,0,96,169,40,141,102,40,3545
1460 DATA 32,148,41,177,0,240,34,173,0
,40,201,23,208,16,32,108,3704
1470 DATA 53,32,236,51,96,169,40,141,1
02,40,32,133,41,96,201,1,3575
1480 DATA 208,243,101,43,96,44,32,108,
53,32,162,51,96,200,177,0,4375
1490 DATA 208,217,32,133,41,173,107,40
,201,3,144,1,96,238,107,40,5332
1500 DATA 160,0,32,158,43,32,148,41,16
2,19,32,42,44,32,19,44,8672
1510 DATA 162,11,32,42,44,169,0,145,0,
136,145,0,32,148,41,173,3178
1520 DATA 8,40,145,0,200,173,9,40,145,
0,32,63,42,96,169,40,1942
1530 DATA 141,102,40,32,133,41,177,0,2
40,34,173,0,40,201,23,208,5683
1540 DATA 16,32,101,53,32,236,51,96,16
9,40,141,102,40,32,148,41,3376
1550 DATA 96,201,1,208,243,32,101,53,3
2,162,51,96,200,177,0,240,7960
1560 DATA 3,76,185,43,32,148,41,173,10
7,40,201,3,144,1,96,238,5905
1570 DATA 107,40,160,0,32,158,43,162,1
1,32,42,44,32,19,44,162,285
1580 DATA 19,32,42,44,32,148,41,169,0,
145,0,136,145,0,32,133,2227
1590 DATA 41,76,158,43,162,17,32,130,4
2,32,148,41,173,14,40,145,2788
1600 DATA 0,200,173,15,40,145,0,32,63,
42,96,32,130,42,32,133,1218
1610 DATA 41,189,2,40,145,0,200,189,3,
40,145,0,32,63,42,96,1318
1620 DATA 169,2,133,129,169,120,133,12
8,169,2,133,131,169,132,133,130,8924
1630 DATA 96,169,2,133,129,169,121,133
,128,169,2,133,131,169,133,133,8824
1640 DATA 130,96,97,44,92,45,169,129,1
33,1,169,184,133,0,96,169,6521
1650 DATA 130,133,1,169,6,133,0,96,160
,0,169,70,145,0,200,169,6049
1660 DATA 71,145,0,96,169,0,141,26,40,
169,0,141,101,40,141,23,2543
1670 DATA 40,141,24,40,169,0,141,25,40
,238,26,40,173,26,40,201,4191
1680 DATA 5,176,3,76,167,44,160,0,32,2
6,42,96,32,163,41,32,556
1690 DATA 63,42,160,0,177,130,208,244,
32,26,42,173,23,40,205,0,4410
1700 DATA 40,240,9,32,124,53,32,41,42,
76,167,44,32,63,42,32,9808
1710 DATA 63,42,32,63,42,32,63,42,169,
0,141,107,40,160,0,32,1012

1720 DATA 85,42,173,0,40,201,1,240,11,
173,41,40,208,17,173,103,5686
1730 DATA 131,240,12,96,173,40,40,208,
6,173,128,128,240,1,96,32,5624
1740 DATA 63,42,173,101,40,208,130,160
,0,177,130,208,208,173,0,40,7910
1750 DATA 141,23,40,173,1,40,141,24,40
,32,115,44,173,25,40,240,3685
1760 DATA 15,32,63,42,32,63,42,32,63,4
2,32,63,42,76,143,44,9838
1770 DATA 32,63,42,32,63,42,32,63,42,3
2,63,42,76,167,44,169,2062
1780 DATA 70,141,49,40,141,50,40,169,6
2,141,54,40,141,55,40,141,3577
1790 DATA 3,208,169,183,141,2,208,162,
8,189,120,138,157,62,39,189,8373
1800 DATA 129,138,93,45,88,46,157,62,3
8,202,16,241,96,169,39,133,6732
1810 DATA 135,169,0,133,134,96,169,38,
133,135,169,0,133,134,96,177,7831
1820 DATA 128,201,13,208,27,189,49,40,
201,192,176,50,254,49,40,254,70
1830 DATA 54,40,162,12,168,136,177,134
,200,145,134,136,202,208,246,96,3585
1840 DATA 201,14,208,26,189,54,40,201,
64,144,19,222,49,40,222,54,6234
1850 DATA 40,168,162,12,200,177,134,13
6,145,134,200,202,208,246,96,173,4473
1860 DATA 61,40,240,32,206,61,40,173,6
1,40,208,75,56,173,60,40,4736
1870 DATA 233,2,168,162,5,169,0,153,0,
36,200,202,16,249,169,0,6735
1880 DATA 141,2,210,96,173,27,40,240,4
6,160,0,177,148,208,40,141,8096
1890 DATA 27,40,24,174,97,40,189,54,40
,105,4,168,173,98,40,141,5192
1900 DATA 0,208,141,59,40,169,24,153,0
,36,140,60,40,169,218,141,6613
1910 DATA 192,2,169,160,141,111,40,96,
173,27,40,240,1,96,206,59,6210
1920 DATA 40,206,59,40,173,59,40,201,6
3,144,13,141,0,208,206,111,7436
1930 DATA 40,173,111,40,141,2,210,96,1
69,1,141,27,40,56,173,60,4029
1940 DATA 40,233,2,168,162,5,189,103,1
12,153,0,36,200,202,16,246,8685
1950 DATA 169,5,141,61,40,169,14,141,1
92,2,169,250,141,2,210,96,8390
1960 DATA 173,27,89,46,148,46,40,240,1
,96,238,59,40,238,59,40,5526
1970 DATA 173,59,40,201,183,176,197,14
1,0,208,206,111,40,173,111,40,8588
1980 DATA 141,2,210,96,169,65,141,98,4
0,169,132,133,148,169,0,141,7789
1990 DATA 97,40,96,169,183,141,98,40,1
69,133,133,148,169,1,141,97,7866
2000 DATA 40,96,149,46,144,47,165,136,
24,105,40,133,136,165,137,105,7223
2010 DATA 0,133,137,96,32,149,46,201,1
19,208,14,165,136,201,225,208,2625
2020 DATA 8,169,117,133,137,169,97,133
,136,96,32,149,46,201,116,208,9495
2030 DATA 14,165,136,201,73,208,8,169,
113,133,137,169,201,133,136,96,540
2040 DATA 160,2,177,136,201,88,240,82,
201,89,240,70,174,90,40,189,473
2050 DATA 74,40,201,1,176,3,76,71,47,1
77,136,201,7,240,7,201,7682
2060 DATA 9,240,11,76,71,47,169,9,32,4
2,48,76,71,47,192,34,1931
2070 DATA 144,9,32,51,48,32,254,47,76,
71,47,200,200,177,136,136,8723
2080 DATA 136,201,0,208,51,169,0,145,1
36,200,169,7,32,42,48,76,3986
2090 DATA 71,47,169,88,141,30,40,76,46
,47,169,89,141,30,40,169,4255
2100 DATA 0,145,136,136,192,5,144,16,1
77,136,240,7,136,32,51,48,4894

2110 DATA 76,71,47,173,30,40,145,136,2
00,192,35,176,3,76,209,46,6845
2120 DATA 96,160,3,177,136,201,88,240,
81,201,89,240,69,174,90,40,9596
2130 DATA 189,74,40,201,1,176,3,76,198
47,177,136,201,25,240,7,7587
2140 DATA 201,27,240,11,76,198,47,169,
27,32,42,48,76,198,47,192,5546
2150 DATA 5,176,9,32,51,48,32,207,47,7
6,198,47,136,177,136,200,8496
2160 DATA 201,0,145,47,58,48,208,51,13
6,169,25,32,42,48,200,169,5921
2170 DATA 0,145,136,76,198,47,169,88,1
41,30,40,76,174,47,169,89,6131
2180 DATA 141,30,40,169,0,145,136,200,
192,36,240,15,177,136,240,6,9408
2190 DATA 32,51,48,76,198,47,173,30,40
145,136,200,192,37,240,3,7863
2200 DATA 76,82,47,96,174,90,40,222,9,
113,189,9,113,208,35,136,6911
2210 DATA 136,177,136,201,114,240,9,13
6,177,136,200,201,114,240,1,96,1031
2220 DATA 136,169,23,32,42,48,136,206,
223,112,173,223,112,208,3,141,364
2230 DATA 221,112,96,174,90,40,222,25,
113,189,25,113,208,32,200,177,9625
2240 DATA 136,201,243,240,9,200,177,13
6,136,201,243,240,1,96,169,1,734
2250 DATA 32,42,48,206,224,112,173,224
112,208,3,141,222,112,96,145,1156
2260 DATA 136,200,170,232,138,145,136,
96,169,0,145,136,200,145,136,96,468
2270 DATA 59,48,162,48,56,233,32,74,74
74,170,173,76,112,133,132,7612
2280 DATA 173,77,112,133,133,202,48,16
24,165,132,105,40,133,132,165,7396
2290 DATA 133,105,0,133,133,76,76,48,9
6,173,110,40,240,11,169,173,8063
2300 DATA 141,0,210,206,110,40,76,117,
48,169,0,141,0,210,177,130,7642
2310 DATA 240,1,96,238,28,40,173,28,40
201,11,144,30,169,0,141,4838
2320 DATA 28,40,189,54,40,24,105,4,32,
59,48,172,22,40,177,132,3405
2330 DATA 208,9,169,88,145,132,169,5,1
41,110,40,96,163,48,158,49,6061
2340 DATA 173,109,40,208,6,169,0,141,3
210,96,172,52,40,162,7,4880
2350 DATA 189,138,138,153,0,39,189,154
138,153,0,38,189,146,138,153,8877
2360 DATA 0,37,136,202,16,234,169,0,14
1,1,210,96,169,76,141,52,7266
2370 DATA 40,169,69,141,57,40,169,0,14
1,9,208,141,10,208,141,11,5899
2380 DATA 208,169,200,141,193,2,169,28
141,194,2,169,228,141,195,2,9628
2390 DATA 169,57,141,62,40,141,1,208,1
41,2,208,141,3,208,96,169,8425
2400 DATA 217,141,110,40,169,68,141,1,
210,238,52,40,173,64,40,24,5088
2410 DATA 105,8,201,16,208,2,169,0,141
64,40,24,109,63,40,168,3657
2420 DATA 174,57,40,185,162,138,157,0,
39,185,178,138,157,0,37,185,7676
2430 DATA 194,138,157,0,38,200,232,236
52,40,208,231,206,52,40,173,975
2440 DATA 110,40,141,0,210,96,254,44,4
0,189,44,40,201,5,240,1,6322
2450 DATA 96,169,0,157,44,40,160,0,177
150,201,15,208,3,76,163,7070
2460 DATA 48,173,109,40,208,10,169,136
141,3,210,169,255,141,2,210,1028
2470 DATA 177,150,201,7,208,3,76,186,4
9,201,11,208,3,76,218,49,6881
2480 DATA 201,13,208,3,76,250,49,201,1
4,208,3,76,54,50,201,5,4822
2490 DATA 208,6,32,5,50,76,186,49,201,
9,208,6,159,49,113,50,4733
2500 DATA 32,5,50,76,218,49,201,6,208,

6,32,65,50,76,186,49,4187
2510 DATA 201,10,208,6,32,65,50,76,218
49,96,173,109,40,208,3,5616
2520 DATA 76,80,55,169,48,141,63,40,32
2,49,173,62,40,201,197,5900
2530 DATA 176,232,238,62,40,173,62,40,
76,245,48,173,109,40,208,3,7007
2540 DATA 76,96,55,169,0,141,63,40,32,
2,49,173,62,40,201,53,3408
2550 DATA 144,200,206,62,40,173,62,40,
76,245,48,173,109,40,208,3,6835
2560 DATA 76,112,55,32,2,49,173,109,40
208,3,76,112,55,173,52,4578
2570 DATA 40,201,207,176,33,238,52,40,
174,52,40,160,16,189,255,38,8347
2580 DATA 157,0,39,189,255,36,157,0,37
189,255,37,157,0,38,202,7515
2590 DATA 136,208,234,238,57,40,96,173
109,40,208,3,76,160,55,32,5647
2600 DATA 2,49,173,109,40,208,3,76,160
55,173,57,40,201,33,144,6442
2610 DATA 33,206,52,40,206,57,40,174,5
7,40,160,16,189,1,39,157,4848
2620 DATA 0,39,189,1,37,157,0,37,189,1
38,157,0,38,232,136,4893
2630 DATA 208,234,96,114,50,109,51,32,
139,40,32,58,45,169,0,141,3473
2640 DATA 65,40,141,66,40,141,11,208,1
41,10,208,141,9,208,141,8,6880
2650 DATA 208,141,12,208,169,17,141,11
1,2,96,174,90,40,254,74,40,6628
2660 DATA 189,74,40,201,2,144,5,169,0,
157,74,40,238,90,40,173,6768
2670 DATA 90,40,201,16,144,5,169,0,141
90,40,96,32,114,50,32,2475
2680 DATA 198,46,169,113,141,77,112,16
9,41,141,76,112,32,78,53,169,6198
2690 DATA 0,141,103,131,141,104,131,14
1,90,40,206,40,40,173,222,112,9199
2700 DATA 240,66,169,7,141,92,40,169,8
141,93,40,160,3,32,15,2323
2710 DATA 53,32,207,46,32,149,50,32,18
5,46,32,144,51,173,66,40,4212
2720 DATA 201,200,144,217,32,63,44,32,
97,44,32,115,44,169,128,141,5882
2730 DATA 77,112,169,0,141,76,112,32,2
05,40,32,139,40,32,78,41,2798
2740 DATA 32,63,42,96,169,239,141,103,
131,169,240,141,104,131,32,97,9917
2750 DATA 44,76,5,51,32,114,50,32,176,
46,169,116,141,77,112,169,7205
2760 DATA 193,141,76,112,32,78,53,169,
0,141,127,128,141,128,128,141,8406
2770 DATA 90,40,206,41,40,173,221,112,
240,43,169,27,141,92,40,169,8601
2780 DATA 28,141,93,40,160,35,32,15,53
32,80,47,32,149,50,32,888
2790 DATA 163,46,32,110,51,105,52,144,
51,173,66,40,201,200,144,217,422
2800 DATA 32,80,44,32,106,44,76,5,51,1
69,109,141,127,128,169,110,7396
2810 DATA 141,128,128,32,106,44,76,5,5
1,173,65,40,24,105,1,141,2522
2820 DATA 65,40,173,66,40,105,0,141,66
40,96,177,144,201,57,208,8749
2830 DATA 12,32,183,50,32,63,44,169,1,
141,101,40,96,201,23,144,5574
2840 DATA 43,201,45,176,39,32,120,52,3
2,63,44,32,97,44,32,115,1750
2850 DATA 44,169,24,141,94,40,173,67,4
0,208,8,169,1,141,67,40,4513
2860 DATA 76,19,52,169,0,141,67,40,76,
19,52,96,201,239,208,251,1134
2870 DATA 162,2,76,73,52,177,144,201,6
7,208,12,32,47,51,32,80,3778
2880 DATA 44,169,1,141,101,40,96,201,2
3,176,65,32,120,52,32,80,3968
2890 DATA 44,32,106,44,32,115,44,169,2
141,94,40,160,0,173,67,4691



StoryBook in G:

Use issue 35's **G:** printer to include your child in your own tall tales.

by Larry Linson

StoryBook is a program that creates a 4-page "personalized" story booklet for children ages 5 to 11. The tale, entitled "A Ghost in the Attic," is complete with pictures to illustrate the booklet. The program personalizes the story, by making your child the main character and using the name of a friend and a pet. The program accomplishes all of this while printing out a **StoryBook** in only one pass.

The inspiration for the program came to me late one sleepless night. I had just finished "Dragon's Breath" (**ANALOG Computing** issue 34), and was trying to come up with some new ideas. I'd been wanting to write a personalized story program for some time, but had been fumbling for an idea as to what form it would take.

I guess I should also admit now that part of the inspiration came from the greeting card feature of Broderbund's *The Print Shop*. However, *The Print Shop*, prints half the greeting card upside down. In my original program, half of the story would print, after which you had to remove the paper from the printer and reinsert it upside down. The results were good, but the process was rather cumbersome!

In **ANALOG's** issue 35 was a program called "G:" by Charles F. Johnson that prints any character set the Atari can produce (and also any graphics 8 picture). I used this program quite a bit to print out program listings, etc. Then it occurred to me: if I were to design a font that was upside down and backward, then I could use "G:" to print out **StoryBook** pages 2 and 3—which need to be upside down—without having to take out and reinsert the paper. So that's what I decided to do, along with creating some upside down and backward pictures.

Using **StoryBook**.

The program is rather straightforward. All you'll need to do to make a **StoryBook** is:

- (1) Type the program in and save it.
- (2) Check the program with "Basic Editor II" from issue 47.
- (3) Boot your AUTORUN disk with "G:".
- (4) Run **StoryBook**.
- (5) Type in your name.
- (6) Identify yourself as a boy or a girl.
- (7) Type in a friend's name and a pet's name.
- (8) Position the paper in your printer at the top of a form and turn it on.

When the program has finished printing (it takes about 2½ minutes), it will ask if you'd like to make another. If so, the program will go back to the start. If not, tear off the **StoryBook**, fold it in half, top to bottom, and then in half again, side to side, (as you would for a card or booklet). The title page goes in front, and the rest should fall into line.

Special features.

You'll notice that **StoryBook** uses a couple of redefined character sets. Using "Create-A-Font" (**ANALOG** issue 16), I defined several special characters—new quotation marks, apostrophes, commas and exclamation marks.

StoryBook prints pictures on each page, such as a ghost, storm cloud, haunted house and the infamous attic door, as well as one complete character set that's upside down and backward. For this I used "Create-A-Font Datamaker" (**ANALOG** issue 22) to make a BASIC subroutine, to incorporate these fonts into my program. One of the more difficult aspects of this program was getting the two different character sets to coexist (peacefully!) in memory. Many articles

have been written about using redefined characters, some mentioning the fact that you can have two or more in memory at one time. But I've never found an example I could work from. By trial and error, I arrived at the proper memory offset that I needed.

There's just one TRAP statement in the program at Line 1450. But this is the first thing the program sees. You will get the error screen immediately when "G:" isn't in memory. To correct this you'll need to reboot the computer with the "G:" AUTORUN disk and make sure your printer is ready to go.

Printing pages 1 and 4 was quite easy. I simply opened the "G:" device and sent each line to the printer. However, printing pages 2 and 3 correctly was a little trickier. I was faced with the choice of putting a line into a very long string, or having the user enter the line backward as it was typed in—an extremely tedious process. I chose the former, letting the computer do the really hard work. In the subroutines in Lines 120 and 130 the story lines are packed into one large string, to be printed out in reverse in the print routines on Lines 80 and 100. When I first finished the "G:" version of the program, I put all of these routines at the end of the program, which resulted in a printing time of almost 3½ minutes. By moving these routines to the beginning of the program, I knocked nearly a minute off the printing time.

Remember this tip when you want to speed up your own programs. When your computer sees a command like GO-SUB 700, it starts at the lowest line number and looks for Line 700. By putting often-used routines at the beginning, you can really cut down on this "search" time.

Here's a breakdown of the various functions you'll find in **StoryBook**.

Lines	Function
50	Sets TRAP to see if "G:" is installed.
60-70	TAB—tells the printer how many spaces between pages 1 and 3, and 2 and 4.
80-90	BACK PRINT—"stuffs" string to be printed into reverse order for printing.
100-110	BACK PRINT 2—similar to BACK PRINT.
120-130	LONG STRINGS—stuffs two strings along with TAB spaces into one string to be printed.
140-150	TABS2—similar to TAB.
160-170	LINE FEED—forwards the printer a desired number of lines.
180-440	Gets information from the writers, prepares the StoryBook for printing.
450-770	Prints pages 1 and 4, right side up.
780-1370	Prints pages 2 and 3, upside down and backward!
1380-1410	THE END routine.
1430-1450	TRAPS errors.
1470-2810	Routine from "Create-A-Font Datamaker" (issue 22) and DATA statements for redefined characters (backward font in Lines 1980-2810).

1940-1970 Sets up "gender vocabulary."
2820-2920 Variables dimensioned and defined.

StoryBook has many REM statements to mark off the major sections of the program. Most of these sections are self-explanatory. I wrote this program using my Epson RX-80 printer at home. I've also tested it on a borrowed Epson FX-80 and FX-85, and it should work as well on Gemini and Legend printers.

If you have children, or work with youngsters, I hope you (and they) enjoy **StoryBook!** ☐

Larry Linson has used computers in his classrooms for the past six years, with children in grades 1 through 8. This is Larry's third program for ANALOG; "What is it?" appeared in issue 20, and "Dragon's Breath" in issue 34.

The two-letter checksum code preceding the line numbers here is *not* a part of the BASIC program. For further information, see the "BASIC Editor II," in issue 47.

Listing 1.
BASIC listing.

```

DS 10 REM StoryBook (c) Ver. 1.2
RT 20 REM Larry W. Linson
JY 30 REM 1987 ANALOG Magazine
VX 40 REM Install "G:" before running
IJ 50 TRAP 1450:OPEN #2,8,0,"G:":GOSUB 28
30:GOTO 190
YN 60 REM TAB
FB 70 FOR X=Q1 TO 5B:? #Q2;" ";:NEXT X:RE
TURN
PW 80 REM BACK PRINT
EB 90 FOR X=LEN(A$) TO Q1 STEP -Q1:? #Q2;
A$(X,X);:NEXT X:? #Q2;" ";:RETURN
IY 100 REM BACK2 PRINT
NT 110 FOR X=LEN(B$) TO Q1 STEP -Q1:? #Q2
;B$(X,X);:NEXT X:GOSUB TAB:GOTO BACK
CS 120 REM LONG STRINGS
UU 130 A$(LEN(A$)+Q1)=X$:RETURN
EK 140 REM TABS2
WT 150 FOR X=Q1 TO 5B2:? #Q2;" ";:NEXT X:
RETURN
YH 160 REM LINE FEED
UV 170 FOR X=Q1 TO J:? #Q2:NEXT X:RETURN
BC 180 REM GET INFO
OQ 190 POKE 16,64:POKE 53774,64
ZJ 200 ? CHR$(125):POSITION 14,Q0:? 5TB$:
POKE 702,Q0:POSITION 17,Q2:? "J J"
YG 210 POKE 710,48:POKE 712,48:POKE 709,Q
12
HN 220 POSITION 11,4:? "J J J J J J J J J J
":POSITION Q12,6:? "J J J J J J J J J J 1987"
XW 230 POSITION Q0,7:FOR X=Q0 TO 39:? "J J
";:NEXT X
XJ 240 IF NOT N1 THEN POSITION 11,21:? "
For Zack & Kelly";:FOR X=Q1 TO 1000:N
EXT X:POSITION 11,21:? C$:C$:C$
QF 250 IF N1 THEN RETURN
SN 260 POSITION 8,9:? "Be sure to use the
SHIFT":POSITION 8,Q10:? "KEY for CAPI
TAL letters.":POKE 764,255
UM 270 POSITION Q1,13:? "What is your":PO
SITION Q3,14:? "first name #5";:INPU
T N1$
IW 280 POSITION Q1,16:? "What is your las
t":POSITION Q3,17:? "name ";N1$;" #5";
:INPUT N2$

```




```

ed":GOSUB L5:B$=A$:SB2=21-LWL:SB=38-LW
L
QM 1020 A$=N1$:X$=" didn't know what to d
o. ":GOSUB L5:X$=GEN3$:GOSUB L5:IF GE
N$="she" THEN SB=5B-Q1
ID 1030 GOSUB TAB2:GOSUB BACK2:B$="slowly
, and peeked around the corner.":SB2=8
VC 1040 A$="It was coming from the attic
for sure.":SB=28:GOSUB TAB2:GOSUB BACK
2
PB 1050 A$="one by one. ":X$=GEN3$:GOSUB
L5:X$=" opened the door":GOSUB L5:B$=
A$:SB2=13:IF GEN$="he" THEN SB2=5B2+Q1
CH 1060 A$="THUMP! SCRAAATCH!, THUMP!, SC
RAAATCH!":SB=29:GOSUB TAB2:GOSUB BACK2
DZ 1070 A$=N1$:X$=" climbed the stairs sl
owly.":GOSUB L5:B$=A$:SB2=15-LWL
LB 1080 A$="Then ":X$=GEN$:GOSUB L5:X$="
heard the noises again.":GOSUB L5:SB=3
5:GOSUB TAB2:GOSUB BACK2
RM 1090 B$="turned and ran!":SB2=30
QP 1100 B$="turned and ran!":SB2=30:A$="a
lone, and SCARED!!":SB=47:GOSUB TAB2:G
OSUB BACK2
OT 1110 A$="THUMP!, SCRAAATCH! again, ":X
$=GEN$:GOSUB L5:X$=" almost":GOSUB L5:
B$=A$:SB2=9
OR 1120 IF GEN$="he" THEN SB2=5B2+Q1
JX 1130 A$="much, it only made ":X$=GEN4$
:GOSUB L5:X$=" feel more":GOSUB L5:SB=
34:GOSUB TAB2:GOSUB BACK2
AO 1140 A$="attic stairs. When ":X$=GEN$
:GOSUB L5:X$=" heard the":GOSUB L5:B$=
A$:SB2=12:IF GEN$="he" THEN SB2=5B2+Q1
HR 1150 A$="not to dwell on these thought
s too":SB=32:GOSUB TAB2:GOSUB BACK2
NC 1160 A$="until ":X$=GEN$:GOSUB L5:X$="
was at the bottom of the":GOSUB L5:B$
=A$:SB2=11:IF GEN$="he" THEN SB2=5B2+1
FP 1170 A$="wasn't sure ":X$=GEN$:GOSUB L
5:X$=" was home. ":GOSUB L5:X$=GEN3$:
GOSUB L5:X$=" tried":GOSUB L5
HV 1180 SB=32:IF GEN$="she" THEN SB=5B-Q2
JY 1190 GOSUB TAB2:GOSUB BACK2
WG 1200 A$="and ":X$=GEN$:GOSUB L5:X$=" s
lowly walked through the house":GOSUB
L5:B$=A$:SB2=6
OQ 1210 IF GEN$="he" THEN SB2=5B2+Q1
GT 1220 A$="over to ":X$=FRND$:GOSUB L5:X
$="s house, but ":GOSUB L5:X$=GEN$:GO
SUB L5:SB=42-LEN(FRND$)
YF 1230 IF GEN$="she" THEN SB=5B-Q1
LI 1240 GOSUB TAB2:GOSUB BACK2:B$="got th
e large flashlight from the closet, ":
SB2=3
WY 1250 A$="an hour. ":X$=N1$:GOSUB L5:X
$=" thought of going":GOSUB L5:SB=39-L
WL:GOSUB TAB2:GOSUB BACK2
VU 1260 A$=N1$:X$=" went to the kitchen a
nd":GOSUB L5:B$=A$:SB2=18-LWL
ND 1270 A$="grocery and wouldn't be back
for about":SB=31:GOSUB TAB2:GOSUB BACK
2:B$=" ":SB=79
IB 1280 A$="o'clock, and ":X$=GEN2$:GOSUB
L5:X$=" dad was at the":GOSUB L5:GOSU
B BACK2
UR 1290 A$="before!! ":X$=GEN3$:GOSUB L5
X$=" thought to ":GOSUB L5:X$=GEN4$:G
OSUB L5:X$="self.":GOSUB L5:B$=A$
GD 1300 SB2=Q12:IF GEN$="he" THEN SB2=5B2
+Q1
YR 1310 A$="and not expected back until f
ive":SB=34:GOSUB TAB2:GOSUB BACK2
AS 1320 B$="But Mom and Dad HAVE been wro
ng":SB=45-LWL:SB2=11
YK 1330 A$=N1$:X$="s mother was at work"
:GOSUB L5:GOSUB TAB2:GOSUB BACK2:J=Q3:
GOSUB LF
LA 1340 SB=Q15:GOSUB TAB:? #Q2;BOR1$;"

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";BOR1$;" ";BOR1$;:SB=52:GOSUB T
AB:? #Q2;BOR2$;" ";BOR2$;" ";BOR2$
TB 1350 SB=Q15:GOSUB TAB:? #Q2;BOR3$;"
";BOR3$;" ";BOR3$;:SB=52:GOSUB T
AB:? #Q2;BOR4$;" ";BOR4$;" ";BOR4$
PU 1360 SB=Q15:GOSUB TAB:? #Q2;BOR5$;" "
";BOR5$;" ";BOR5$;:SB=49:GOSUB TAB:? #
Q2;BOR6$;" ";BOR6$;" ";BOR6$
PP 1370 SB=Q15:GOSUB TAB:? #Q2;BOR7$;"
";BOR7$;" ";BOR7$;:J=Q15:GOTO LF
RQ 1380 REM THE END
DO 1390 GOSUB Q200:POSITION Q12,13:? "You
r ";STB$:POSITION 14,14:? "is Finished
!"
BO 1400 POSITION Q5,18:? N1$;" would you
like":POSITION Q15,20:? "to make anothe
r";:INPUT YN$
LS 1410 IF YN$="Y" OR YN$="y" THEN N1=0:J
=Q5:GOSUB LF:GOTO Q200
XN 1420 GRAPHICS 0:POKE 702,64:END
WO 1430 REM TRAP
EM 1450 GRAPHICS 0:POSITION 9,12:? "(G:)
" is not installed!":? :? " You'll n
eed to Re-boot! Sorry...":? :? :END
RU 1470 REM NEW CHARACTERS
MY 1480 GRAPHICS 0:POKE 559,Q0:POKE 106,
PEEK(106)-PA:CHSET=(PEEK(106)+Q1)*256
XE 1490 FNT=CHSET/256:CLO=Q0:POKE 203,CLO
:POKE 204,FNT
FO 1500 FOR N=Q1 TO 28:READ ML:XFR$(N,N)=
CHR$(ML):NEXT N
TP 1510 DATA 104,169,0,133,205,168,169,22
4,133,206,177,205,145,203,200,208
WX 1520 DATA 249,230,204,230,206,165,206,
201,228,208,239,96
MP 1530 XFR=USR(ADR(XFR$))
YA 1540 READ A:IF A=-Q1 THEN RETURN
YG 1550 FOR X=Q0 TO 7:READ J:POKE CHSET+A
*8+X,J:NEXT X:GOTO 1540
EF 1570 DATA 1,0,24,60,60,24,0,24,0
OM 1580 DATA 3,160,80,168,127,168,80,160,
0
YM 1590 DATA 4,24,12,6,255,6,12,24,0
HI 1600 DATA 7,0,24,8,16,0,0,0,0
SN 1610 DATA 8,0,102,68,34,0,0,0,0
TW 1620 DATA 9,0,102,34,68,0,0,0,0
Q5 1630 DATA 12,0,0,0,0,0,24,8,16
HO 1640 DATA 17,56,120,56,56,56,124,124,2
55
ZH 1650 DATA 23,254,14,14,28,60,120,120,2
55
WD 1660 DATA 24,60,102,60,102,102,126,60,
255
ID 1670 DATA 25,60,102,102,62,6,14,60,255
ST 1680 DATA 28,96,146,243,147,146,2,0,25
5
NL 1690 DATA 30,0,64,78,201,201,73,14,255
QF 1700 DATA 65,56,124,246,254,246,246,24
6,255
CU 1710 DATA 66,252,230,252,230,254,254,2
52,255
MW 1720 DATA 67,0,0,0,0,0,0,0,255
EC 1730 DATA 68,0,0,0,0,0,96,96,255
ZZ 1740 DATA 69,56,68,186,162,186,68,56,2
55
HW 1750 DATA 71,126,224,238,230,254,254,1
26,255
EF 1760 DATA 73,124,124,0,124,124,124,124
,255
TV 1770 DATA 75,206,220,248,252,222,222,2
22,255
LK 1780 DATA 76,224,224,224,224,254,254,2
54,255
ZI 1790 DATA 78,230,246,254,254,254,238,2
38,255
TE 1800 DATA 79,124,238,238,238,254,254,1
24,255
TA 1810 DATA 82,252,206,254,252,222,222,2

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22,255
TI 1820 DATA 83,126,224,120,12,254,254,25
2,255
TO 1830 DATA 84,254,124,124,124,124,124,1
24,255
NZ 1840 DATA 87,238,238,238,254,254,238,1
98,255
BN 1850 DATA 89,238,238,124,56,124,124,12
4,255
IO 1860 DATA 64,96,16,8,8,48,64,86,105
LN 1870 DATA 70,15,24,20,16,27,9,100,152
SD 1880 DATA 72,192,96,160,48,150,25,1,2
KC 1890 DATA 74,4,12,24,16,24,12,228,156
DT 1900 DATA 77,34,85,42,85,170,85,10,0
VS 1910 DATA 80,128,80,168,85,170,85,170,
0
PF 1920 DATA 81,0,33,41,8,2,18,16,0
BW 1930 DATA 85,0,0,165,90,36,24,0,0,-1
GU 1940 REM GENDER
UJ 1950 IF GEN$="B" OR GEN$="b" THEN GEN$
="he":GEN2$="his":GEN3$="He":GEN4$="hi
m":RETURN
MR 1960 IF GEN$="g" OR GEN$="G" THEN GEN$
="she":GEN2$="her":GEN3$="She":GEN4$="G
EN2$:RETURN
AN 1970 REM BACKWARD.FNT
US 1980 DATA 104,169,0,133,205,168,169,22
4,133,206,177,205,145,203,200,208
YA 1990 DATA 249,230,204,230,206,165,206,
201,228,208,239,96
EX 2000 DATA 1,0,24,0,24,60,60,24,0
MJ 2010 DATA 7,0,0,0,0,8,16,24,0
GD 2020 DATA 12,8,16,24,0,0,0,0,0
CE 2030 DATA 14,0,24,24,0,0,0,0,0
IZ 2040 DATA 25,0,33,64,252,64,33,0,0
XJ 2050 DATA 26,0,210,82,82,82,215,0,0
UF 2060 DATA 27,0,37,37,39,37,119,0,0
KP 2070 DATA 28,164,164,167,160,167,180,1
80,180
WK 2080 DATA 29,36,36,231,0,231,36,36,36
QD 2090 DATA 30,37,37,229,5,229,37,37,37
KN 2100 DATA 33,0,102,126,102,102,60,24,0
VI 2110 DATA 34,0,62,102,102,62,102,62,0
BB 2120 DATA 35,0,60,102,6,6,102,60,0
CW 2130 DATA 36,0,30,54,102,102,54,30,0
EO 2140 DATA 37,0,126,6,6,62,6,126,0
LX 2150 DATA 38,0,6,6,6,62,6,126,0
IO 2160 DATA 39,0,60,102,118,6,102,60,0
UD 2170 DATA 40,0,102,102,102,126,102,102
,0
DN 2180 DATA 42,0,60,102,96,96,96,96,0
CP 2190 DATA 43,0,102,54,30,30,54,102,0
CM 2200 DATA 44,0,126,6,6,6,6,6,0
SB 2210 DATA 45,0,99,99,107,127,119,99,0
GC 2220 DATA 48,0,6,6,62,102,102,62,0
OI 2230 DATA 49,0,108,54,102,102,102,60,0
UP 2240 DATA 50,0,102,54,62,102,102,62,0
JL 2250 DATA 51,0,60,96,96,60,6,60,0
HK 2260 DATA 52,0,24,24,24,24,24,126,0
TG 2270 DATA 53,0,126,102,102,102,102,102
,0
EL 2280 DATA 54,0,24,60,102,102,102,102,0
WZ 2290 DATA 55,0,99,119,127,107,99,99,0
CL 2300 DATA 57,0,24,24,24,60,102,102,0
OX 2310 DATA 58,0,126,6,12,48,96,126,0
CS 2320 DATA 65,255,198,198,199,198,198,1
98,199
JU 2330 DATA 66,255,99,99,99,99,99,227
DM 2340 DATA 67,12,6,3,1,0,0,0,0
ZO 2350 DATA 68,221,217,207,193,215,220,9
6,63
ZF 2360 DATA 69,219,155,243,131,235,59,6,
252
JM 2370 DATA 70,48,96,192,128,0,0,0,0
ML 2380 DATA 71,0,0,62,102,102,62,6,124
GM 2390 DATA 72,0,0,0,0,34,68,102,0
WG 2400 DATA 73,0,24,0,56,24,24,60,0
NY 2410 DATA 74,192,192,193,195,193,192,2
06,221

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KU 2420 DATA 75,3,3,131,195,131,3,115,235
OM 2430 DATA 76,255,128,191,160,160,167,1
64,164
XP 2440 DATA 77,255,0,255,0,0,231,36,36
EC 2450 DATA 78,0,0,124,102,102,102,102,0
QT 2460 DATA 79,255,1,253,5,5,229,37,36
MA 2470 DATA 80,0,124,102,102,124,96,96,0
MW 2480 DATA 81,164,164,167,160,160,191,1
28,255
UG 2490 DATA 82,0,0,124,102,96,96,96,0
MR 2500 DATA 83,0,0,255,0,0,255,0,255
NY 2510 DATA 84,0,24,126,24,24,24,14,0
LQ 2520 DATA 85,37,37,229,5,5,253,1,255
UY 2530 DATA 86,180,183,176,160,167,164,1
64,164
NA 2540 DATA 87,36,231,0,0,255,0,0,0
AB 2550 DATA 88,37,229,5,5,229,37,37,37
OF 2560 DATA 97,0,124,102,124,96,60,0,0
KG 2570 DATA 98,0,62,102,102,62,6,6,0
YX 2580 DATA 99,0,60,6,6,6,60,0,0
EB 2590 DATA 100,0,124,102,102,124,96,96,
0
JA 2600 DATA 101,0,60,6,126,102,60,0,0
VF 2610 DATA 102,0,24,24,24,124,24,112,0
HK 2620 DATA 103,60,96,124,102,102,124,0,
0
CV 2630 DATA 104,0,102,102,102,62,6,6,0
EI 2640 DATA 105,0,60,24,24,28,0,24,0
PE 2650 DATA 106,60,102,96,96,96,0,96,0
FQ 2660 DATA 107,0,102,54,30,62,102,6,0
AM 2670 DATA 108,0,60,24,24,24,24,28,0
LW 2680 DATA 109,0,99,107,127,127,51,0,0
ZE 2690 DATA 110,0,102,102,102,102,62,0,0
GC 2700 DATA 111,0,60,102,102,102,60,0,0
MA 2710 DATA 112,6,6,62,102,102,62,0,0
NJ 2720 DATA 113,96,96,124,102,102,124,0,
0
CR 2730 DATA 114,0,6,6,6,102,60,0,0
XM 2740 DATA 115,0,62,96,60,6,60,0,0
CJ 2750 DATA 116,0,112,24,24,24,126,24,0
SR 2760 DATA 117,0,124,102,102,102,102,0,
0
JH 2770 DATA 118,0,24,60,102,102,102,0,0
BU 2780 DATA 119,0,54,62,127,107,99,0,0
TV 2790 DATA 120,0,102,60,24,60,102,0,0
YF 2800 DATA 121,30,48,124,102,102,102,0,
0
DR 2810 DATA 122,0,126,12,24,48,126,0,0,-
1
DZ 2820 REM VARIABLES
JE 2830 Q0=0:Q1=1:Q2=2:Q3=3:Q5=5:Q10=10:Q
12=12:Q15=15:Q50=50:Q200=200:GRAPHICS
Q0:POKE 559,Q0
QM 2850 DIM N1$(Q12),N2$(Q15),PET$(Q12),F
RND$(Q12),YN$(Q1),GEN$(Q3),GEN2$(4),GE
N3$(Q3),GEN4$(Q3)
HQ 2860 DIM STB$(13),A$(Q50),B$(Q50),C$(Q
10),X$(Q50):STB$="|+0-| | | " : C$="
"
NZ 2870 DIM BOR1$(Q5),BOR2$(Q5),BOR3$(Q5)
,BOR4$(Q5),BOR5$(6),BOR6$(Q5),BOR7$(Q5)
,XFR$(28)
VM 2880 TAB=60:BACK=90:BACK2=110:L5=130:T
AB2=150:LF=170
YF 2890 BOR1$="| | " : BOR2$=" | | " : BOR3$="<=
>":BOR4$=" | | "
JO 2900 BOR5$="| | | | | " : BOR6$="| | | | | " : BOR7$
="| | | | | "
EQ 2910 RESTORE 1510:PA=Q5:GOSUB 1480:FNT
1=FNT:PA=Q12:RESTORE 1980:GOSUB 1480
VE 2920 FNT2=FNT:GRAPHICS Q0:POKE 756,FNT
1:RETURN

```


News from the Chicago CES.

by D.F. Scott

The ST, as a device for demonstrating software, easily outnumbered every other home computer on display at the Summer CES in Chicago's McCormick North Hall. Outside the Atari booth, the ST outnumbered Commodore 64s and PC clones by a two-to-one margin, and Amigas and Apple IIs (including the GS) by three-to-one. There was barely a Macintosh or an Atari XE to be found.

One possible reason for this apparent coup by Atari was the absence of Commodore and Apple. The latter usually chooses to miss CES in favor of the Computer Dealer's Expo; the former is undergoing a corporate reorganization. Another reason is the uncertain long-range outlook for PC clones in the consumer market. Either way, with respect to the consumer computer market, the ST has evidently found a niche. And, if you were standing in the middle of it in Chicago, you might say it was a rather wide niche.

Tucked away in the recreational portion of that niche, one will find ST software developers becoming more liberal, more realistic, moving away from the point-and-shoot scenarios of coin-operated machines. Much of the free memory space is being used for digitized sound tracks, make-your-own-scenario routines, and extensive data structures for still frames or cel animation.

Accolade taps its roots.

Accolade, the company started by a team of former Activision executives (who were renegades from the programming staff at Atari), has decided to step up software production for Atari computers. With the long list of flight simulators in the world (one-third of which are available now), it's about time someone decided to produce a car simulator.

The casual eye may glimpse **Test Driver** and send incorrect messages to the brain, resulting in the exclamation, "Oh no, not another racing game!" Later, the same eye will recognize the fine artistic detail that depicts the dashboard on a Porsche 911 (Turbo). Subsequently, it will realize the radar detector is operational, the rearview mirror *does* show what's behind you, and your tachometer certainly isn't registering random numbers. What's ahead of you looks very much like a highway, not some dotted tear line from a solid grey coupon.

Test Driver takes into account numerous features and vital statistics of the simulated car: suspension, brake status, fuel line, acceleration time and torque. And, if by some chance you're no fan of Porsche 911 Turbos, you may choose instead to drive a Ferrari 308GTS, a Chevrolet Corvette, a Lotus Turbo Esprit or even a Lamborghini Countach.

Although not fully implemented in the version shown at CES, the objective will

be to drive up, then down a mountain road, which is in various states of disrepair and often lacks a guardrail. The scenery contains rocky cliffs, cloudy skies and Smokey bears. The Accolade representative underscored just how many difficult-to-program driving factors are accounted for. I told her if they really wanted to be *difficult*, they should try simulating a Ford Fiesta. Suggested list will be \$44.95, for release in third-quarter '87.

Besides releasing the first of its Famous Course series for the ST, the **Mean 18** golf game, Accolade has also ported its **Hard-Ball** baseball game to the ST. The 8-bit versions of these games were noted for their spectacular TV-camera-style graphics. The ST version should also incorporate a Quantel-like, zoom-in/out feature which adds to the TV sportscast appearance of the game. Suggested list price is \$39.95.

FTL (Faster Than Light) emerges from wormhole.

After a long delay presumably caused by an unexpected overabundance of college, Andy Jaros and the geniuses at FTL who brought us Sundog have two new products on their way from the labs. You may have read about **RPV** before—it's based on the Atari coin-op game Gravitator. It has the capability to hook up two STs with a null modem cable and stage dogfights between the two. At the time of the game's showing in Chicago, all it

The ST as a recreational vehicle

needed was a title screen; but the game itself has been debugged and it now contains a make-your-own-planet utility.

RPV and Gravitator are both played like Asteroids, but with a planet down below whose ground defenses are only outnumbered by the Gs it can pull. In RPV, you have full freedom of movement, except when dragged by gravity. You have a limited fuel supply, but can refuel by landing next to a "captured" fuel station and jamming a hose into it. The objective is to disable each planet's defenses without going down in history as a trigger-happy fuel-guzzler.

Dungeonmaster is a graphic maze adventure game reminiscent of Alternate Reality, but with a more detailed forward view. The dungeon here is indeed underground, looking so dank and musty you may be compelled to sneeze. There are various obstacles along the way which, for the sake of maintaining the level of surprise, I will not divulge.

Genus: intelligent soap bubbles.

Perhaps the most diligent and productive ST game company today is Microdeal, a group of British programmers whose creations are distributed to the U.S. via MichTron. Authors Steve Bak and Pete Lyon created Karate Kid II, as well as Goldrunner, which is arguably America's leading Galaga-style game.

Now Lyon and Ed Scio are descending into the depths of the dank and musty

(mank and dusty?) with Airball—though along with the descent comes an ascent into craziness.

You are an intelligent bubble. You move through a three-dimensional indoor world of several rooms—on multiple levels with staircases—picking up accessory objects and absorbing them, well, into your "body." As you move along, you begin to lose air (like some PR firms I know) and must search for the first available spigot to reinflate yourself. Unlike the usual witches and elves, the enemies in this game are *literally* needles and pins.

Airball includes another great Microdeal musical score, and soon to be available is a make-your-own-world utility, where you take a turn as interior decorator.

From our

"Well, it's about time" Department . . .

With a computer named ST, you'd think there'd be a decent "Star Trek" game available for it. Decent, by ST-gamers' present standards, would have been impossible just two years ago. We've seen the recent Trek text-adventures; yet find ourselves asking: is there, in truth, graphics in this universe?

Simon and Schuster Software (a Gulf and Western subsidiary, just like Paramount Pictures) has heard our pleas and is responding. Soon after press time, **Star Trek: The Rebel Universe** will be released, as one in a series of graphic tactical

adventure games that places you in command of the *Enterprise*, exploring a galaxy that seems, at times, in command of you.

We're told by S&S representative Kevin Shepherd that British free-lance author Mike Singleton is assembling this game based on the TV series, complete with digitized tracks from the show. The objective—which may very well take five years to complete—is to crush a rebellion within the Federation initiated by the Klingon/Romulan alliance. There may be hundreds of star systems in this game, each having its own orbital planetary systems. Ship-to-ship combat is to be three-dimensional and very graphic.

Don't accept any imitations—and don't talk to any software traders with names like "Cyrano Jones." This may be the tactical Trek our species has searched the skies for.

The other final frontier.

A company in Tarzana, California, called Final Frontier Software, has made its living from one PC program called Space M+A+X. It's a space station construction simulator, based not only on the operation of the NASA space shuttles (launch, orbital maneuvers, extra-vehicular activities, and landing), but also the assembly of a U.S. geosynchronous orbit space station designed by NASA, using commercial payloads. You not only control the actual operation of the vehicles, but may also act

as mission director, making such command decisions as appropriating a budget and choosing the fuel-to-payload ratio for a particular shuttle launch.

The control one has over the plethora of facts and statistics seems phenomenal. The PC version requires three 360K disks of program and data. Not only do the data screens make Multiplan look like "connect-the-dots," but there's also a wealth of graphic images, such as external booster separation and touchdown on the field at Edwards Air Force Base.

The reason I mention this is because the company is considering making an ST version of this simulation. If you'd like to see such an educational and involving simulation, and would be willing to pay for it once released, drop "2FS" a line at 18307 Burbank Blvd. Ste. 108, Tarzana, CA 91356.

Flight Simulator XXVIX.

It's debatable whether personal computers, as described in the latest Avalon Hill catalog, "were really meant for flying air raids over Britain, Tehran and Moscow." This is from a company whose most heavily touted new release is Dr. Ruth's Game of Good Sex.

Avalon Hill is, however, working on its first ST release, and—guess what, folks—it's a flight simulator. **Spitfire 40** will be a simulation of an RAF Mark I Supermarine Spitfire in the Battle of Britain, combatting Nazi war planes. One unique feature of this game is that the cockpit window takes up the entire screen. To see the instrument panel, you scroll the window up with a push of the mouse, with the right button held down.

The ST demo shown wasn't yet in beta condition. Not much of the scenery was in place, with the exception of the take-off field and some rotating windmills. Objects will have full-color shading and hidden-line removal. There need to be several of them, though, to get the full-screen forward view to look like a real landscape. As it is now, the blue-over-green-stripe scenery looks more like a trip through the flag of the small African country of Djibouti. Avalon Hill stated the final edition would be completed in August.

Reach out and touch something.

Author Sky Matthews, of a small company called Jagware, is assembling a role-playing game, **Alien Fires** (from a distance, it looked more like "Alien Fries," and I thought the author had reinvented the Veg-O-Matic). Your role is that of a

time lord, *à la* "Doctor Who," sent from Earth in the year 2199 to intercept and squelch the plot of a mad scientist who is developing convenient (for him) warps in the fabric of time.

This game augments the theme of the old mainframe "adventure" games, with a journey through mazelike chambers, meeting odd sorts of creatures along the way. In this version, though, the maze environments move in simulated real time, and each creature one meets along the way *talks back*, using proprietary speech synthesis routines. Instead of the old choice between "attack" or "retrieve object," you may quiz each creature like a reporter in search of information, through a text-based query language.

At the time of *Alien Fires*' showing in Chicago, Jagware was searching for a distributor for the ST and Amiga.

A flock of Firebirds.

Firebird Licenses USA, whose name is quite deservedly associated with Starglider, is developing a three-part "trilogy" graphic adventure in the style of *The Pawn*, called **Knight Orc**. Not much has been discussed about the plot, other than the fact that you portray an "orc." Projected release date is August, and list price will be \$44.95.

The company is also working on an exclusive ST release (I love that term) called the **Universal Military Simulator**, which will let the player construct his own wargame, using arbitrary elements from any era, historical or imaginary. One will also be able to load preconstructed scenarios to be released in the future as "battle library" disks. Slated for release in July, its list price should be \$44.95.

Firebird is also "considering" translating an arcade game called **The Sentry** to the ST. In this, a robot maneuvers within several original landscapes (the press release counts "over 10,000"), in a constant search for energy, as well as an attempt to overthrow the ruler of the land. This might very well have been named "U.S. Policy in the Middle East."

From the grab bag . . .

Here's what else was being introduced—in actuality, or on paper—at the Summer CES:

MicroProse should be shipping the ST version of **F-15 Strike Eagle** by press time, and is translating its new flagship program, **Gunship**, for the ST, as well. For next year, the company is working on a wargame called **Red Storm Rising**—one guess what it's about.

Electronic Arts is shipping a tactical warfare game called **Empire**, for Interstel. From its own labs, EA is creating an ST version of **Touchdown Football**, using digitized sound tracks, such as crowd cheers, referee whistles and helmet clashes from a real NFL game. EA was also showing the ST version of **Music Construction Set**; now in the beta stage, it looks very, very much like Activision's *Music Studio*.

EA is also releasing for First Byte—a producer of educational software like *Kid Writer*, with proprietary speech synthesis—**Computer Mad Libs**. The program has a mostly written story, with the exception of certain missing key words. The program asks for words by their appropriate parts of speech, filling in their respective blanks, but only *before* it reads the completed story. The software-based speech synthesizer First Byte is famous for then reads the story back to you.

Mindscape will be importing from the U.K. **Into the Eagle's Nest**, an arcade-style game played within a four-story building, viewed from the top down. The objective is to release captured Allied spies from the grips of their Nazi kidnapers.

A company called Shelbourne Software is releasing **3D Breakthru** for use with Stereotek glasses. It's an inverted form of *Breakout*, as if that program's screen were viewed from the bottom, looking sideways at a wall of bricks.

The design team of Xanth Park is revising Hybrid Arts' **MIDI Maze** to include two new features: first, it allows two systems to be joined by a null modem cable; and, second, it allows one ST in the MIDI network to act as the overall monitor, displaying a map of the maze with the position of each player within it.

The ST, to the artistic programmer, is a virgin canvas with its own plentiful palette. The few restrictions it presents allows it to be a vehicle for *realism* in computer games, in a gaming environment that previously championed surrealism and impressionism. With both facets of gaming in good health, we're about to be treated—if the indications from Chicago are correct—to an interactively artistic Renaissance. ☐



High Roller

by H&H/Eigen Software for Mirrorsoft
MINDSCAPE
 3444 Dundee Road
 Northbrook, IL 60062
 Low resolution \$49.95
 453K total code

by D.F. Scott

Asking a software author to create an original warplane game would be like asking a biologist to concoct a new species of iguana. There are so many on the market today that we're running out of decent new names. The title **High Roller**, for instance, brings back memories of Alex Trebek, giant cubic-foot dice and big cash prizes.

As soon as you pass **High Roller** by Mirrorsoft running on an ST in your computer store, memories of a different game will come to mind: Skyfox. But don't just pass it by—take a minute to stand still and watch.

It's not Skyfox, is it? **High Roller** is what Skyfox and Harrier Strike Mission should have been. What's so unique about this game is that it works. Here's the scenario: you fly a Harrier jump jet (again) within the airspace of a country located in Northern Africa (which has the good fortune to be precisely rectangular). This country is divided into a 16x32 grid. Its countries are ruled as sectors and referred to—as on a Rand McNally map—by two-letter names. Since there are more sectors in latitude than there are letters, the uppermost six are called [, \,], ^, - and '.

In the "Combat" mode, you begin life in the lower left corner of the country, at sector AA. You have four friendly bases to defend—called Q, W, E and R—and you're parked at Q. Having one of your bases destroyed by an enemy tank batal-

lion results in your own termination. Death and failure, in this game, go hand-in-hand.

The enemy headquarters is in precisely the opposite corner, at sector 'P. Between you and it, things don't look very appealing. The ground is flat desert, the shrubs are sparse, and the mountains are characteristically North African pyramids—this game could use a **High Roller** scenery disk. Although it may seem that the quickest way between AA and 'P is a straight line, you'll undoubtedly find yourself distracted and diverted by 3500 SAM silos, over 1000 tanks and somebody's entire air force. Yours, quite unsatisfactorily, is the only friendly plane in existence.

Enemy HQ is, at the least, three full tanks of fuel away; but all your refueling stops start in the lower left corner. So it's your duty to clear areas of tanks and excess shrubbery, and establish bases along the way to your objective,—forming a supply line. Since moving a base can literally take the ground crew *fifteen minutes*—and you can't save a game in progress—it's advisable not to refuel at a newly established base.

Strangely enough, most actual strategy takes place on the ground, while most action is in the air. Say you've cleared your little corner of menacing tank squadrons. (This isn't too difficult a task—even on the highest skill level, it may become *routine*.) You decide to ascend above 10,000 feet and have some fun with the enemy

planes. At 3,000 feet, the SAM silos come into play, since they can now fire missiles at you.

The inconsistency is this: when you were at 300 feet, those silos were relatively harmless little toadstools. So you're most safe when and where the SAMs are most *vulnerable*. Next time you're flying a *real* Harrier over hostile territory, try hovering at 300 feet near a SAM silo, then timing the duration of your life with a stopwatch.

You have an ample supply of flares and chaffs (hot waste metal) to divert an attacking missile—but they're not the all-purpose, anything-attractors they were in Harrier Strike Mission. SAMs and their AAM (Air-Attack Missile) counterparts cannot be fooled for long.

You're finally in the air, giving chase to an entire squadron. The air battle scenarios are the high point of this game. Although the graphics are raster oriented, the planes *do* roll, dive, loop, spin, fire afterburners and run away. They're not little cardboard figures suspended in the air by fishing line. You have a very limited supply of ammo (it seems just like the Pentagon to make a plane that can fly sideways, but can't shoot), but you do have two Sidewinder missiles to fish you out of tight spots. Don't ask me why you can't fire your cannons while there's a Sidewinder in the air.

You also have a fanciful display in two dimensions, called "Friend-or-Foe Trac," which graphs for you at all times—while

you're in good working order—the aerobatic maneuvers you and your prey are performing. You also have conventional radar that's capable of being jammed; a "bogie" can be on your tail without your knowing it.

Control of your plane is achieved by either the keyboard or a joystick/mouse combination. Do yourself a favor and get a joystick if you don't have one. What's the good of flying a fancy plane when " is up and ? is down?

Some bugs: whether I control the rudder

via mouse or keyboard, it has a tendency to send "power up" signals to my plane incessantly, keeping me from slowing down and eventually forcing me to bail out. The rudder is rather useless when it does work, anyhow, so I just leave it alone. Also, the FOFTRAC displays the graph of the sector I'm in, but it only shows the SAM sites in AA at the beginning of the game, not for the remainder. So, if I leave AA and come back, I've lost sight of the silos.

If you read the manual from front to

back first, you might think you have a clear understanding of the game. You'll soon learn the red blinking lights under the letters QWER on the instrument panel are *not* greetings and salutations from home, but distress signals. Leave a light blinking for too long and your plane does a maneuver I call an "Oral Roberts"—it's immediately called home to its maker. Your manual tells you none of this.

The game's authors, apparently aware of the repetitiveness of ground maneuvers, put a little menu at the beginning to let you assume an altitude of 10,000 feet *instantly*, so you can forget the ground for the time being. Forgetting the ground is what airplane games are all about.

Fortunately, **High Roller** is a game that lets you do battle in three-dimensional space, with a foe that really fights back and, therefore, is worth the investment. After all, we recreationalists didn't buy our STs just for target practice. **A**

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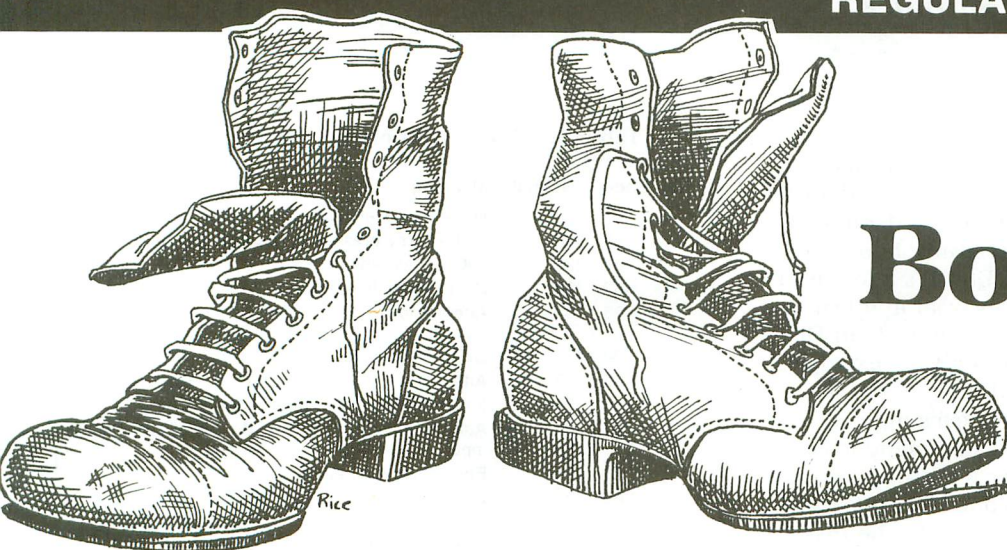
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Boot Camp

Everywhere a macro, macro.

by Karl E. Wieggers

How about a little sing-along? Follow the bouncing cursor: "Old MacDonald had an Atari, X-I, X-I-O. . ."

Okay, okay; no more singing. But today we're going to talk about all sorts of things you can do with disk files, using an assembly language analog (I love that word) of the Atari BASIC XIO command. And, lest you fear I've forgotten the visual appeal of programming, we'll also take a look at a special XIO graphics command. Along the way, we'll add some entries to the MACRO.LIB and SUBS.LIB files we generated last month. Finally, we'll see how to read a disk directory.

X-I, X-I-O.

The XIO command is one of the less well known in Atari BASIC. XIO lets you perform a myriad of disk file operations, like locking and deleting, that are impossible to do with other BASIC commands. What XIO really does is provide direct access to the central input-output (CIO) subsystem from BASIC. Since we've spent a lot of time here probing into the mysteries of CIO, it seems reasonable to add disk operations to our toolbox.

The format of the BASIC XIO command is:

```
XIO command,#IOCB,aux1,aux2,filespec
```

I'm sure you see the resemblance to the other CIO functions we've learned to perform. The *command* parameter is the numeric code for a particular CIO operation, such as \$03 for OPEN and \$11 for DRAW. The #IOCB parameter is (guess what) the number of the input-output control block to use for the operation. *Aux1* and *aux2* are the two auxiliary parameters required for some CIO operations. *Filespec* is a device (and optional file) name, such as P: or D2: DATA.FIL.

The assembly language code to perform a particular CIO operation also involves choosing an IOCB, setting the command byte and setting the auxiliary values if they're need-

ed. The filespec function is handled by pointing to a "buffer address" which is the label of a data string like P: or D2:DATA.FIL. About the only IOCB bytes not set explicitly by the XIO command are the high and low buffer length bytes, but these aren't even needed by most of the new CIO commands we'll explore today.

You're already used to CIO commands like OPEN, PUTREC, CLOSE, GETREC and DRAW. The ones I'll introduce today pertain to disk file operations, including LOCK, UNLOCK, RENAME, DELETE, GET STATUS and FORMAT. One final CIO command is FILL, which quickly fills a polygon shape on a graphics screen with a solid color. Table 1 summarizes a bunch of CIO commands, old and new.

Table 1.—CIO commands.

Name	Hex Code	Function.
OPEN	\$03	Open an IOCB.
GET RECORD	\$05	Input a record up to EOL or end of buffer.
GET CHARACTERS	\$07	Input a specified number of characters.
PUT RECORD	\$09	Output a record up to EOL or end of buffer.
PUT CHARACTERS	\$0B	Output a specified number of characters.
CLOSE	\$0C	Close an IOCB.
GET STATUS	\$0D	Return the status of a device or file.
DRAW	\$11	Draw a straight line on a graphics screen.
FILL	\$12	Fill a polygonal area on graphics screen.
RENAME	\$20	Rename a disk file.
DELETE	\$21	Erase a disk file.
LOCK	\$23	Lock a disk file.
UNLOCK	\$24	Unlock a disk file.
POINT	\$25	Move file pointer to specific sector and byte.
NOTE	\$26	See where file pointer is now.
FORMAT	\$FE	Format a disk

Example 1—Lockup.

No, this doesn't refer to the dreaded *keyboardus lockupus*. We're just going to lock a disk file. First we need a file to practice on. Create a file called PRACTICE.FIL on whatever drive you like; the contents are irrelevant. I do my experimenting with the RAMdisk, drive D8:. It's a lot faster than using a physical drive, and reduces wear and tear on the mechanical drives. If you use a drive other than D8:, you'll need to change the designation in all my examples to match yours (Line 530 in Listing 1).

(Incidentally, there's a neat way to create a simple ATAS-CII disk file for this. Use the DOS COPY command to copy from E: to D8:PRACTICE.FIL. Now type a few lines, pressing RETURN at the end of each. When done, press CTRL-3 on a new line to close the file and write it to the disk.)

Please turn to Listing 1 to see how to lock a file. The equates list contains the standard items for CIO operations, except that the LOCK command value of \$23 is supplied in Line 180. First we need to choose an available IOCB. In Line 330, I opted to use IOCB #3. The command is LOCK, and all the buffer length and auxiliary bytes can be set to 0 (Lines 360-400). In Lines 410-440, I set the buffer address to point to the name of the disk file we wish to lock, at label FILENAME. The filespec at label FILENAME can contain wildcards, if you wish to lock more than one file at a time. As usual, the JSR CIOV in Line 450 locks the file.

Whenever we're doing this sort of disk file manipulation, possibilities for error are limitless. What if the file doesn't exist? What if you accidentally specified a nonexistent device name? If the disk is write protected? We need a mechanism to recover from such errors; CIO helps out.

On exiting from a CIO call, error status is recorded in two places: the 6502's Y-register and another byte in each IOCB called ICSTA (\$0343 in IOCB #0). A successful operation leaves a status value of 1. Any abnormality generates an error number from \$80 to \$AB. Note: all such error numbers have bit 7 set, and so are regarded as negatives. A CIO error thus sets a negative flag in the 6502's processor status register, and we can easily test for an error via an instruction like the BPL ALLDONE in Listing 1's Line 460.

If the negative flag is set, the BPL instruction fails and control drops through to Line 470. At that point, we call subroutine LOCKERR to do the graceful recovering. In this case, I simply print a message on-screen saying that an error was encountered during the locking attempt, and return to the calling program.

In real (as opposed to tutorial) life, you'd probably want to print a more detailed message and let the user decide what sort of action to take next. You might even choose from a collection of possible messages, based on the specific error encountered. After all, the cryptic ERROR-170-type messages aren't terribly illuminating.

Table 2 lists many of the error numbers you might encounter during a CIO operation. Your error handling procedure might load the contents of the ICSTA byte for the correct IOCB and compare it against several anticipated error numbers to decide which message to print. Don't forget to leave a catch-all message in case someone generates an error you either didn't think of or didn't know about.

Table 2.—Some CIO error (status) numbers.

Hex Code	Decimal	Meaning
1	1	No error—everything's cool.
80	128	BREAK key pressed during I/O operation.
81	129	IOCB is already in use.
82	130	Device specified does not exist.
83	131	Attempt to read from an IOCB opened only for output.
84	132	CIO command is invalid or syntax is bad.
85	133	Attempt to use an IOCB that isn't open.
86	134	IOCB number isn't in the range 1-7.
87	135	Attempt to write on an IOCB opened only for input.
88	136	End of file was reached.
89	137	Data record longer than 256 bytes was truncated.
8A	138	Device does not respond, causing a timeout.
8B	139	Device malfunction.
90	144	Disk is write protected, or directory is garbled.
92	146	Attempted an invalid operation on the device.
A0	160	Disk drive number error.
A1	161	Too many disk files are open at once.
A2	162	The disk is full.
A3	163	Unspecified fatal disk error.
A4	164	Disk file is garbled, or file pointer is not pointing to part of the open file.
A5	165	Filename error.
A6	166	POINT error—pointing to nonexistent byte number.
A7	167	File is locked.
A8	168	Attempt to use invalid or unknown CIO command.
A9	169	Disk directory is full (64 files maximum).
AA	170	File is not found.
AB	171	POINT error—pointing to a sector that is not part of the open file.

Last month, we found lots of shortcuts to writing assembly programs. Why should this month be any different? All this XIO/CIO stuff looks like a job for. . .

MacroMan to the rescue!

Listing 2 contains some additional equates for more CIO commands, and an XIO macro. Please add this code to your MACRO.LIB file from last month, using the line numbers shown. Now let's take a look at the XIO macro.

Just like the BASIC version, our XIO macro takes five parameters. The only thing missing is the number sign (#) in front of the IOCB number in parameter 2. Not all of these disk CIO commands require five parameters, so we could probably write a smarter macro to handle variable numbers of parameters (such as missing aux1 and aux2). In fact, the MAC/65 manual does include a very sophisticated XIO example with just such a capability. However, I'll keep things simple today, remaining consistent with the BASIC XIO format.

As usual, I make sure the right number of parameters were passed in Line 3290. Line 3320 selects the IOCB number, and Lines 3330-3340 set the command value. Lines 3350-3380 stuff the auxiliary parameters passed into the correct bytes. Note that all four of these parameters must be values, not addresses. However, the fifth parameter for the filespec can either be a string literal (like D8:PRACTICE.FIL) or a non-zero-page address (like FILENAME).

The one catch is that, if you use an address, it must have

been defined *before* invoking the macro. When I tried this with the XIO call prior to a `FILENAME .BYTE . .` line in the program, I saw the dreaded PHASE ERROR. Most of the time, a literal will work just fine. All the code in Line 3390-3520 just handles the two flavors of parameter 5, literal (3400-3460) or address (3480-3510). Again, the filespec can contain wildcard symbols (? and *) if the operation you're performing permits them.

In keeping with my philosophy of dividing the program's work among a bunch of subroutines, Listing 3 contains some code I'd like you to tack onto the end of your SUBS.LIB file from last time. Please use the line numbers shown. These are all subroutines for handling general errors encountered during the XIO LOCK, UNLOCK, RENAME, FORMAT and DELETE operations.

There's also a routine for handling the CIO GET STATUS (or just STATUS) operation. This is like the BASIC STATUS command. There are three possible responses from the STATUS command, which again wind up in the Y-register and in ICSTA. A value of 1 means the filespec supplied was found and is unlocked. A value of 167 (hex \$A7) means the file is there but it's locked. If the file isn't found, a status of 170 (\$AA) results. You may be familiar with these numbers from your activities at the DOS menu.

It's a very good idea to check the status of a file before performing operations that could result in an error if all's not well. For example, before deleting a file, it must be unlocked. You can either let the delete operation generate an error and handle it there, or make a preemptive strike with the status command. The subroutine STATUSERR (Lines 1290-1630 in Listing 3) handles the found-but-locked and not-found conditions, as well as being a catch-all in case some unanticipated value shows up in the status byte. These aren't really "errors," just responses to inquiries. However, an ounce of prevention . . .

Example 2—Disk gymnastics.

Now let's have some fun! Please create a file called simply *P* on a disk—doesn't matter what's in it. The example in Listing 4 refers to drive D8:, so please change D8: to *Dwhatever*: throughout the listing if you aren't using a RAM-disk. We're going to .INCLUDE the MACRO.LIB and SUBS.LIB files, and I have those on drive D8: also (Lines 240 and 990).

Here's the plan: we're going to lock *P*, unlock it, rename it to *Q.R*, lock *Q.R*, then try to delete *Q.R* (it won't work). The nice part: this example is structured so that you can fool around with it a lot. Try substituting the names of files that don't exist and see how good my error trapping is. Make mistakes in the syntax for the rename command—see if I care. Comment out the lock operation in Lines 590-620, so the subsequent delete operation succeeds. Comment out some of the status checks and let the errors get caught after trying the CIO command. Do whatever you like, but please play with this example enough to feel comfortable with what we're trying to learn.

I've even supplied the format operation, in lines 880-910. As found in Listing 4, this block of code is commented out. *The FORMAT command is dangerous!* I'm sure you know this already, but make sure you have a disk that isn't dear

to your heart in the drive before uncommenting those lines and letting 'er rip. As is, the format is for drive D2:, so you may need to change that. Don't try to format your RAM-disk. And please, folks, don't drink and format. The disk you save may be your own.

I've taken my own advice and done a status check before many of the other operations in this example. However, you really don't need to do it everywhere. For example, I do a status check first thing, before trying to lock file D8:P. But, once the LOCK command in Line 380 is successful, I'm pretty confident that the UNLOCK immediately thereafter will go okay, so I don't do another status check. Of course, this won't catch those of you who manage to flip the disk drive door open between Lines 380 and 390, but I'm not too worried about that.

Note the format of the RENAME command in Line 480. The old and new names follow the drive identifier, separated by a comma, all within the one pair of double quotes. Be careful using RENAME, since it's pretty easy to wind up with duplicate filenames on the same disk.

This intensive error checking results in a leapfrogging structure to the code, as we keep skipping around the JSRs to error routines. Hey, nobody forced you to become an assembly language programmer—if it's structure you seek, try Pascal. You'll have to use your judgment as to how extensive the error trapping should be in your own programs, based largely on the intended users. Just keep in mind how you feel when a program you bought or got from the public domain crashes due to sloppy error handling!

Example 3—Fill me in.

Our third example, in Listing 5, illustrates the other graphics XIO command, FILL. This command fills a polygon with a solid color, from the color register of your choice. The very compact listing uses our graphics macros from last month to good advantage. When you write programs like this, don't forget to .INCLUDE the MACRO.LIB file at the beginning of the code, and .INCLUDE the SUBS.LIB file at the end. I mention this yet again because I repeatedly forget SUBS.LIB, then wonder why my simple program won't run.

We need an additional equate, which I added to MACRO.LIB in Listing 2. This is for an address called FILDAT (\$02FD). Before doing a fill operation, you simply load FILDAT with the number of the color register you want to use.

In Listing 5, we open a full screen of graphics 5, select color register 1, and plot the lower right corner of a rectangle at location 40,35. Next, draw a line to the upper right corner of the figure at 40,10 and draw over to the upper left corner at 20,10. Then position the cursor at the lower left corner at coordinates 20,35. Select color register 1 for the fill operation using our POKE macro and, finally, execute the fill with the XIO call in Line 290. The infinite loop in Line 300 just keeps the display on-screen; press RESET when you're done admiring it.

You can get some interesting effects by using different color registers for the outline (Line 230) and the filler (Line 280). A SETCOLOR or two frees you from the confines of the default color values. To draw a solid triangle, you can just omit the second DRAWTO in Line 260. Experiment

with different angles of lines and numbers of vertices in your polygon, and see what this command lets you get away with.

Example 4—Disk directory.

Perhaps the most interesting data on a disk is that in the disk directory. The directory lists all the files on the disk, the number of disk sectors occupied by each, and the number of free sectors remaining on the disk. Many applications need to access the directory, and Listing 6 shows you how to do it in assembly language.

Begin by opening an IOCB with the first auxiliary byte set to 6. Line 250 of Listing 6 uses the OPEN macro from last month to do this. The filespec shown (D8:*.*) will list all files on drive D8:. Change this filespec if you want to list some or all of the files on another drive. A really conscientious programmer would check for a CIO error following the OPEN, but I've omitted that step to save space.

Now, we need to read records one at a time from the disk directory. The subroutine called INPUT (Lines 470-600) performs that task. INPUT takes a record of eighteen characters and stashes it at label FILENAME (Line 390). The .DS 18 directive at FILENAME simply reserves 18 bytes for holding our filespec. Why 18 bytes? This is the format of a disk directory record:

```
Byte 1 ..... *if locked, else blank
Byte 2 ..... Blank
Bytes 3-10 ..... Filename
Bytes 11-13 ..... Extension
Byte 14 ..... Blank
Bytes 15-17 ..... Number of sectors occupied
Byte 18 ..... End-of-line marker ($9B)
```

The final record, however, is 17 bytes long, in the format: XXX FREE SECTORS, followed by an EOL.

Since we don't know how many entries there are in the directory until we read it, we need some way to know when to stop reading the directory. One way is to see if the fifth byte in FILENAME is an F (for FREE), meaning that we're done. Alternatively, we can let CIO return an end-of-file error (error number 136, hex \$88) and then stop our routine. That's how I do it in Listing 6, Lines 280-290. If the end of the file wasn't reached yet, I use the PRINT macro to print the current contents of FILENAME on the screen (Line 300) and go back to get another record (310-320). When the end of the file is reached, the code at label DONE simply closes the IOCB and halts execution.

Notice that, in Lines 310-320 I used an unconditional branch operation to loop back to READONE. Wouldn't a JMP READONE instruction work just as well? Yes, of course it would.

The difference is that the branch operation is *relative* (e.g., go back 25 bytes), whereas the jump operation is *absolute* (go to a specific address). If your program contains only relative branching, then it is "relocatable" in memory: you can load it at any address (not just the one at which you originally assembled it) and it should run just fine. Programs containing absolute jumps to addresses within the program are usually not relocatable. They must be reassembled at a new origin to run at a different address.

It is generally preferable to write relocatable assembly rou-

tines, especially if you're writing a machine language subroutine for a BASIC program. I haven't been too rigorous about making all my examples relocatable, but that's something we should all keep in mind. All the internal JMPs in my macros really ought to be changed to unconditional branches.

Once you've read the disk directory using this sort of routine, you can twiddle it. Suppose you don't care about the number of sectors occupied by the files, and just want to see their names. You could add an end-of-line marker in byte 14 of the FILENAME data block before printing it, thereby retaining only the data through the extension.

Here's your homework assignment: write a general INPUT macro, to read a string up to a specified maximum number of characters from a specified IOCB, and store the string at a particular address. Then, modify the directory program in Listing 6 to use this macro instead of the INPUT subroutine. There will be a short quiz at the beginning of the next class. **A**

Despite his Ph.D. in organic chemistry, Karl Wiegers earns a living writing applications software for photographic research at Eastman Kodak Company, mostly on an IBM mainframe. He is also interested in educational applications of Atari 8-bit, Atari ST and Apple II computers.

Listing 1.
Assembly listing.

```
0100 ;Example 1 - Locking a disk file
0110 ;by Karl E. Wiegers
0120 ;
0130 .OPT OBJ,NO LIST
0140 ;
0150 ;equates for CIO operations
0160 ;
0170 PUTREC = $09
0180 LOCK = $23
0190 EOL = $9B
0200 ICCOM = $0342
0210 ICBAL = $0344
0220 ICBLL = $0348
0230 ICAX1 = $034A
0240 ICAX2 = $034B
0250 CIOV = $E456
0260 ;
0270 ;*****
0280 ; PROGRAM BEGINS HERE
0290 ;*****
0300 ;
0310 *= $5000
0320 ;
0330 LDX #$30 ;use IOCB #3
0340 LDA #LOCK ;command is LOCK
0350 STA ICCOM,X
0360 LDA #0 ;don't need
0370 STA ICBLL,X ;to set buffer
0380 STA ICBLL+1,X ;length or
0390 STA ICAX1,X ;any aux bytes
0400 STA ICAX2,X
0410 LDA # <FILENAME ;point to
0420 STA ICBAL,X ;file to be
0430 LDA # >FILENAME ;locked
0440 STA ICBAL+1,X
0450 JSR CIOV ;do it!
0460 BPL ALLDONE ;error?
```



```

0470 JSR LOCKERR ;yes, print msg.
0480 ALLDONE
0490 BRK
0500 ;
0510 ;name of file to be locked
0520 ;
0530 FILENAME .BYTE "D8:PRACTICE.FIL"
0540 ;
0550 ;*****
0560 ;
0570 ;error handling subroutine - just
0580 ;prints a message if any error is
0590 ;encountered
0600 ;
0610 LOCKERR
0620 LDX #0
0630 LDA #PUTREC
0640 STA ICCOM,X
0650 LDA # <ERRMSG
0660 STA ICBAL,X
0670 LDA # >ERRMSG
0680 STA ICBAL+1,X
0690 LDA #80
0700 STA ICBLL,X
0710 LDA #0
0720 STA ICBLL+1,X
0730 STA ICAX2,X
0740 JSR CIOU
0750 RTS
0760 ;
0770 ;error message to print
0780 ;
0790 ERRMSG
0800 .BYTE "Error during lock",EOL

```

Listing 2.
Assembly listing.

```

0211 STATUS = $0D
0221 FILL = $12
0222 RENAME = $20
0223 DELETE = $21
0224 LOCK = $23
0225 UNLOCK = $24
0226 POINT = $26
0227 NOTE = $27
0228 FORMAT = $FE
0272 FILDAT = $02FD
0285 ICSTA = $0343
3140 ;
3150 ;*****
3160 ;
3170 ;XIO macro
3180 ;
3190 ;Usage: XIO cmd,IOCB,aux1,aux2,fs
3200 ;
3210 ;'cmd' is a CIO command number
3220 ;'IOCB' is the IOCB number to use
3230 ;'aux1' is the 1st auxiliary byte
3240 ;'aux2' is the 2nd auxiliary byte
3250 ;'fs' is a filespec (literal or
3260 ; previously-defined address)
3270 ;
3280 .MACRO XIO
3290 .IF %0<>5
3300 .ERROR "Error in XIO"
3310 .ELSE
3320 LDX #%2*16
3330 LDA #%1
3340 STA ICCOM,X
3350 LDA #%3
3360 STA ICAX1,X
3370 LDA #%4
3380 STA ICAX2,X
3390 .IF %5<256
3400 JMP @SKIPXIO

```

```

3410 @XDEV .BYTE %$5,EOL
3420 @SKIPXIO
3430 LDA # <@XDEV
3440 STA ICBAL,X
3450 LDA # >@XDEV
3460 STA ICBAL,X
3470 .ELSE
3480 LDA # <%5
3490 STA ICBAL,X
3500 LDA # >%5
3510 STA ICBAL,X
3520 .ENDIF
3530 JSR CIOU
3540 .ENDIF
3550 .ENDM

```

Listing 3.
Assembly listing.

```

0640 ;
0650 ;*****
0660 ;
0670 ;LOCK error handler subroutine
0680 ;
0690 LOCKERR
0700 LDX #0
0710 LDA # <LOCKMSG
0720 STA ICBAL,X
0730 LDA # >LOCKMSG
0740 STA ICBAL+1,X
0750 JSR PRERROR
0760 RTS
0770 LOCKMSG
0780 .BYTE "Locking error",EOL
0790 ;
0800 ;*****
0810 ;
0820 ;UNLOCK error handler subroutine
0830 ;
0840 UNLOCKERR
0850 LDX #0
0860 LDA # <UNLOCKMSG
0870 STA ICBAL,X
0880 LDA # >UNLOCKMSG
0890 STA ICBAL+1,X
0900 JSR PRERROR
0910 RTS
0920 UNLOCKMSG
0930 .BYTE "Unlocking error",EOL
0940 ;
0950 ;*****
0960 ;
0970 ;sub. to print error messages
0980 ;
0990 PRERROR
1000 LDA #PUTREC
1010 STA ICCOM,X
1020 LDA #80
1030 STA ICBLL,X
1040 LDA #0
1050 STA ICBLL+1,X
1060 STA ICAX2,X
1070 JSR CIOU
1080 RTS
1090 ;
1100 ;*****
1110 ;
1120 ;RENAME error handler subroutine
1130 ;
1140 RENAMERR
1150 LDX #0
1160 LDA # <RENAMMSG
1170 STA ICBAL,X
1180 LDA # >RENAMMSG
1190 STA ICBAL+1,X

```



```

1200 JSR PRTEROR
1210 RTS
1220 RENAMEMSG
1230 .BYTE "Renaming error",EOL
1240 ;
1250 ;*****
1260 ;
1270 ;STATUS error handler subroutine
1280 ;
1290 STATUSERR
1300 CPY #$AA ;file not found?
1310 BNE CHKLOCK ;no, skip ahead
1320 LDX #0
1330 LDA # <NOTFNDSMSG ;yes, say so
1340 STA ICBAL,X
1350 LDA # >NOTFNDSMSG
1360 STA ICBAL+1,X
1370 CLC
1380 BCC PRTSTATUS
1390 CHKLOCK
1400 CPY #$A7 ;file locked?
1410 BNE UNKNOWN ;no, skip ahead
1420 LDX #0
1430 LDA # <STLOCKMSG ;yes,say so
1440 STA ICBAL,X
1450 LDA # >STLOCKMSG
1460 STA ICBAL+1,X
1470 CLC
1480 BCC PRTSTATUS
1490 UNKNOWN
1500 LDX #0
1510 LDA # <UNKNOWNMSG ;handle all
1520 STA ICBAL,X ;other status
1530 LDA # >UNKNOWNMSG ;values
1540 STA ICBAL+1,X
1550 PRTSTATUS
1560 JSR PRTEROR
1570 RTS
1580 NOTFNDSMSG
1590 .BYTE "File not found",EOL
1600 STLOCKMSG
1610 .BYTE "File is locked",EOL
1620 UNKNOWNMSG
1630 .BYTE "Unknown error",EOL
1640 ;
1650 ;*****
1660 ;
1670 ;FORMAT error handler subroutine
1680 ;
1690 FORMATERR
1700 LDX #0
1710 LDA # <FORMATMSG
1720 STA ICBAL,X
1730 LDA # >FORMATMSG
1740 STA ICBAL+1,X
1750 JSR PRTEROR
1760 RTS
1770 FORMATMSG
1780 .BYTE "Formatting error",EOL
1790 ;
1800 ;*****
1810 ;
1820 ;DELETE error handler subroutine
1830 ;
1840 DELETERR
1850 LDX #0
1860 LDA # <DELETMSG
1870 STA ICBAL,X
1880 LDA # >DELETMSG
1890 STA ICBAL+1,X
1900 JSR PRTEROR
1910 RTS
1920 DELETMSG
1930 .BYTE "Deleting error",EOL

```

Listing 4.
Assembly listing.

```

0100 ;Example 2 - using the XIO macro
0110 ;by Karl E. Wieggers
0120 ;
0130 ;examples of using STATUS, LOCK,
0140 ;UNLOCK, RENAME, DELETE, and
0150 ;FORMAT disk operations
0160 ;
0170 ;you need the MACRO.LIB and
0180 ;SUBS.LIB files on the disk in
0190 ;the drive named in lines
0200 ;0240 and 0290
0210 ;
0220 ;
0230 .OPT OBJ,NO LIST
0240 .INCLUDE #D8:MACRO.LIB
0250 ;
0260 ;*****
0270 ; PROGRAM STARTS HERE
0280 ;*****
0290 ;
0300 *= $5000
0310 ;
0320 XIO STATUS,3,0,0,"D8:P"
0330 CPY #1
0340 BEQ OK1
0350 JSR STATUSERR
0360 BRK
0370 OK1
0380 XIO LOCK,3,0,0,"D8:P"
0390 BPL OK2
0400 JSR LOCKERR
0410 BRK
0420 OK2
0430 XIO UNLOCK,3,0,0,"D8:P"
0440 BPL OK3
0450 JSR UNLOCKERR
0460 BRK
0470 OK3
0480 XIO RENAME,3,0,0,"D8:P,Q,R"
0490 BPL OK4
0500 JSR RENAMERR
0510 BRK
0520 OK4
0530 XIO STATUS,3,0,0,"D8:Q,R"
0540 CPY #1
0550 BEQ OK5
0560 JSR STATUSERR
0570 BRK
0580 OK5
0590 XIO LOCK,3,0,0,"D8:Q,R"
0600 BPL OK6
0610 JSR LOCKERR
0620 BRK
0630 OK6
0640 ;
0650 ;-----
0660 ;NOTE: program will stop here
0670 ;and tell you that the file is
0680 ;locked.
0690 ;-----
0700 ;
0710 XIO STATUS,3,0,0,"D8:Q,R"
0720 CPY #1
0730 BEQ OK7
0740 JSR STATUSERR
0750 BRK
0760 OK7
0770 XIO DELETE,3,0,0,"D8:Q,R"
0780 BPL OK8
0790 JSR DELETERR
0800 BRK
0810 OK8
0820 ;

```



```

0830 ;-----
0840 ;BE VERY CAREFUL WHEN USING THE
0850 ;FORMAT COMMAND !!!!!!!!
0860 ;-----
0870 ;
0880 ; XIO FORMAT,3,0,0,"D2:"
0890 ; BPL OK9
0900 ; JSR FORMATERR
0910 ; BRK
0920 OK9
0930 ; BRK
0940 ;
0950 ;-----
0960 ;pull in all the subroutines
0970 ;-----
0980 ;
0990 .INCLUDE #D8:SUB5.LIB

```

Listing 5.
Assembly listing.

```

0100 ;Example 3-using the FILL command
0110 ;by Karl E. Wieggers
0120 ;
0130 .OPT OBJ,NO LIST
0140 .INCLUDE #D8:MACRO.LIB
0150 ;
0160 ;*****
0170 ; PROGRAM STARTS HERE
0180 ;*****
0190 ;
0200 *= $5000
0210 ;
0220 GRAPHICS 5+16
0230 COLOR 1
0240 PLOT 40,35
0250 DRAWTO 40,10
0260 DRAWTO 20,10
0270 POSITION 20,35
0280 POKE FILDAT,1
0290 XIO FILL,6,0,0,"5:"
0300 END JMP END
0310 ;
0320 ;include the subroutine library
0330 ;
0340 .INCLUDE #D8:SUB5.LIB

```

Listing 6.
Assembly listing.

```

0100 ;Example 4-reading disk directory
0110 ;by Karl E. Wieggers
0120 ;
0130 .OPT OBJ,NO LIST
0140 .INCLUDE #D8:MACRO.LIB
0150 ;
0160 ;*****
0170 ; PROGRAM STARTS HERE
0180 ;*****
0190 ;
0200 *= $5000
0210 ;
0220 ;open IOCB #1 to read disk
0230 ;directory - use any filespec
0240 ;
0250 OPEN 1,6,0,"D1:*.*)"
0260 READONE
0270 JSR INPUT ;get a filename
0280 CPY #136 ;end of file?
0290 BEQ DONE ;yes, quit
0300 PRINT FILENAME ;no,write it
0310 CLC ;get the next one

```

```

0320 BCC READONE
0330 DONE
0340 CLOSE 1 ;all done
0350 BRK
0360 ;
0370 ;save 18 bytes for a filename
0380 ;
0390 FILENAME .DS 18
0400 ;
0410 ;-----
0420 ;subroutine to read a filename
0430 ;from the disk directory and
0440 ;store it at address FILENAME
0450 ;-----
0460 ;
0470 INPUT
0480 LDX #510 ;use IOCB #1
0490 LDA #GETREC ;command is
0500 STA ICCOM,X ;GET a RECOrd
0510 LDA # <FILENAME ;put it at
0520 STA ICBAL,X ;address FILENAME
0530 LDA # >FILENAME
0540 STA ICBAL,X
0550 LDA #18 ;get 18 chars
0560 STA ICBLL,X
0570 LDA #0
0580 STA ICBLLH,X
0590 JSR CIOV ;go do it
0600 RTS
0610 ;
0620 ;include the subroutine library
0630 ;
0640 .INCLUDE #D8:SUB5.LIB

```

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sion. In the magazine, in Listing 1 on page 89, the variable SEARCH in Line 110 should be changed to SEARCHS. Similarly, for the disk version, change the variable SEARCH to SEARCHS in Line 4400 of the main program.

I was notified of this problem by Mark Llewellyn, who found out that using the Search option with any search phrase would cause the program to lock up after the first record.

Sincerely,
Jim Siemion
Bellevue, WA

"Hot Poker" revised.

This is a revision of S.M. Baugh's "Hot Poker" program that appeared in the January 1987 issue of *ANALOG Computing*—or more accurately, it is a revision of the ML routine at the heart of that program.

This new routine is contained in Lines 3 and 4 of the sample program below. In the original, the machine language routine is 216 bytes long; my version is 101 bytes shorter (115 bytes). Mine also runs a little faster (not that it matters much, since the original runs very fast).

Of more consequence is the fact that both the loader program and the resulting BASIC fragment to be ENTERed into your own BASIC programs will be substantially shorter. The BASIC fragment, which originally had line numbers from 2 to 9, will not need the original Lines 5, 6 and 7. (Of course, the remaining lines' numbers will need to be revised.) This is mainly because the number 155 is avoided altogether. As for the loader program, it would be nine ponderous lines shorter!

All this makes it easier to type in the program listing. There's also one more way to make things easier. I refer to the (erroneous) statement made on pages 14 and 15, that the machine language string needs to be filled with dummy data at the start.

To explain: suppose you want to transfer numbers from data statements to a string and then use standard BASIC manipulations on the resulting string (PRINT DEST\$, for example). For this to work, you must have the length of the string right. The problem is that the present machine language routine doesn't set the length of the strings it fills. If you need to set the length of the resulting string (and you may very well *not* need to), there's a very simple way to do so. Suppose your destination string, DEST\$, needs to be 200 bytes long. Execute the following statements:

```
DIM DEST$(201)
DEST$(201)=""
```

This, owing to what might be considered a glitch in Atari BASIC, sets LEN (DEST\$) to 200. Note that the second of these two statements can be executed after the USR call, as in the sample program. Putting dummy data in the string, among other things, sets the string length.

The above suggestion works fine if you know the number of data bytes in the destination string. If you don't know, you *could* just count them. In keeping with a long tradition of computer laziness, I have provided an alternative; the accompanying program illustrates its use. The key is that the variable U is no longer a dummy. When you return from the USR call, it contains the address of the last DESTination datum plus 1. So, to get the number of DESTination data, use the expression U-ADR(DEST\$)—or the like.

To further explain the differences between the present effort and Baugh's, let me remind you of some rules they have in common. You are responsible for specifying the line number of the first data statement. That means you have to make sure the statement exists, is a data statement containing numbers less than 256 and that all the data statements are numbered so as to appear consecutively in a listing of the final program. Additionally, you must avoid spaces in your data statements. (I don't think Baugh mentioned this last one.)

In my quest for brevity, I found it expedient to add one additional restriction: that first data statement can't be the first statement in the total program. For example, the following program beginning will move the two numbers 104 and 96 to the first 2 bytes of DEST\$.

```
5 REM LOAD DO NOTHING ROUT
INE
10 DATA 104,96
20 DIM ML$(115),DEST$(3)
30 DEST$(3)="":GOSUB 100
40 U=USR(ADR(ML$),10,1,ADR
(DEST$))
50 ? DEST$
100 REM INIT ML$ HERE
```

But, if the opening REM statement is left out, making the data statement the first line of the program, you'll get garbage. What happens is that the ML routine will skip the first line and use Line 20 instead.

To offset this slight disadvantage there's another added plus. In a data statement, two consecutive commas (an empty datum) are interpreted as a zero. This could be handy if you're entering a lot of zeroes.

Baugh mentions the possibility of ex-

tending his program to alphabetic input—for hexadecimal numbers, presumably. Such a routine would be a little different in approach; I think it would be better to keep it separate.

Tell S.M. I think his program is amazing as a third effort; all I've done is neat-en it up a little—well, a lot.

Jerry Bridgman
Madison, WI

Editor's note: To create Mr. Bridgman's demo program (including his new version of "Hot Poker"), type in the first program below and run it. A file named ML.LST will be created on your disk. Now type in the second program below and merge the file ML.LST with the command ENTER "D:ML.LST". You now have the complete demo program in memory.

Program 1.

```
10 DIM L$(120):OPEN #1,8,0
,"D:ML.LST"
20 L$="3 ML$(1,75)=":L$(13)
)=CHR$(34)
30 FOR X=1 TO 75:READ A:L$(
(13+X)=CHR$(A):NEXT X:? #1
;L$
40 L$="4 ML$(76,115)=":L$(
15)=CHR$(34)
50 FOR X=1 TO 40:READ A:L$(
(15+X)=CHR$(A):NEXT X:? #1
;L$:CLOSE #1
100 DATA 104,104,133,209,1
04,133,208,104,104,133,205
,104,133,213,104,133,212,1
65,136,133,203,165,137,133
,204
110 DATA 160,2,165,203,24,
113,203,133,203,144,2,230,
204,160,1,177,203,217,208,
0,144,234,208,5,136
120 DATA 192,255,208,242,1
60,4,169,0,133,214,200,177
,203,201,71,176,23,201,44,
240,21,233,48,133,215
130 DATA 165,214,10,133,21
4,10,10,101,214,101,215,13
3,214,144,226,160,0,132,20
7,160,0,165,214,145,212
140 DATA 230,212,208,2,230
,213,164,207,208,202,198,2
05,208,167,96
```

Program 2.

```
2 DIM ML$(200),DEST$(20)
6 ST=ADR(DEST$)
10 U=USR(ADR(ML$),1000,2,5
T)
20 DEST$(U-ST+1)="":? "K";
DEST$:?
30 POKE 201,8:POKE 82,0:FO
R I=1 TO U-ST:? ASC(DEST$(
I)):NEXT I:POKE 82,2:POKE
201,10
40 LIST 1000,1010
50 ? :? "# DATA=";U-ST
99 END
1000 DATA 216,104,104,133,
209
1010 DATA 104,133,208,104,
104
```

(continued on page 92)



Phantasie II

by Doug Wood

SSI

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by Steve Panak

One of my favorite programs for the ST has been responsible for sleepless nights, dog-tired, dragging days, and more than one call to 911 in search of qualified mental help. It became a compulsion, not only for myself, but for a number of my friends, who would show up at all hours of the night, begging to voyage to Pelnor for just a few more minutes.

When these minutes turned into hours, then days, I realized that SSI had a winner. As I said in February, Phantasie is fantastic. But much to my horror and surprise, we finished it. We were heartbroken, until yesterday, when **Phantasie II** arrived.

Having defeated the evil Black Knights on the Isle of Gelnor, in **Phantasie II** you are transported south to the Isle of Ferronrah. The nefarious Nikademus has also moved his sinister self south, and now rules over this once-beautiful island. A mysterious cloud hangs over the island, and no one has come or gone in over forty years. That is, no one until you accept the challenge.

Phantasie II takes over where Phantasie I left off. In fact, if you so desire, you can transfer your characters from I to **II**. Unfortunately, they'll lose much of their power, although they retain a couple of valuable spells and items. You may also create new characters, if you wish.

Regardless of your choice, it isn't necessary to complete I in order to enjoy (or complete) **II**—but the experience sure

helps. This is because **Phantasie II** is a universe full of great danger.

For those of you familiar with Phantasie, skip the next paragraph or two. For those of you who stuck around, here's a brief synopsis of how the game plays. You may have up to six adventurers in your group (six is the recommended number). This merry band is comprised of members from a variety of vocations and races. Wizards and thieves, humans and elves coexist in near harmony. You create the characters, and strengthen them on the way to completion of this epic game. The characters' strength is determined by a number of standard D&D™ attributes and skills.

Program design is quite possibly the best I've ever seen. The game makes full use of the menu and windowing capabilities of the ST, with the resulting game being the easiest I've ever played (except, of course, Phantasie I). All control is through the mouse. You move the pointer and click on whatever your brave little heart desires. From movement to battle, from casting spells to drinking potions, the mouse gives effortless control. Screen displays of maps, menus and monsters are very colorful, clear and distinct.

There have been a couple of changes since Phantasie I hit the shelves. An additional battle option allows combatants to toss rocks at any adversary. You're now after an evil orb, and amulets are the important artifacts. While there are still scrolls to guide you to the end of the adventure, new terrain features include lava, mist and haunting, dark voids. Although

transferred characters will retain divine spells and the wand of Nikademus, using these items will prove to be a task.

As far as the game itself goes, in comparison to Phantasie I, **Phantasie II** is twice as good. More enemies, more dungeons, more danger—all blend to create a game that's guaranteed not to disappoint. There are three planes in the **Phantasie II** universe. You'll move from one to the next as your power increases. The dungeons always manage to throw you for a loop, even if you've seen hundreds before. You'll enjoy the secret doors and passages, transporters, and the occasional omnipotent being who snuffs your whole party. Of course, you'll probably enjoy the latter only if you remembered to utilize the save game feature.

I have to give an unqualified thumbs-up to **Phantasie II**. It is a worthy successor to Phantasie I, one of my all-time favorite games. And, while I find it difficult to believe it was possible to outdo the original, Doug Wood has done so. My disbelief has turned to anxiety—*anxiety* over when they'll give us Phantasie III. **A**

Steve Panak is a Trust Attorney and a free-lance writer living in northeastern Ohio. He holds a B.S. in B.A. and a J.D. He currently oversees computer operations in his department, where he develops software to teach complex legal concepts. In his spare time, he enjoys computer games.

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ST notes

by D.F. Scott

Newsworthy happenings in the ST world.

Tuning up the production line.

The once bogged down machine that was the Atari production line seems to be churning at near full speed again. The Mega STs 2 and 4, for example, were released in Europe, with both blitter and new TOS installed. Reports are that the same machines, with minor differences, are being readied for distribution by Atari U.S. at the time of this writing.

Our counterpart in Great Britain, *ST User International*, in its May issue, released photographs of the rear and interior of the Megs. There's an internal fan after all; and there's a pop-out slot for what appears to be an optional second hard drive port. Perhaps most important, however, is the pop-out slot which makes extra room for a bus expansion outside the machine.

Computer Systems News reports that Sig Hartmann, who's in charge of signing on Original Equipment Manufacturers under Atari's banner, has signed an agreement with a company called Idris, to jointly produce an ST version of UNIX. Unlike other UNIX versions, the Idris 68000 UNIX doesn't require a full-scale memory management unit—a device the ST is not equipped with. Idris may begin shipping a RAM version as early as September. And, if all goes well, according to the report, Idris may be hired to produce the OS for Atari's 68020 computer, which Hartmann now calls the "ES."

Should this 68020 machine be used as a UNIX networking computer, it will be the Mega ST, with its full 68000 expansion bus, which will be ready to be plugged in as a UNIX

terminal. By next April, Atari may have available the first Motorola chip-based UNIX network to sell for a four-digit figure.

What the press releases don't tell you . . .

At the Summer CES in Chicago last June, our staff probably took home enough press releases and news material to be recycled into an entire edition of the *Sunday New York Times*. I personally thought the odds of finding several new ST software releases missing from the seemingly infinite pile of news was less than the lowest number in the ST's double precision. One quick check of a software distributor's dealer catalog proved me wrong. Here are some of the new items we did not see in Chicago:

Portal, by Activision, is a graphic adventure game by Rob Swigart and Brad Fregger. In it, you portray an astronaut having returned to Earth—or what seems like Earth—after a long mission, to find all the people missing. Buildings, animals, birds, trees, lakes are present; only the people are gone. They were thoughtful enough to leave an artificial intelligence named Homer (I hope he's no relative of "Eliza"), who isn't quite sure what happened either, but can provide you with some clues.

You travel through a city that looks like a sadly vacated metropolis from Sundog, using Homer's clues to determine how to bring all the people back. Trouble is, I predict, they may be having a party someplace. They may not want to come back.

Tracker, from Firebird, is a more tactical adventure game, in the genre of *Mercenary*. You're commander of eight TRAC (Terminate Renegade Artificial Intelligence) zero-gravity, inner-atmospheric fighters. Your mission: liberate Zeugma IV from the menace of robotic Cycloids being controlled by some omnipotent, dictatorial artificial intelligence force—which we hope is no relative of Homer.

The planet is divided into twenty-two sectors, each of which has detailed terrain characteristics. Unlike other tactical games, it gives you the option of controlling all eight TRACs by "remote control," or entering any one at any time and piloting it manually from a first-person viewpoint, as in *Starglider*. The objective is to systematically disassemble the Cycloid power structure. The game promises to use strategic algorithms for enemy movements, so it actually responds to your decisions, rather than just going about its own business.

I have yet to see a Firebird/Rainbird game that's anything less than quite good. I have a feeling I won't be disappointed.

Mindscape has two attractive new entries: **Plutos** and **Q-Ball**. *Plutos* is a Galaga/Xevious-style arcade game which is rather colorful, its package as well as screen.

Q-Ball, written by a person named Adam Billyard, is a British import from English Software—the pun was obviously intended here, too. A three-dimensional game of snooker, its billiard balls are not affected by the laws of gravity. Instead, they're suspended in space within a box whose eight corners serve as pockets; otherwise, the rules of snooker apply.

The keyboard rotates the billiard "field" with respect to the player, and establishes aim, power and "english" on the ball. This is the type of game that would appeal to Xanth "Shiny Bubbles" Park.

A company called Intracom, Inc. has listed a printing utility, **Bumper Sticker Maker**. Personally, I've been wanting "Warp Six: A Law You Can Live With" on my 280Z.

Mastertronic is promising to port over its **Ninja** and **Renegade** to the ST; whether its plethora of motorcycle games is next, we've yet to see.

Spectrum Holobyte will port over its Macintosh games, **Falcon** (a flight-combat simulation) and **PT Boat** (the latter seen on a Mac at Chicago CES). The Mac version uses digitized sound tracks to simulate the explosions of depth charges, and the thunder of the forward guns.

Classic Image has released **Diablo**, an arcade-style version of the old "fifteen" sliding hand-held puzzle, wherein each sliding tile contains a

portion of a curved track upon which a ball rolls. The object is to slide the tiles so that the tracks connect in such a way as to keep the ball rolling.

Sierra will introduce two graphic adventures: **Police Quest**—perhaps a merging of Black Cauldron with a Joseph Wambaugh novel—and a port of the PC "adult" adventure, **Leisure Suit Larry and the Land of the Lounge Lizards**. Yes, that's its *real* name. The "quest" in this game is simply "a good time," and the various twists of mazes and obstacles have been replaced by sleazy bars and detox centers. Instead of monsters, Larry meets a lot of girls in various stages of undress and maturity. One wonders why this is called "adult." //

Wherefore art thou STuff?

The other day I was fortunate enough to run across a new product from MichTron called **STuff**, a package of twenty-one small utility programs by

Timothy Purves—the Peter Norton of the ST—and J. Weaver Jr.

Trouble is, nobody knew what it cost. Nobody knew because STuff isn't in any of MichTron's pricing catalogs, nor is it in any *other* catalog published by any distributor. On top of that, nobody knew how the program even found its way onto the shelf.

Whether or not it had fallen out of a time warp, there it was: a small, yellow booklet and a disk, glistening in the fluorescent light of the store. In it were programs which allow the user, among other things, to: preset the order of files running from an AUTO folder; set the resolution on AUTO folder programs to medium; make an AUTO folder boot from hard disk; automatically boot any GEM program on power-up; delete any program from disk *permanently*; modify the date/time stamp on a file; and select accessory files to load on power-up.

It seems to be a nice package—if only it could decide whether or not to fully exist. //

"Can you guys bundle WordStar with Gunship?"

Finally, MicroProse, the company commanded by Major Bill Stealey (USAF retired), has agreed to change its name. The settlement was made out of court with MicroPro, manufacturer of Wordstar 2000 Professional (which the company is reported to be upgrading again).

The agreement states that MicroProse must change its name on all packaging and advertising within one year. This may delay the introduction of F15 Strike Eagle and Gunship for the ST. In return, MicroPro has agreed not to produce any products within the next ten years using the word *prose* in its title or advertising.

At last report, Major Stealey was still searching for a new name. I thought perhaps "WarPerfect Corp." might be a suitable, distinctive title. If you have any better suggestions, please drop them a line—or rather a chute. //

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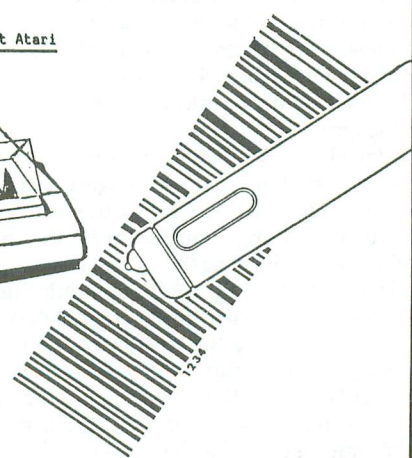
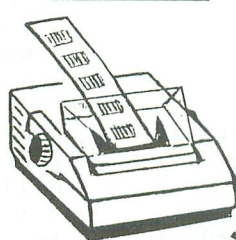
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Panak strikes!

Reviews of the latest software.

by Steve Panak

I'm not sure how many of you are aware of this, but the entertainment software industry has gone through quite a revolution in the last year. I'm sitting here, sort of sizing up the past year, trying to predict what the next year has in store for us—and the developments have been simply amazing.

It all started at the 1986 Summer CES, when Activision announced its acquisition of Infocom. In addition to the Activision and Infocom imprints, the company also publishes sporting games under the Gamestar logo.

Electronic Arts, not to be outdone, announced its "Affiliated Labels" program, which at last count had ten members, including Origin (Ultima, Ogre), Software Toolworks (Chessmaster 2000) and The Game Designers Workshop (The Battle of Chickamauga). Then EA signed a "strategic alliance" with TSR to produce official D&D-related computer games. And, not to be outdone in the acquisition game, Electronic Arts bought all of Batteries Included's assets. Intellicreations joined the fray by announcing, in October 1986, the licensing of five new products from international developers, due early this year. They never arrived. In April, Intellicreations joined Electronic Arts.

The reason for all this: economies of scale inherent in a large system of distribution channels. Translation: the products

are cheaper to get to us, the consumers, this way.

If this is the only effect of these consolidations, then more power to them. More efficiency should yield more and better products at (we hope) lower prices.

But what about the possible stifling of new talent? Are the small, independent producers, like the small movie studios of the past, gone forever? I already see this effect in the 8-bit line. In the last year, I've examined maybe fifty products. Probably 90 percent were from five core companies. The ST line is still new enough, perhaps, to capture the interest of innovative producers.

Is all this good or bad? I don't know. If I did, I could read the future, and would probably have been picked up by the government and locked away by now, rather than being allowed to write for the public. I just hope these new channels encourage, rather than thwart new talent, because the truly good, creative, new ideas spring from the minds of individuals. They're not as likely to grow in bu-

reaucratic soil, which is often stagnant with concern for the bottom line.

The next game proves, fortunately, that this stagnation has not yet begun.

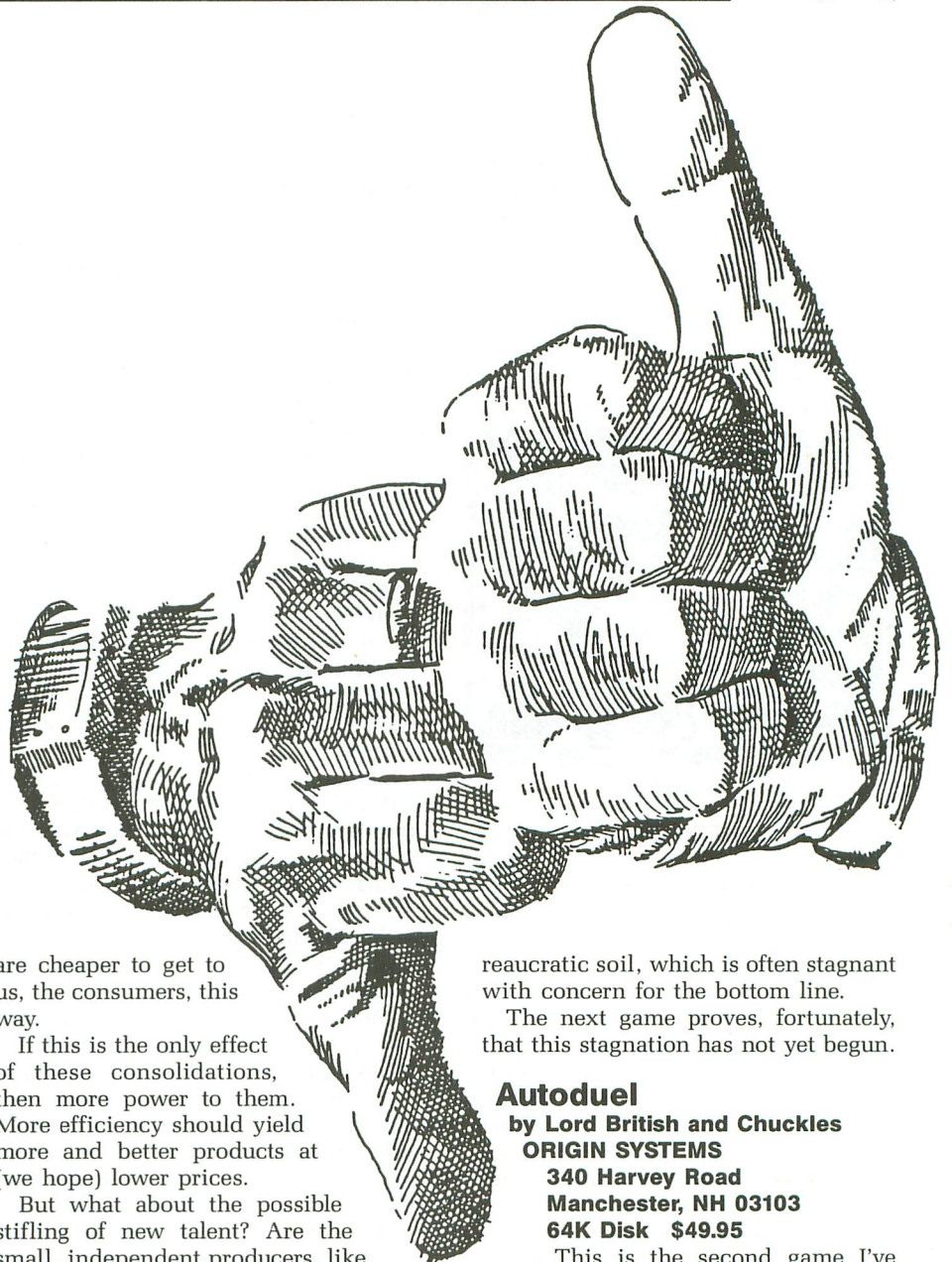
Autoduel

by Lord British and Chuckles
ORIGIN SYSTEMS

340 Harvey Road
Manchester, NH 03103
64K Disk \$49.95

This is the second game I've looked at recently which uses a theme similar to that underlying the popular movie *Road Warrior*. I tested (and got hooked on) *Roadwar 2000* from SSI. (You'll see a review of it in an upcoming issue.) Now, from Origin Systems, the company who unleashed the Ultima series on us, comes another battle for supremacy on the roads of tomorrow. The difference in this game is that you're all alone. In *Autoduel*, your goal is to become the best "autoduelist" in the land. You do this by defeating adversaries and building bigger, more powerful vehicles.

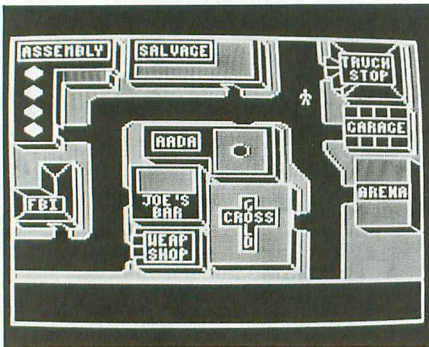
To start the game, you first create and name a driver. This autoduelist's makeup is determined by the way you allocate experience points among three skills: me-





Panak strikes! *continued*

chanical, driving and marksmanship. Until you acquire enough money, however, you're on foot. When you do get some cash, you'll probably have such a pathetically small bankroll that you'll have to settle for a subcompact—with a tiny, weak engine and a couple of puny rockets. You window shop the gas guzzlers and laser cannons, but your budget is just too limited. You'll have to work your way up to those goodies. Just settle for a car that will get you around town.



Autoduel.

Each of the northeastern U.S. cities you can explore are full of a variety of places to visit. You could hit the saloon, and slug back a drink or bribe the barkeep. There's also the weapons shops, garages, junkyards and hospitals. Atlantic City has casinos where the lucky can gamble their way to strength. Then there's the arena, where the brave (or desperate) autoduelists battle for fame and fortune. To the delighted roar of the crowds, duelists of every skill level compete in a number of divisions, driving and striving to earn prestige, money and experience points. On amateur night at the arena, the Killer Karts provided by the management are guaranteed crowd pleasers. A couple of wins here, and you might be able to afford your own car and move up to one of the higher divisions.

If the arena's action is not to your liking, then you'll have to choose another way to earn your keep. The AADA (American AutoDuel Association) needs couriers to carry loads between towns. What's in these payloads is none of a good courier's business. He just concerns himself with getting the goods there on time. Unfortunately, the roads are also full of outlaws who prey on inexperienced drivers. Of course, depending on your morals, you might also wish to keep an eye out for people to take advantage of. And the superb game design allows a fantastically complex level of play.

Naturally, you can save your game. You can also (if you have the money) clone your player, backing him up in case the original meets an untimely doom. For a slightly lesser charge you can update a braintape, storing your current skills for placement into your clone at activation time.

Various repairs can be performed on your car, and you can take mechanic classes in hopes of raising that aptitude. A fleet of cars can be created, stored, reconfigured and reused. And you have such great control over car design (in fact, nearly half the manual is dedicated to vehicle design and control). Chassis, engine, tires, armor and weapons (both offensive and defensive) are all available in great diversity.

My favorite weapon—and, of course, the most expensive—is the laser, but flamethrowers and land mines get the job done as well. Still, even with all these great things to do, I was a little disappointed.

I found the game a bear to control, definitely lacking power steering. You move and fight on the open highways and in the arenas, using the joystick, which seems very sluggish in response time. Purchasing a car with better equipment will result in better handling, but won't remove the need to issue most of the commands from the keyboard.

I don't see why this game couldn't have been designed around simple menus, as Origin did with its Ogre game. ST-style pull-down menus greatly simplify play and speed up learning. With all the stuff to learn in this one, you'll need all the help you can get. While the superbly written manual should supply that help, it concentrates instead on creating an atmosphere. I loved these pages of background, but how about a simple sheet of hints to help us along?

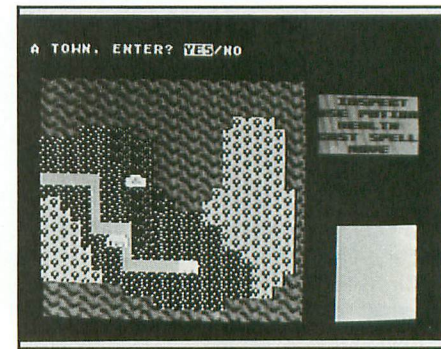
The map of the northeast seaboard (your dueling area) was nicely done and very useful. The screen displays, while simple, were well designed and detailed, and the arcade portions were engaging. When dueling, the screen's borders contain critical data, such as vehicle and driver status, active weapon and radar. Though there's often a lot of text on-screen, it never becomes hard to read. Unfortunately, it wasn't as easy to deal with the numerous disk swaps necessary in this game, as well as the annoying dead ends—where a wrong response to a prompt requires a lengthy reboot of the game.

The way software prices have been going down, a game has to be pretty good to be deserving of a \$50 price tag. Unfortunately, despite a captivating and intriguing concept, **Autoduel** fails to get into high gear. It is noticeably flawed by excessive disk swaps and accesses, slow response time, and difficulty of play. But, if you can put up with the stiff suspension and the high sticker price, then you'll find **Autoduel** to be remarkably full of options.

Phantasia

by Winston Douglas Wood
SSI
1046 North Rengstorff Avenue
Mountain View, CA 94043
48K Disk \$59.95

Back at the beginning of this year, I looked at this game on the ST. **Phantasia** and its sequels (two at last count) quickly became my all-time favorites. Easy to learn and play, they transformed me—and a number of my friends—into all-night video junkies. While I looked forward to the issuance of these groundbreaking games in the 8-bit format, I must admit I was rather concerned that they would lose a lot in the translation. Well, I'm happy to report they don't.



Phantasia.

Phantasia, the current premier fantasy adventure game for the ST has just invaded the 8-bit universe, where I predict it will also dominate. The game invariably follows the familiar D&D-type formula precisely, sending super- (and sub-) human characters on a quest for the wand of Nikademus. Along the way, these adventurers encounter riches and dangers beyond their wildest dreams. And, after perhaps weeks of play, they might even complete the game.

The main characteristic that makes **Phantasia** one of the best games available for the ST is its simple user interface. The



Panak strikes! *continued*

combination of mouse and menus makes moving through and conquering the kingdom nearly effortless. I was pleased to find that the 8-bit version duplicates this feature as closely as possible, using the joystick. In fact, some players actually felt the stick was better than the mouse. But, regardless of personal preference, all are able to play comfortably—without being chained to the keyboard.

Like any respectable fantasy game, **Phantasie** has you first create characters, then assemble a party, and, finally, begin pillaging. Your home base is any of a number of towns, the first being Pelnor. In these towns, you create the characters, choosing their race and profession, while the computer randomly assigns values to attributes such as strength and intelligence. When you have enough (six) desirable characters, you assemble your group, buy some weapons and hit the road.

Once on the road, you move throughout the kingdom, meeting creatures of every variety. Some are helpful, but most must be dealt with quickly and severely. With each successful encounter, your for-

ture and experience grows. Upon each return to town you become stronger and stronger, until finally, you find yourself able to take on Black Knights three at a time.

Just don't fool yourself into thinking you can take on Zeus. In your many journeys you'll also come across dungeons full of great wealth—and great danger. Their dark, dank passages, teleporters, strange pools, secret doors, and creatures of every variety and skill level will prove most demanding of your own skill and bravery. The only clue you'll get from me is that scrolls hold the knowledge essential to successful completion of this game.

The main drawback, as I see it, is the lengthy response time required for the drive to load another portion of your new universe. Also annoying is the fact that you can save your game only while in a city. This makes it doubly important to save before leaving each town.

I was disappointed in the graphics, but only in comparison to the ST version. Compared to other 8-bit games, **Phantasie's** graphics are adequate, the screen displays and messages easily read. Control

with the joystick is easily learned; thrusting swords and casting spells will quickly become second nature. The same manual as that provided with the ST version is used. It's organized nicely, but must be referenced until you learn the numbers assigned to the various spells. Little in the way of instruction is given to you, and a lot of questing and killing is between you and the wand.

Overall, this introductory-level fantasy game is guaranteed fun for all. Its ease of play and the way it constantly beckons you deeper into its world make it addictive for even the most demanding customer. Those who love D&D-format games are especially susceptible to its spell. Just remember: even a fifteenth-level warrior has to pause occasionally for rest. **A**

Steve Panak is a Trust Attorney and a free-lance writer living in northeastern Ohio. He holds a B.S. in B.A. and a J.D. He currently oversees computer operation's in his department, where he develops software to teach complex legal concepts. In his spare time, he enjoys computer games.

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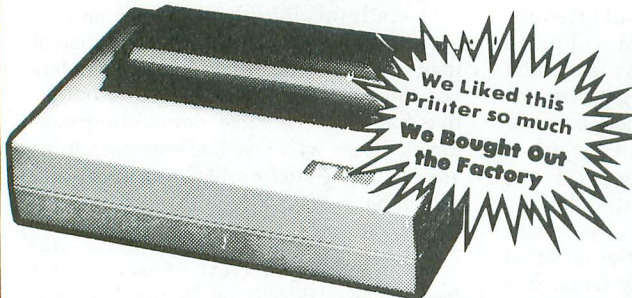
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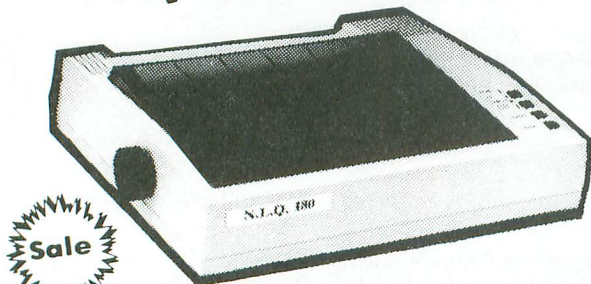
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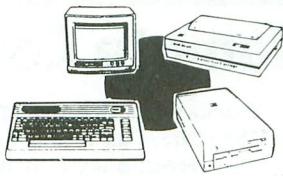
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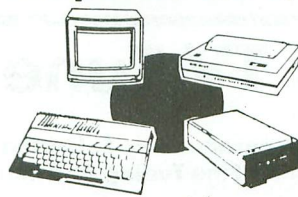


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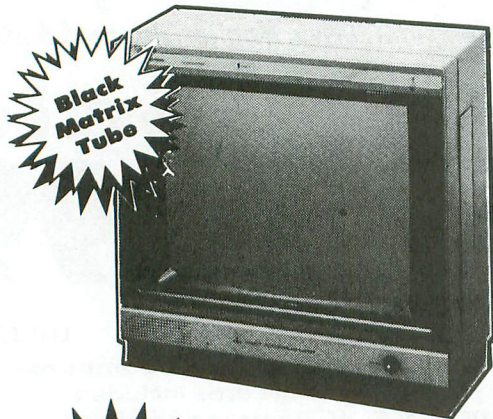
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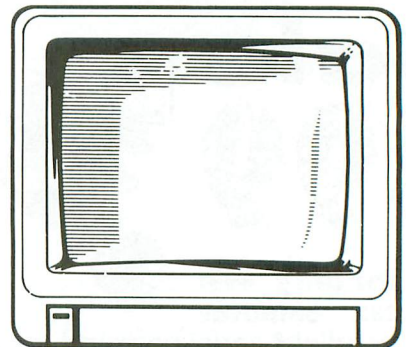


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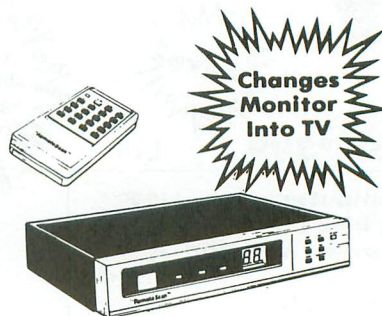


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by Victor T. Albino

If you've ever been impressed by professional slide shows generated through the use of expensive video equipment, you'll really enjoy producing the same kind of results on your ST, with this new program from Power Systems. With the use of just a few simple commands, you can now arrange and display your Neo-Chrome pictures with theatrical special effects.

The overlay and scrolling capabilities of **Power Vision** make it especially useful as a tool for producing business presentation graphics. You can, for example, depict a bar chart that draws animated lines to demonstrate a corporation's increase in annual sales. Colorful graphics and text displays can be made to appear on the screen by rolling, meshing, blinking, or simply popping into view. The entire show can be set up to run continuously, making it suitable for unstaffed convention exhibits.

If you have the proper hardware, you can even connect the output signal from your computer to a video cassette recorder, and save the presentation to tape. In this format, the show could be used by a company's marketing or public relations staff, even if they have no computer knowledge.

Creating such presentation masterpieces is as easy as one, two, three. First, use Neo-Chrome to produce the images you want to show. The manual provides

some examples on how to plan these pictures. Second, run the **Power Vision** compression program, which condenses your normal 32,128-byte pictures down to as little as 300 bytes. Of course, this means you can put over forty Neo-Chrome pictures on a single-sided disk or more than eighty on double-sided drives. When you wish to modify a previously condensed picture, simply use the uncompress program to restore it to its regular size. Third, using a text editor or word processor, list the display commands you want the program to follow and save them as a file. If you wish, this command file can be set to run the show automatically on bootup.

The statements that make up the command file are easy to use and fully explained in the manual. **BLINK** causes the picture to blink onto the screen by doubling its speed each time, until the display becomes stationary. The **CURTAIN** command, depending upon the particular option selected, will perform several functions that resemble a curtain rising, falling, or opening and closing to the sides. **MERGE** causes the picture to display with a venetian blind effect.

The **RAINBOW** command produces a rainbow of color that can be in front of or behind the picture. **MESH** causes the picture to be slivered into 1/8-inch pieces, with odd-numbered pieces entering from the right and even-numbered pieces from the left, until they fit together to form the final display. **WAIT** tells the program to pause for whatever number of seconds

you select before proceeding to the next slide. **GOTO** works a bit like a branching command. With it, you can direct the slideshow script to jump to and execute separate picture subroutines.

An especially interesting command is **BACKLOAD**. When **BACKLOAD** is used just prior to a **CURTAIN OPEN**, the new picture is loaded behind the current picture. When the **CURTAIN** command is given, the backloaded picture will make its appearance as if from behind an opening curtain.

The **SET** command provides unusual versatility by allowing the user to customize a show while the program is running. Let's say, for example, you're giving a presentation about your company's annual performance, when someone asks a question about the production schedule for the third quarter. With the push of a button, you can interrupt the preprogrammed sequence and call up the exact slides in your show that relate to third-quarter activity. This flexibility is possible because you can program the ten function keys to branch to labels previously set in your command file.

You can also program your **HELP**, **UNDO** and **RETURN** keys to provide additional functions. For example, you may wish to pause during the middle of a presentation in order to make a point, then continue without disrupting program operation.

(continued on page 91)

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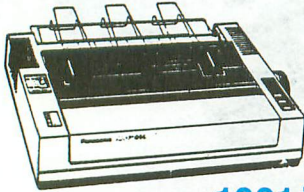


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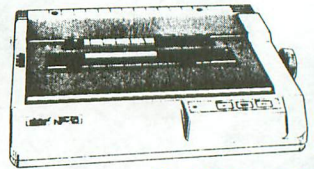
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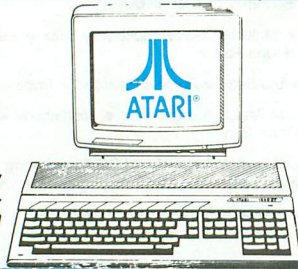


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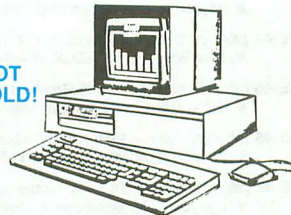
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Although not mentioned in the documentation, one of the most enjoyable aspects of **Power Vision** is its ability to animate Neo-Chrome pictures. Using the large number of pictures that can be condensed on a single disk and the scrolling capabilities of some of the commands, it's possible to create your own mini movies. This works even better if you load the command file and all the condensed pictures into a large RAMdisk, since this allows each picture to be shown much more quickly.

Power Systems has a policy of keeping costs down so they can produce affordable software. The company's objective is to put its investment dollars into program quality rather than into the customary accessories. In keeping with this philosophy, **Power Vision's** packaging is adequate but quite modest, and the fifteen-page manual is actually contained on the program disk as a documentation file to print out.

Another unusual aspect of this compa-

ny is something called CAREWARE. This is the name given to Power Systems' policy of giving ten percent of its gross sales to organizations providing assistance to the needy. Certainly, this policy alone sets the company apart from its competitors.

Without a doubt, **Power Vision** is a clear winner in the price-for-performance category. If you need to do business presentation graphics, would like to try your hand at animation, or just want a nice way to store and display your picture files, take a look at this program. At this price, it can't be beat. **A**

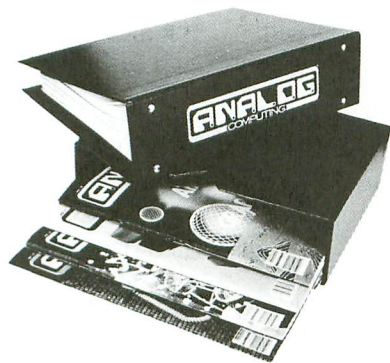
Victor T. Albino is a hospital administrator, self-taught computer enthusiast and the vice-president of his local Atari user groups. A number of his programs and articles have appeared in computer magazines, and he's also received awards in educational programming and computer graphics.

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Reader comment continued from page 76

Let's get Jet.

I am writing this letter to inform your readers of another case of Atari "discrimination," namely Jet by subLOGIC.

Jet is an excellent combat simulator that currently is manufactured only for Commodore, IBM and Apple computers. Anyone who's ever played Jet knows what Atari 8-bit owners are missing out on. They are working on an ST version to be released sometime this fall, but an 8-bit version is not planned at this time.

I wrote subLOGIC a letter, and they replied by saying, "Our decision to manufacture it will be based on consumer demand..." I also called subLOGIC and was informed that demand was increasing. I was told to "call back in three or four months."

Personally, I would like to see an 8-bit version started as soon as possible. If we 8-bit users write letters and call, it might influence their decision to begin work on an 8-bit version of Jet sooner. Please write

them a letter or two and give them a call asking about Jet.

Their address is: subLOGIC Corporation, 713 Edgebrook Drive, Champaign, IL 61820. Or call them toll free at (800) 637-4983.

Sincerely,
Matt Brady
Visalia, CA

Extra info.

I had some trouble with the "Integer BASIC" programs in your **Atari 8-Bit Extra**... every time I loaded the files, the internal BASIC was turned off, and I could not run any BASIC program unless I hit RESET, which killed the "Integer BASIC"!

I have figured out what was wrong. It appears that Barry Green wrote the program on a 1200XL, or maybe an old 800XL with BASIC Rev. B in it. Why? He was using a BASIC Rev. A cartridge. The routine to switch out the OS FP ROM also switches out BASIC, unless you are using an external cartridge of BASIC. (And why would anyone with BASIC Rev. C on board want to use BASIC Rev. A?)

The fix is simple, and the same fix works on both INTBASIC.OBJ and INTBASI2.OBJ. Copy either of these files under the name PATCH.OBJ before running. Then they can be renamed again, under the names PATCHED.OBJ and PATCHED2.OBJ. Here it is:

```
10 REM PATCH INTBASIC.OBJ
20 REM IN THE GUISE OF PAT
CH.OBJ
30 REM by Bob Hardy
40 CLOSE #1
50 OPEN #1,12,0,"D:PATCH.O
BJ"
60 FOR X=1 TO 39
70 GET #1,A
80 NEXT X:NOTE #1,SEC,BYT
90 GET #1,A
100 IF A<>254 THEN ? "WRON
G BYTE! ABORTING.":CLOSE #
1:END
110 POINT #1,SEC,BYT
120 PUT #1,252
130 CLOSE #1
140 GRAPHICS 0?: "PATCH.OB
J":? "MODIFIED ON DISK,"
150 ? "AND IT IS":END
```

This modification will not switch out internal BASIC, but works just as well with a cartridge BASIC.

Incidentally, while messing around with this, I discovered that there are slight differences in speed between the three revisions of Atari BASIC. Rev. A is the slowest, then Rev. C, and Rev. B is slightly faster (if buggier) than Rev. C. Here are the jiffy figures after running Listings 3, 4 and 5 from the article:

	FP w/A	Int. w/A	FP w/B
FOR-NEXT	1459	1044	1445
MATHTEST	947	510	942
SCRNFILL	3754	1869	3731
	Int. w/B	FP w/C	Int. w/C
FOR-NEXT	1031	1449	1034
MATHTEST	504	943	504
SCRNFILL	1847	3736	1852

Note that the times for BASIC Rev. A, with and without "Integer BASIC," are the same as the values shown in the article.

Sincerely,
Bob Hardy
Chico, CA

Software from Starfleet.

Starfleet Software has written software for the XMM801 printer, including several utilities for displaying and printing Koala and MicroPainter picture files. We also have some utilities for ATASCII printing of program listings with all control characters and special characters. Also included on the disk is a G:-compatible AUTORUN.SYS file which is 100 percent compatible with the Epson "G:" handler published in **ANALOG Computing** issue 35, only ours works with the XMM801 printer from Atari. We also have a version of the popular "Matt*Edit" (issue 21) text editor program, which will work with the XMM801 printer to print out text files written with ATASCII graphics characters.

The utility disk is available from us for use with the XMM801 printer, and does not require a translator disk to work properly. The price for this disk is \$5.00 to cover disk cost, postage and handling, and packaging costs. You may order either by sending a check or money order to us, or by calling our BBS at 217-423-0049, 24 hours a day.

Atari 835/1030/XM301 modem owners who are looking for a fix to problems with BASIC XE from OSS: we are the only publishers of a handler for these modems that works with BASIC XE, and 99.5 percent of all DOSs available for the Atari XE. Calling OSS will only get you referred to us. Ask about the availability of our modem handler for these modems.

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The End User

**THIS MONTH:
Emulator hubbub,
amiability vs.
power in
software.**

by Arthur Leyenberger

Lately, there's been a lot of chatter on Delphi and CompuServe, and among user groups, about emulator programs for the ST. Two in particular come to mind. One is an 8-bit emulator from a guy in Canada; the other is an MS-DOS emulator called PC-Ditto, that was recently shown at COMDEX in Atlanta. Yawn, blink, blink, yawn; I'm going upstairs now. That's how I feel.

Before you write a poison-pen letter to **ANALOG Computing** (I get enough of them already) claiming I'm Satan himself, let me tell you *why* I think emulators are a waste of time. (By the way, if you're a Type A personality—you know, close-minded and unwilling to admit there's the slightest chance that a different opinion than yours exists, let alone may be correct—you can skip the next few paragraphs. As a Type A personality myself, I should be skipping the next few paragraphs too, but somebody's got to stick around and write them.)

First, I am *not* minimizing the effort that's been extended by various programmers to create these emulators. Getting 8-bit software to run on an ST is, no doubt, a very impressive feat. So is getting MS-DOS software to run on an ST. But, aside from the technological marvel it may be, the usefulness of this type of product is scarcely greater than that of a toy. . . something to be the first on the block or to amaze your friends with. An 8-bit emulator for the ST reminds me of the Pocket

Fisherman, an all-in-one fishamajig once sold on late-night TV in New York—a novelty.

As far as the 8-bit emulator goes, I'd just as soon have a *real* 8-bit Atari and disk drive (it isn't *that* expensive these days), and avoid having to transfer files from 5¼ to 3½-inch drives, put up with slower execution speed and waste time determining which programs work and which ones don't. For me (and, I suspect, for a lot of other ST users who already have 8-bit Ataris in or out of the closet), the best 8-bit emulator is an 8-bit computer.

The need for an 8-bit emulator or even a PC emulator decreases as time goes on, for two reasons. First, as mentioned previously, the hardware is getting cheaper all the time, so it may be cheaper to just buy the other computer and avoid all the hassles of trying to run software on a machine it wasn't intended for. Second, eventually, as computer products like the ST mature, the good software gets ported to all machines, anyway—or similarly good software becomes available. It may take a while, but good software generally follows the success of the hardware.

Therefore, products such as the CP/M, 8-bit and PC emulators (or even the Magic Sac, for that matter), are short-term items, of interest primarily to tinkerers. Serious users (on any computer) get work done by using the machine as a tool to accomplish something—the computer is a means to an end, rather than an end in itself. So these users initially buy a computer that will run the kind of software

Arthur Leyenberger is a human factors psychologist and free-lance writer living in New Jersey. He has been an Atari enthusiast for over five years. When not computing, he enjoys playing with robotic toys.

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End User *continued*

they need to get their work done. They buy a machine; they buy (we hope) some software; and away they go.

Don't get me wrong. I'm a tinkerer from way back. Really. Ask anyone. Yes, the Magic Sac is a neat thing. I'm amazed that 8-bit and PC emulators work at all. (Gosh, how do they do that?) Even the CP/M emulator is neat. . .well, kinda neat. But they don't all seem, to me, to be serious products that will have wide appeal.

Friendly software: what is it?

A while back, I discussed software documentation and mentioned some things to look for in determining the quality of same. Whether you're a writer of documentation or a user, the point is to have clear, concise instructions for use of a program. In other words, a program is only as good as its documentation. This month, I'm going to tell you a program is only as good as the program. Let me explain.

We all know the feeling: you see a fantastic program at the computer store (or your friend's house), one which you know does exactly what you want. In fact, you may have been searching high and low for this special program you had thought didn't exist. So you buy it and take it home. The moment you look at the documentation, a small fear stirs in your soul, as you see how complex the program really is. Once booted, seconds turn to minutes, which become hours. It's not that you can't figure out how this thing works, it's that the program seems to fight you at every turn. For example, after a long string of input you find you've made a mistake and want to correct it. Unfortunately, the program has no edit function, so you have to spend another ten minutes re-entering the data, hoping you don't make another silly mistake.

Finally, the data is entered and, being a streetwise Atari user, you want to save the data before you go on. Nice move. You instruct the program to save the file, whereupon it asks for a filename. You type in a name that makes sense to you and realize, just microseconds after pressing RETURN, the filename you entered was the name of your income tax data for this year. Sorry, that important tax file, the one that took you months to create, just got overwritten. (You *did* have it backed up, didn't you?) Why? Because your neat new program didn't bother to check if a file by that name already existed, didn't give you the option of replacing it or aborting the save file operation.

As you begin to use this new program,

you notice a few other—uh—quirks. Trying to save a file with the disk out of the drive locks up the computer. The menu-based program which you thought at first was simple to use has now become a chore. To merely load a file and begin your work session requires three menu selections. Other operations need even more keystrokes.

What you have here is *not* a user-friendly program, but a user-hostile program. It's almost as if the programmer hated users and was trying to get back at them, by making the program difficult and frustrating to use. Even though the above example does not describe any one real product, this kind of experience is not unique. Although it's little consolation, there are programs for all computers—from the Atari 8-bit to the IBM PC—that are poorly designed.

What constitutes a well-designed program? We all know one when we see one. The commands are easily learned and come readily to mind. Changes are easy to make. Program operation is intuitive; that is, it makes sense. There are many excellent programs for both the 8-bit and ST computers. One Atari 8-bit program that always comes to mind when I'm talking about well-designed software is Pinball Construction Set by Electronic Arts.

PCS is visual, for one thing. What you see is what you get. The program operation is straightforward—you pick up the pinball game pieces from an on-screen parts box, then carry them over to and place them on the playfield. Want to make a change? Just pick up the part and pull it off the screen.

A good program not only wins user respect and makes you want to use it, but also generates feelings of satisfaction and confidence in your ability to use it effectively. A quality program is easy to learn, easy to use, easy to remember, reliable and helpful when difficulties arise (and they will). For example, instead of just displaying the message "file not found," a helpful program should also list the files that were found on the particular disk. Knowledge is power, and the more knowledge a user has while using a particular program, the more power he or she has to use that program effectively.

User-oriented software communicates with the human via an easy-to-follow, consistently presented user interface. Users perform better and are more satisfied when *they*, not the computer, are in con-

(continued on page 96)



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End User *continued*

trol. Factors that influence the perception of control by the user are: minimal response time to commands, immediate feedback of program operations, forgiveness for errors and the ability to easily correct them, and the ability to escape or break out of danger.

There are two guidelines that should be followed to ensure that software allows the user to concentrate on the task, rather than on the mechanics of operation. First, software should be designed to allow the user to control program flow and to easily enter information. All actions should be initiated and controlled by the user (i.e., the user should not be surprised at either the need for a particular command or the outcome of that command).

There are basically two methods that can be used for controlling program operation and flow: menus and commands. Menus are especially effective for novices and casual users. They're more helpful, because they make program operation self-documenting, by displaying all the possible alternatives on-screen at once. Commands, the second method, can take the form of full words, function keys or combinations of keys. Command-based programs are preferred by experienced users, as they can perform a program function by simply entering the appropri-

ate command, rather than via a series of time-consuming menu selections.

Since novices prefer menus (because they typically provide more guidance) and experienced users prefer commands (because menus slow them down), how should you design a program that will be favored by novices and experts? The answer is to provide both methods of program control. As novices begin to learn the program, through menu use, they will probably begin to employ the commands. An excellent example of software providing both menus and commands is SynCalc, a spreadsheet for the 8-bit Atari.


SynCalc has an excellent user interface. It goes one step beyond providing both types of control. As the menus are presented and the user selects choices, the command is gradually built and displayed at the top of the screen. By observing the growing command line while making menu choices, the user can learn command equivalents of the menus quickly—and progress from novice to expert.

The second guideline for designing good program interfaces is to present error messages in an informative but non-threatening manner. Messages should be brief, avoid the negative and provide constructive information that can be used to solve whatever problem has arisen.

Further, if possible, allow users to correct their mistakes with a minimum of keystrokes. For example, if an error has occurred from a string of input data, let the user edit or modify the incorrect part, rather than forcing him or her to retype the entire string.

The amount of information needed to correct an error also differs with the experience of the user. Experienced users often need only an indication that an error has occurred; they will know how to correct it. Beginners need a little more hand-holding.

These two guidelines are useful, both for programmers designing new software and for users who want to evaluate software. Of course, they're only guidelines, but when you use them as such to evaluate any of the thousands of programs for the Atari 8-bits, it becomes easy to separate the excellent programs from the mediocre.

Finally, I am *not* suggesting that a trade-off be made between ease of use and power. A simplistic and easy-to-use program serves no one's needs. Likewise, a powerful but difficult-to-use program is almost useless. A powerful and easy-to-use program, however, will not only meet the needs of its users, but also make money for the programmer/designer. 

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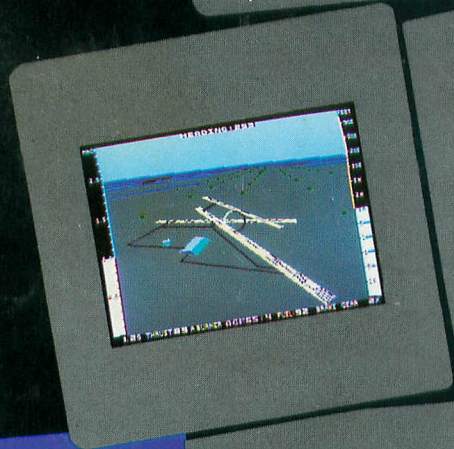
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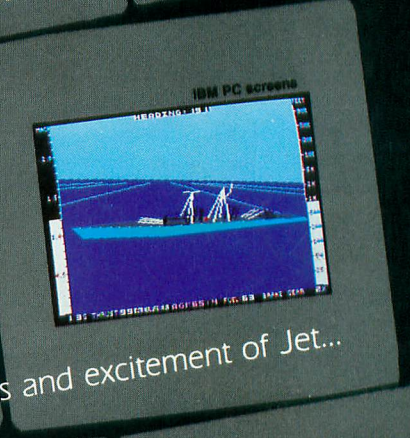
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