

**PUBLICATIONS AVAILABLE:** We can supply reprints of the following publications that have to do with the Arcade unit exclusively.

**SERVICE MANUAL, PA-1,** at \$5 ppd. This is actually a short work on how to mechanically disassemble the unit to gain access to the printed circuit board. It's prime value lies in the parts list, parts layout, and schematic diagram.

**PEEK N POKE MANUAL,** at \$5 ppd. This document covers the use of the %() command and its use in reviewing/changing memory slots. Based largely on the work of Brett Bilbrey, the designer of Treasure Cove.

**ON-BOARD ROM SUBROUTINES** at \$3.50 ppd. A compilation of discoveries by Tom Wood into some secrets of the subroutines that exist in the machine. These routines are called by executing a RST 38H instruction along with some variables.

**HANDBOOK OF HARDWARE and SOFTWARE** at \$35. ppd. This document of over 300 pages was published by the Dave Nutting Co., a Bally subsidiary that invented the Arcade unit. The following was written by Andy Guevara, who most recently has converted the Ms.CANDYMAN into a cartridge for L & M:

#### ASTROCADE SECRETS REVEALED!

By  
Andy Guevara

Well maybe not ALL of them, but enough to get you on your way...

The largest single source for machine language techniques for the Astrocade is the system description known affectionately as the Nutting Manual. This one document has been the source of almost all the machine language routines used in the latest generation of games (and, from the beginning, in all cartridge games).

Granted, you do need to know something about Z-80 machine language before tackling this manual. But if that's not a problem, then this is what you need to get that space war game of yours off the ground.

Curious? Let's take a look at L&M's Ms. Candyman... What's the first thing you notice? The music of course! There's a complete music processor in the ROM chips on board the Astrocade just waiting to be tapped. And it's done in a much easier way from machine code than from BASIC. There is also information on making rectangles of any size, much like the Box command. And for drawing patterns on the screen from memory.

Probably what you're most interested in are the routines used to move objects around the screen. Well, there are two ways to do this. The first is to make your own character set with characters of your own choosing. Like a gremlin instead of an "A". Then it's a matter of "printing" them wherever you choose. The second method is to use the vectoring capability of the Astrocade. By setting up a block of memory for specific information,

you can let the system take care of moving your character around the screen, keeping track of the movement limits you've defined, and whether or not he's supposed to bounce off walls, etc. That's the one we used. By using the system functions as often as possible, we only needed to develop our own framework to direct the activities of the game. Would you believe that we don't control the motions of the Jokers in Ms. CM? The Astrocade does it for us! All we do is set the speed and stand back...

Did you know that the SNAP function is built into the system? From machine code it's easy to get to and use. Of course the SHOW function is there too. There's also the capability to scroll any part of the screen, and define the size of the scroll window.

For keeping track of data, there are routines for handling tables of bytes, words, or nibbles easily. I use these a lot.

Here's a very little known fact... On board the system, there is a set of floating point math routines. And they're not even described in the Nutting manual! I always thought this strange, since the calculator programs haven't been giving back integer answers. A little sleuthing into the source code of the unit showed these routines. And if you're real nice, I might explain how to use them. Suffice to say that about half of the 200+ page manual is the source code of all that is in the ROM set of the Astrocade. This has been most helpful when the descriptions of routines were less than adequate (which is about half the time).

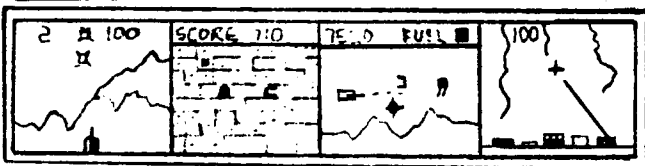
Once you get the hang of it though, you'll find the manual indispensable. I have!

ARCADIAN NEWSLETTER - We started this publication in late 1978, when the original Bally Basic language cartridge appeared. The first two years really are those of discovery, as we found out more and more about the workings of the machine, and then the subscribers wrote programs utilizing that knowledge through years two and three. The new Astrocade Basic cartridge then showed up (the one with the cassette jack and red LED) and we had to go back to Square Three. Actually, there are not many differences between the cartridges, and most programs work on either. Volume 5 has the most educational material as we pushed tutorials. These were written on three levels - beginner, intermediate, and advanced, and then we also ran some super-advanced material on machine language programming. These Volumes are available as follows:  
 Volumes 1 and 2 at \$10 each. Volumes 3 and 4 at \$12.50 each, and Volume 5 at \$15., all postpaid.

ALTERNATIVE ENGINEERING is looking for your response to having a full-size keyboard for the Arcade unit. This would be a professional design, with extra numerical keypad to the side and a dedicated microprocessor to convert the keystrokes into something the Arcade unit understands. Along with it would be a new Basic cartridge that would have an extra jack in it for the attachment interface (using a telephone-type kinky cord). This keyboard would also be one of the building blocks towards the ultimate Zgras unit. The target price of \$150-165 is well below that of a Apple replacement advertised at \$250. Contact them at this new address - Outlet Road, Hallowell, ME, or call them at 207-623-8506 before 10am.

# ASTROGAMES SOFTWARE 1984 PRICE LIST

## TAPE A1

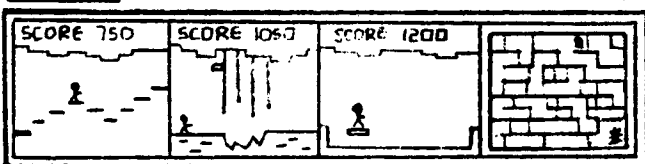


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 DEFENSE PRO  
 METRO ATTACK

also included:  
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\$ 9 US PPD.

## TAPE A2

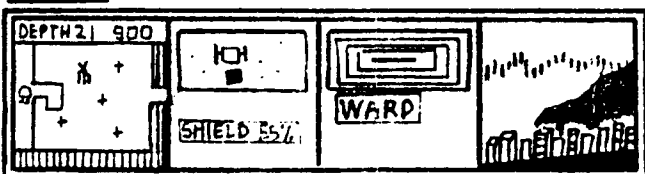


MULTI-ADVENTURE  
 OVER 4 DIFF.  
 SCREENS  
 NIGHT BOMBERS →



\$ 9 US PPD.

## TAPE A3



TUNNELLER  
 STAR WAHS  
 WAR DEMO  
 (graphics)

\*\*NEW FOR 1984\*\*  
 Tunneller has 6  
 machine animated  
 characters!!

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Send check or money order, for price of tape(s) only. (WE PAY POSTAGE!!!) to:  
 ASTROGAMES 3020 COOK ST. VICTORIA, B.C. CANADA V8T-3S9

## OTHELLO

```

10 gosub 900
20 B=3-B;if B<=A gosub 200
25 if B>A gosub 400
30 if Q_H=H+1;if H=2 gosub 800;goto 10
40 if Q=0H=0
50 gosub 500;goto 20
200 X=5;Y=5;W=245;V=205;gosub W
205 C=JX(B);D=JY(B);Q=&(23)
210 if Qreturn
215 if TR(B)_MU=69;goto 250
220 if C+D=0S=0;goto V
225 if Sgoto V
230 S=1;I=X+8xC;J=Y+10xD
235 if (ABS(I)>29)+(ABS(J)>35)goto V
240 gosub W;X=I;Y=J;gosub W;goto V
245 MU=X+Y+50;box X,Y,2,2,3;return
250 N=0;gosub Z;if T#0MU=70;goto V
255 L=0;C=X;D=Y;K=0
260 for I=-1to 1
265 for J=-1to 1
270 if I=0if J=0goto 290
272 TC=Ix41+Jx12+62
275 X=X+8xI;Y=Y+10xJ
280 gosub Z;if T=3-B_L=L+1;goto 270
282 @(K)=0
285 if T=B_N=N+L;@(K)=L
288 K=K+1
290 X=C;Y=D;L=0;next J;next I
295 if N=0MU=70;goto V
300 gosub W
305 return
350 if (ABS(X)>29)+(ABS(Y)>35)T=-1;return
355 T=PX(X-3,Y-3)+PX(X-2,Y-1);return
400 V=305;W=V;P=0;E=0
402 NT=0;VA=-1;VC=15
405 for X=@(18)to @(19)step 8
410 for Y=@(17)to @(16)step 10
411 MO=X+35;TA=Y+42
415 gosub 250;if N<Pgoto 435
420 if N=Pif F>0if rnd(3)>1goto 435
425 P=N;E=X;F=Y
430 for K=0to 7;@(K+8)=@(K);next K
435 next Y;next X;if E=0Q=1
440 for K=0to 7;@(K)=@(K+8);next K
445 TB=0;VC=0;NT=1;X=E;Y=F;return
500 gosub 600;K=0
505 if X=@(18)_@(18)=X-8
510 if X=@(19)_@(19)=X+8
515 if Y=@(16)_@(16)=Y+10
520 if Y=@(17)_@(17)=Y-10
525 for I=-1to 1;for J=-1to 1
530 if I=0if J=0goto 560
535 E=@(K);K=K+1;if E=0goto 560
540 C=X;D=Y;for E=Eto 1step -1
550 X=X+Ix8;Y=Y+Jx10;gosub 600
555 next E;X=C;Y=D
560 next J;next I;return
600 CX=X;CY=Y

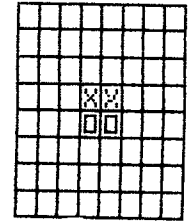
```

LOWERCASE WORDS ARE 1-BYTE KEYPAD WORDS. UNDERScores ARE SPACES.

```

605 O=70+9xB
610 TV=0;MU=0;return
800 @(1)=0;@(2)=0
805 for X=-27to 29step 8
810 for Y=-35to 35step 10
815 gosub Z;@(T)=@(T)+1
820 next Y;next X
830 CX=-77;CY=40
840 print "SCORES:"
845 for A=1to 2
850 print " __#",#2,A,"=",@(A);next A
860 K=KP;return
900 clear ;NT=2;input "#PLAYERS?"A
905 if A>2goto 900
910 clear ;BC=58;FC=189;for C=0to 8
915 box 0,-40+10xC,63,1,1
920 box 32-8xC,0,1,81,1;next C
925 for X=-3to 5step 8
930 for Y=-5to 5step 10
935 B=(Y+15)+10;gosub 600
940 next Y;next X;B=2;Q=0;M=1
945 Z=350;@(16)=15;@(17)=-15;@(18)=-11;
    @(19)=13;return

```



REVERSI or OTHELLO requires you to place a man (using JX or JY) adjacent to the opponent (or computer) only if the opponent becomes trapped between an existing man of yours and the new one. Lot of strategy involved - books have been written about it. The program was submitted in old Bally Basic and translated via the old Ibach formula. The sound ports mean nothing to the new Basic, so make the following changes for AstroBasic use: Line 272, replace &(19) with TC Line 402, replace &(22) with VA ; replace &(21) with VC Line 411, replace &(16) with MO ; replace &(17) with TA Line 445, replace &(18) with TB ; replace &(21) with VC (above changes courtesy of George Moses.)

Bob Wiseman  
1899 Muskegon Dr.  
Cincinnati, OH 45230

ABC HOBBYCRAFT'S

## ASTROCADE/UNDERGROUND

(812) 477-9661

We would like to thank all of those who took advantage of sale on Galactic Invasion last month. However, it seems that we still have a number of these fine cartridges left over. Therefore, for a limited time we are offering this cartridge for the unheard of Price of \$1.95, this cartridge was originally \$29.95, a savings of \$28.00. We would also at this time like to offer the original Bally Dealer DEMO cartridge also for \$1.95. This cartridge demonstrates the capabilities of the machine, along with the four built in games. This demo also sold for \$29.95. Now is your chance to obtain this scarce collectors item. These Prices are only available to those who Place an order for another item at the same time.

We have even more specials for you to choose from. This month we have savings from L&M Software. Choose from the following bargains:

Tape #1 Claim Jumper / River City Gambler	\$5.00
Tape #2 Cosmic Saucer Battle / The Black Lagoon	\$5.00
Tape #14 Alien Invasion	\$7.50

All of these Programs are Quality games for use in Astro BASIC only.

We have even more bargains this month. Two of the most Popular Games for the Astrocade: Space Fortress (#2012) and Football (#3002) which originally sold for \$29.95 each. We are now prepared to offer them for the low Price of \$12.95 each.

We also still have some Astrocade units left. We are offering them \$99.95 with the following cartridges: Astro BASIC, Galactic Invasion, Football, Pinball, and DogPatch. That is \$179.75 worth of cartridges when you buy an Astrocade from us for the low Price of \$99.95.

We would be Pleased to fill your Astrocade needs. Just write us or give us a call (no calls on Wednesday Please), and let us know how we may help you. We attempt to keep all of the newest games for the Astrocade in stock. We currently have in stock Sneaky Snake, Muncher, Sea Devil, Ms. Candyman, Solar Conqueror, and Cosmic Raiders in Stock as well as all of the other Astrocade Games.

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6004 Astrocade BASIC with built-in interface Regular price:	59.95
Special sale price:	29.95

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Ms. Candy Man (L&M)	29.95
Sneaky Snake (New Image)	32.95
SEA DEVIL	29.95

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(All items ASTRO BASIC only unless otherwise noted...)

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12 ft. hand controller extension cord (each)	7.95



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# ARCADIAN

VGN4

## CUBIC RUB

```

10 clear ;FC=7;BC=161;B=280;gosub 90
20 R=(KN(1)+128)*51;A=R*12+60;C=R*9
30 J=(R+54)*256-52;K=RM-52
40 box J,K,7,8,3;box J,K,7,8,3
50 if JX(1)=1gosub 180;goto 20
60 if JX(1)=-1gosub 230;goto 20
70 if TR(1)gosub 90;goto 20
80 goto 20
90 for R=0to 5;C=R*9
100 for Q=C+1to C+8;*(Q)=*(C);next Q
110 gosub 120;next R;return
120 J=(R+54)*256-52;K=RM-52;gosub B;TV=(C)
130 J=J-7;K=K+8;gosub B;TV=(C+1)
140 J=J+7;gosub B;TV=(C+2);J=J+7;gosub B;TV=(C+3)
150 K=K-8;gosub B;TV=(C+4);K=K-8;gosub B;TV=(C+5)
160 J=J-7;gosub B;TV=(C+6);J=J-7;gosub B;TV=(C+7)
170 K=K+8;gosub B;TV=(C+8);return
180 H=(C+8);I=(C+7);for Z=C+8to C+3step -1
190 *(Z)=*(Z-2);next Z;*(C+2)=H;*(C+1)=I
200 for S=1to 3;H=*(*(A+1));for Z=A+1to A+1step -1
210 *(*(Z))=*(*(Z-1));next Z;*(*(A))=H;next S
220 for R=0to 5;C=R*9;gosub 120;next R;return
230 H=(C+1);I=(C+2);for Z=C+1to C+6
240 *(Z)=*(Z+2);next Z;*(C+7)=H;*(C+8)=I
250 for S=1to 3;H=*(*(A));for Z=Ato A+10
260 *(*(Z))=*(*(Z+1));next Z
270 *(*(A+1))=H;next S;gosub 220;return
280 CX=J;CY=K;return
290 for X=0to 45step 9;print X;input "="*(X);next X
300 for X=54to 131;print X;input "="*(X);next X
    
```

LOWERCASE WORDS ARE 1-BYTE KEYPAD WORDS.  
 UNDERSCORES ARE SPACES.

## CUBIC RUB

```

GGG
GGG
GGG
WWW RRR YYY 000
WWW RRR YYY 000
WWW RRR YYY 000
BBB
BBB
BBB
    
```

Dorothy Neff  
 4204 SE 29 Ave  
 Portland OR 97202

**CUBIC RUB Instructions:**  
 To Play, select cube face by rotating knob - center of cube flashes.  
 Use joystick right to rotate selected face clockwise  
 Use joystick left to rotate selected face counter-clockwise  
 Use trigger to reset all faces solid

To load: Enter program, then (first time only) press WORDS GOTO 290 GO  
 The computer will display the array addresses < \*( ) > and you enter the following list of numbers. Now you can save the program by recording it. Play the game with the usual WORDS GO input.

* INPUT	* INPUT	* INPUT	* INPUT
0 71	69 12	90 48	111 10
9 87	70 11	91 47	112 17
18 82	71 10	92 46	113 16
27 89	72 1	93 14	114 52
36 79	73 8	94 13	115 51
45 66	74 7	95 12	116 50
54 7504	75 19	96 5	117 32
55 50	76 26	97 4	118 31
56 7474	77 25	98 3	119 30
57 14898	78 46	99 37	120 25
58 22322	79 53	100 44	121 24
59 7444	80 52	101 43	122 23
60 39	81 41	102 50	123 34
61 38	82 40	103 49	124 33
62 37	83 39	104 48	125 32
63 30	84 7	105 23	126 43
64 29	85 6	106 22	127 42
65 28	86 5	107 21	128 41
66 21	87 28	108 3	129 16
67 20	88 35	109 2	130 15
68 19	89 34	110 1	131 14

# THE GAME PLAYER

... get's high  
on mushrooms in

## SNEAKY SNAKE New Image

This month we take a look at yet another new cartridge, and a fine one, too. For all of you fans of the coin-operated Arcade game CENTIPEDE, this cartridge game by New Image is just the one for you!

SNEAKY SNAKE is a very colorful, enjoyable family game for one to four players. Each player starts with five "shooters", utilized one at a time. The t.v. screen will present the player(s) with a field of multi-colored mushrooms. At the top of the screen will appear the "snake", who will begin his decent downward, meandering over, under, and around the mushrooms as he moves closer to you! At the bottom of the playfield is your shooter which you can maneuver left or right, and slightly up or down. Using the trigger, the player must shoot the snake before he makes contact with your shooter. A player may fire one shot at a time, or rapid-fire (machine gun-like) by holding the trigger in.

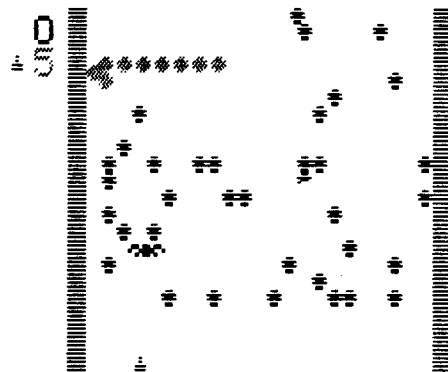
Each hit on any segment of the snake awards you 50 points, and turns that segment of the snake into a mushroom. Any mushroom or part of one that you shoot, is good for one point. A single hit on the snake will not kill it, however. The player must hit each circular segment that comprises the snake in order to kill it. Be fore-warned that a hit on any part of the snake may cut it into two separate snakes!

Upon elimination of the snake, a new screen will appear. Each screen is different, both in intensity of play and color. The different background color for each screen adds visual variety to the game. The higher your score gets, the harder each new screen will be. The snake will move faster each time, and the mushrooms will almost fill the whole screen.

Things can get rather hectic if you do not get the snake before he reaches the bottom of the playfield. Once down, he will move left and right until you get him, or he get's you. If you take too long, new snake segments will enter from the left and right, moving over, under, and around your shooter!

There is no escape now for the player. In your panic, be careful not to bump into a mushroom; you will be destroyed if you do.

If this is not enough to keep you occupied, there is another creature you must contend with: the spider! That's right, folks, it's the old pesky spider trick. Periodically, a spider will appear and try his best to pounce on you. He is good for 100, 200, or 300 points a shot depending on how close you are to him when you shoot him. As a player's points get higher, each spider will move faster and come at you continuously.



SNEAKY SNAKE is an excellent cartridge game. Not only is the player presented with good graphics and full color, his ears are treated to a fanciful and light-hearted tune throughout the game. And just as the action speeds up, so does the music, further adding to the enjoyment of playing.

Our players here really like SNEAKY SNAKE, and additionally were pleased that bonus shooters are awarded (at each 10,000 points). The game-play itself, along with the sounds and music, make this cartridge a real winner!

[screen from Dave Corson]

## S C C R E B O A R D

High scores for the period Jan. 7 to Feb. 8

### Cartridges:

Bally Pin I	320,430	Don Gladden
Bally Pin II	336,700	Stan Kendall
Wizard (Skill 1)	453,200	Stan Kendall
Ms. Candyman (Skill 1)	164,439*	Fred Olivas
Pir. Chase (Skill 1)	1,942,443	Mike Prosize
Pir. Chase (Skill 9)	705,284	Peggy Gladden
Space Invaders	7,045	Stan Kendall
Muncher	69,000	Melinda mullen
Solar Conqueror	18,871	Lloyd Friedman
Sea Devil	177,850	Eric Allen
Treas. Cove (Tour. level)	27,314*	Fred Olivas
Sneaky Snake	40,600*	Joe Kulak

### Cassettes:

Dungeons of Dracula	3,440	Al Showalter
Exitor	31,575	Fred Olivas
Yahtzee (2 player)	348	Peg Williams

\* Indicates a new high score

Are there any SWL's / DXer's out there?  
— I'd like to hear from you. Maybe we can put together some SW programs for the Astrocade. (I use an R-2000).

SEND YOUR HIGH SCORES on any game, along with info on the skill level, to: Michael Prosize, c/o The Game Player, 48-G Ridge Road, Greenbelt, Maryland 20770. Photographs of your scores are not necessary. We trust you.

© M. L. Prosize 1984

**DOT-TO-DOT**

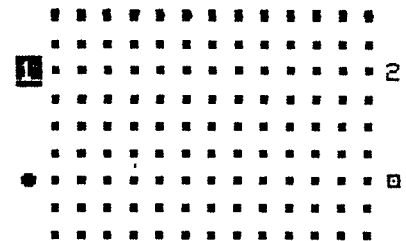
LOWERCASE WORDS ARE 1-BYTE KEYPAD WORDS. UNDERSCORES ARE SPACES.

```

1 clear ;BC=7;FC=172;gosub 20;S=0;R=0;goto 50
2 box X,Y,3,3,3;return
3 gosub 2;gosub 2;return
4 if P=1S=S+1;CY=0;CX=-75;print #0,S
5 if P=2R=R+1;CY=0;CX=65;print #0,R
6 return
7 X=X+JX(P)*10;Y=Y+JY(P)*10;if X>60X=60
8 if X<-60X=-60
9 if Y>40Y=40
10 if Y<-40Y=-40
11 return
12 box -70,20,9,11,3;return
13 box 70,20,9,11,3;return
14 if P=1box A,B,3,5,1;box A,B,5,3,1
15 if P=2box A,B,5,5,3;box A,B,3,3,3;box A,B,1,1,3
16 return
17 gosub 14;C=1;gosub 4;return
20 CX=-30;print "DOT-TO-DOT";print ;print "_____BY_JOE_PEOPLES";print ;print ;CX=-30;print
"J(XY)=MOVE";CX=-33;print "TR=REGISTER
30 for Z=1to 75;box 0,25,110,10,3;for N=1to 50;next N;next Z;clear ;return
50 for X=-60to 60step 10;for Y=-40to 40step 10;gosub 2;next Y;next X;CY=20;CX=-70;print "1",
;CX=70;print "2"
60 X=0;Y=0;P=1;C=0;gosub 12;A=-70;B=-20;gosub 14;P=2;A=70;gosub 14;P=1
70 gosub 7;gosub 3;if TR(P)line X,Y,4;A=X;B=Y;MU=10;MU=30;MU=50;MU=70;goto 90
80 goto 70
90 gosub 7;gosub 3;if TR(P)MU=25;MU=62;if (ABS(X-A)+ABS(Y-B))=10line X,Y,1;MU=55;MU=55;MU=55
;MU=55;goto 110
100 goto 90
110 if PX(X+5,Y)if PX(X,Y+5)if PX(X+5,Y+10)if PX(X+10,Y+5)if PX(X+5,Y+5)=0;A=X+5;B=Y+5;gosub
17
120 if PX(X+5,Y)if PX(X,Y-5)if PX(X+10,Y-5)if PX(X+5,Y-10)if PX(X+5,Y-5)=0A=X+5;B=Y-5;gosub
17
130 if PX(X,Y+5)if PX(X-5,Y)if PX(X-10,Y+5)if PX(X-5,Y+10)if PX(X-5,Y+5)=0A=X-5;B=Y+5;gosub
17
140 if PX(X,Y-5)if PX(X-5,Y)if PX(X-5,Y-10)if PX(X-10,Y-5)if PX(X-5,Y-5)=0A=X-5;B=Y-5;gosub
17
150 if R+S=96goto 190
160 if C_C=0;goto 70
170 P=P+1;if P>2P=1
180 gosub 12;gosub 13;goto 70
190 box 0,0,80,20,2;CY=0;CX=-23;print "GAME_OVER
200 box 0,0,80,20,3;for Z=1to 50;next Z;if TR(1)clear ;R=0;S=0;goto 50
210 goto 200

```

Joe Peoples  
310 Sail Fish Lane  
New Philadelphia, OH 44663

**DOT-TO-DOT**

PRIZE WINNER !!!

The SOURCEBOOK is a compilation of SOURCES of software and hardware products for the ARCADE unit as built by Bally and Astrocade. Every program printed in the ARCADIAN, and those available on tape or cartridge are given a short review, and the source identified. Similarly, hardware available for the unit is reviewed and its source located. The current issue, Winter/Spring 1984, is now available for \$7.50, from RMH Enterprises, 635 Los Alamos Ave., Livermore, CA 94550 (Californians add tax)



## EXTENDED MEMORY PRODUCTS REVIEW

by Dave Carson

This month the focus is on utilities and hardware.

The LISTING FORMATTER by George Moses, the BLUE RAM UTILITY by John Perkins, the BLUE RAM INSTRUCTION program by Ken Lill, and an introduction to the 64k RAM BOARD from R&L Enterprises.

We have all looked to the ARCADIAN for years to provide us with the current news, new product info, tutorials, new ideas, and probably most of all, game listings. In typing in the listings we have been confronted with the special codes for multiply, divide, and the arrow symbols. We have been at a loss to be able to determine the number of spaces the programmer intended to use at various places. We are also aware that if the key-stroke words are mistakenly typed in that we could experience a shortage of memory in a program and that Asto and Bally BASIC would not understand. Those of us with printers realize all of these problems when we do a listing for our own uses as well. These problems need no longer exist thanks to George Moses! His LISTING FORMATTER program is now in the hands of Bob F. and will soon be put into use. This program is also available to anyone having at least 16k of RAM, and BLUE RAM BASIC, or VIPERSOFT. Of course a serial or parallel interface and a printer is needed as well.

The program is menu driven and provides all instructions as well as all access to your printer. Since there are a variety of printers in use, George will be happy to work with the customer individually to custom tailor the software to the particular application. We worked together on my copy for myself and the ARCADIAN. The end result is a clean listing from ANY of the BASICS with all the correct symbols. Each programmed "space" is represented by an underline and the "key words" (GOTO IF TO etc.) are printed in lower case to show a one byte entry.

To use the program, you simply load it and follow the prompts. If you enter the program size it will display the intended SZ in the header at the beginning of the listing. It is capable of listing all the arrays that go with the program as well. When answers have been given to the prompts, you will be instructed to have the printer ready, start the tape with the object program and press a key. The screen will clear and the word "printing" appears. The printer then begins to do your listing.

This is one of the most "every-day" useful programs that I have seen. It works perfectly, it is extremely well done, it contains all needed options, and at a price of \$15.00 it is quite a value. I recommend it highly. Thanks George, this is something we've needed for long time and will benefit everyone through the ARCADIAN!

Contact the GEORGE MOSES CO. for more information and for ordering.

Instead of repeating Don Gladden's review from Vol. 5, No. 9 on the BLUE RAM UTILITY, I will just make a few additional comments. The program loads to the first 8k of memory, then if you want, it loads the 2nd 8k with instructions readable page at a time. The instructions list and comment on the available commands. If a printer is on line at the time, a permanent record of the instructions will be put on paper for future reference. This can also be done with the DASM command to print out your disassembly for ease of study.

This may well be the most useful and exciting piece of software yet written for our system. I am just beginning to get involved with Z-80 code and every time I sit down to the BALLY, I put the program to use at least a couple of times. Even with all the use, there is no fear of wearing out the tape. There is a built in command for making back-up copies (I recommend making a copy for use and putting the original away as a master).

The utility is available from Perkins Engineering and is a MUST BUY item for anyone with a 16k or larger unit. The price of \$5.00 is certainly no reflection of the value. The price only covers the cost of the tape and the shipping.

The utility is not the only program that you receive for the \$5.00! On the back is a BLUE RAM INSTRUCTION program done by Ken Lill that covers operation and use of the complete system. This is quite an elaborate program consisting of four segments. It will not only show you how to operate your B-R, but is loaded with graphics to give you an idea of just what is possible. Also included are examples of different commands available in B-R E.B. This is aimed primarily at new Blue Ram owners and is a great assist in learning what it is all about. It is something that all of us can appreciate and enjoy reading and watching. If you already have a copy of the utility that does not include this program on the back, send a tape and return postage to Ken and he will see that you get it. Ken spent a lot of time and effort in making this program available and it is most definitely a plus for the system. By the way, Perkins Engineering is back in operation, as noted last month. Joe Poelking is no stranger to the Blue Ram. When I ordered my first 4k unit, he was the one that built it. I'm sure they will be more than happy to answer your questions and process your orders. I haven't had the opportunity to meet Joe yet, but I plan to stop in for a visit soon.

In Vol.6, No.1 I mentioned getting a call from R&L Enterprises. I wrote also that when the board arrived you would be hearing about it. Well, it is here and I'm going to introduce it this month. First I want to make a statement about policy. I have already stated my policies concerning handling of software items here but now I'm moving into an area of direct competition for your dollars and your support. I will not use this column to make any direct comparisons or in any way keep a "scoreboard" of sorts, between the memory expansion units available. I will point out the uses that the customer can expect to realize if he (she) is considering a purchase. A memory expansion on the BALLY-ASTROCADE unit is an expensive move and I strongly advise researching all possibilities to find what is right for you. I own a BLUE RAM and I'm very pleased with it. Now that I am gaining hands on experience with the R&L 64k RAM BOARD I will be able to speak first hand about it. I haven't seen the VIPER or the new Z-GRASS unit but the bottom line is that each of these systems will do the same basic thing, add memory to our unit and open up new worlds of capabilities for us to explore. Each system has it's own unique features and at this time, I am not aware of any dire negative aspects of any system.

Now to the business at hand. I've gotten calls and letters asking "what is this R&L board that you mentioned?". There was a review in Vol.5, No.4 and a couple of ads, the most recent being last month, and nothing else said. That is what this column is for, to make public, external memory products. The board provides the user with RAM memory beyond the 1800 bytes of the ARCADE. The board can be ordered several different ways (see ad page 24). The amount of RAM is up to the buyer. You could have as little as 2k or as much as 64k depending on the pocketbook and the uses that you would expect. There are three items required for use of the board. (1) You will need to build (or have built) a power supply for the board itself. Mike White is helping me with the evaluations because he is much more the expert. Mike built us a very nice power unit in a case, with rubber feet, and a rocker switch for \$20.00. The schematic and parts list comes with the board. Mike tells me that by using parts you might have lying around the house, and really cutting costs, the supply can be built for as little as 5 or 6 dollars. (2) You will need a 300 baud BALLY BASIC tape interface to handle tape I/O. (3) If you will require addressing memory above 8000H, or want the convenience of

Extended BASIC, you will need one of the Extended BASIC languages. R&L is recommending use of BLUE RAM EXTENDED BASIC at this time. They are working on one of their own but haven't projected a date.

Four k of RAM comes with the assembled board. Additional chips may be purchased from R&L. The book that comes with the unit lists the compatible RAMs so that you can "shop" for the best prices. Chips simply plug into the sockets at any address you want them, from 0000H (replaces the operating system of the ARCADE) to FFFFH. Mike and I have been experimenting with RAM in the 2000H area (cartridge ROM) for screen dump purposes, and it's working! Having access to these lower areas from 0000 to 3FFF (everything below the screen RAM) opens lots of new doors.

I can't say enough about the quality of the board. It has to be seen to be fully appreciated. The documentation is extensive and even I can understand most of it. Stay tuned, there is lots more to be said. More each month 'till it is covered or possibly a complete column as we learn more about the R&L ENTERPRISES 64k RAM BOARD.

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No screen picture this month. A utility program wouldn't make a very exciting illustration. My screen dump routine has progressed almost to perfection since last column. I can now dump cartridge screens and the on-board games as well as any of the BASICS. I have also changed my vertical line "grey" to a dotted grey. This allows more detail. I would like to offer this service for advertising purposes or whatever. Actual screen pictures would make nice ad displays. Contact me with your wants.

A s.a.s.e will insure an answer to your letters. I Hope you enjoyed GOLDDIGGER, drop me a line and let me know.

You MUNCHER fans out there with external memory and the B-R utility or the MLM can see something that is literally a mind blower! Get the game into the ex. memory area and change address 8039H (if loaded to 8000, 6039 if loaded to 6000) from 23H to 3FH. You will probably want to tape it as a conversation piece!

Send all items for review to:  
DAVE CARSON P.O. Box 39 KIPTON, OHIO 44049  
(216)774-4645  
FOR U.P.S.: 309 State Street

FOR SALE "Bally Midway" expandable home computer & video arcade with BASIC and two controllers. Complete for &75. Full line of cartridges - \$6 and \$7 each (914)769-6662

HAND CONTROLLERS CHEAP at BellVision 52 Main St., Port Washington NY 11050. Along with some other cheap hardware/software. Tell them we sent you - (516) 944-9154

MAZEMAN is a new cartridge about to be distributed by Dave Carson - we'll have some more words about it in the next issue - it's good to have another game coming along.

PROGRAM LISTING ENHANCEMENTS found in this issue courtesy of George Moses and Dave Carson, as indicated in Dave's article on the previous page. Blue Ram owners - get this easy-to-use program for only \$15! G.Moses, P.O.Box 686, Brighton MI 48116

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