ARCADIAN

February 18, 1983 Volume 5 Number 4

ODDS 'N' ENDS 56

Q & A 57

SOFTWARE REVIEW ~ GEN'L. VIDEO ASSEMBLER 57

SOUND SYSTEM CONVERSION 58

TUTORIAL ~ INTERMEDIATE 3 60

GAME PLAYER 62

MUSIC KEYBOARD - M. PEACE AB 63

TUTORIAL ~ BEGINNER 3 68

HARDWARE REVIEW ~ R & L EXPANSION 69

GOBBLERS - K. DOERGE AB/BB 70

ANALOG CLOCK - G. MOSES AB/BB 71

TUTORIAL - ADVANCED 3 72

ARCADIAN Published monthly by Robert Fabris, 3626 Morrie Drive, San Jose, CA 95127-9990. Second Class permit pending at Sunnyvale CA. One year subscription rate (Nov. - Oct.): USA -$15.00; Canada - US $15.00 or CAN $20.00 (payable to Robert Fabris); Foreign - US $20.00. Cash, check or money order. Single copies not for sale.

Subscriber address changes - please indicate old address. Please place your name and address on all bits of paper sent to us. POSTMASTER please mail FORM 3579 to ARCADIAN, 3626 Morrie Dr., San Jose, CA 95127-9990. Volume 5 No. 4 . Bally is a trademark of Bally Mfg. Co. Astrocade, Arcade, Videocade are trademarks of Astrocade, Inc.

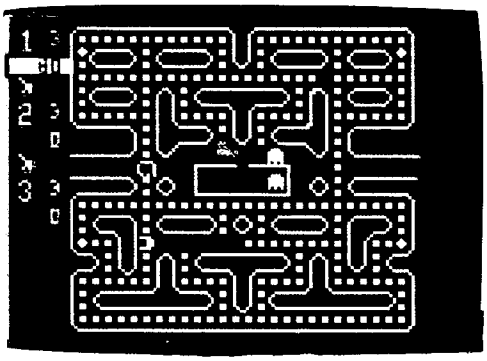
ARCADIAN

Volume 5 Number 4

February 18, 1983

Bally PROFESSIONAL arcade™

The fun lives on!



ILLUSTRATED HERE is a portion of an advertisement that appeared in a trade paper over a year ago. It shows the screen for the "Munchkin" Videocade that was never officially produced due to problems with Atari. Most unfortunate, as you can see that it is a much better representation than Atari's.

TAPING ROUTINE ADDITION to the program at the top of page 49 was received from Dave Carson, P.O. Box 39, Kipton, OH 44049. Dave suggests the following..."After the program is all debugged, all variables, strings, etc., are in place and ready to save, a real clean little routine for a professional look and auto-run is as follows:

CLEAR the screen and type in - - -

```
CLEAR; PRINT" ■ ■ ■ LOADING.....";: PRINT: PRINT: PRINT:  PRINT:  CX=-18;  PRINT"ATTACK";
%(20156)=27195; %(20158)=13; :PRINT%(16384),1937
```

Of course, CX=-(number of characters in title x 3). The program is reloaded by :INPUT. The POKES in the routine add ;RUN (GO) (the trick to give you auto-run) into the line input buffer. As mentioned in the article, this won't handle ports. If you set ports then use your pre-program to do them, and use :INPUT;RUN in your line 20 and use the above routine to print the pre-program. It works well and looks great!

Blue Ram owners with taped cartridge games can also set up really attractive "title pages". Load the cartridge game into the Blue Ram. Set the mode to ROM. Reset and type in the following program:

```
10 CLEAR:NT=0
20 PRINT"   LOADING.....
30 CY=0; CX=-21; PRINT"SEAWOLF
40 CY=-10; CX=-9; PRINT"AND
50 CY=-20; CX=-18; PRINT"MISSILE
60 :INPUT %(24576)
70 STOP
```

(3 spaces)

```
100   CLEAR;PRINT"                LOADING.....";
%(20156)=27195; %(20158)=13; :PRINT%(16384),1937
```

Use GOTO 100 to save the title program to tape. When the cursor returns, stop the tape, set up---

```
:PRINT%(24576),2048 *
```

Restart the tape and Print the game (leave about 5 seconds between the routine and the game.) To reload, simply use :INPUT (GO) LOADING..... will appear, then the title. When the cursor reappears, stop the tape. Press and hold RESET, put the range switch at 2K, switch the MODE switch to ROM and release the RESET. You should have the menu.

FOOTNOTE * the shown 2048 value is correct if you have a 4K memory. Use 1024 if you have 2K, 4096 if you have 8K.

ARTILLERY DUEL CORRECTIONS required in the newest Basic Manual (that comes with the #6004 Basic Videocade).... As an identifier, the older version of the Manual has two printings of "Perspectives" on page 90. Now that you know which version you have, those with the newer one should make two corrections in Artillery Duel on page 95. Line 170 should read

```
170  P=(S=1)x5;C=P-5+1
```

and Line 350 should read

```
350   BOX 0,36,159,16,2; BOX (P+1),
(P+2)+1,3,1,1
```

PROGRAM MODIFICATIONS

My first error of the year showed up in Line 390 of O-Jello, page 40, where the 16÷(A should read 16x(A . You might also try a green background (BC=178)

GOBBLERS - This 2-player game requires you to eat a bunch of squares, where each square has one to four dots in it, resulting in a score of 1 to 4 for each one eaten. They are positioned in a 5 x 10 grid, and you utilize the JX and JY directiones of your controller to move your man. Of course, your opponent is doing the same. The computer is keeping score. It is listed in Bally Basic, but plays in AstroBasic as well, just a bit faster. (p.70)

USER GROUP CORNER-WANTED : Interested Arcadians in the Greater New Orleans Area to form a User Group. Eastbank contact is Matt McCarthy, 480-9663, and Westbank contact is Larry Fuglaar, 347-1241

BALCHECK CHANGES Dick Belton reports that he can make changes to his testing device to accommodate either of the on-board ROM configurations as reported by H.A.R.D. in the last issue (p.49). If you have a Balchek testing device, Dick will replace the PROM in your device for only a $2.50 shipping charge. Dick also reports that he can repair controllers at $5.00 each plus parts, and he has six foot cables at $4.50. Dick will repair the Astrocade units at the rate of $30.each plus parts and $10.50 shipping. (4906 Willshire Ave. Baltimore , MD 21206.)

ARCADIAN

February 18, 1983 Volume 5 Number 4

QUESTIONS FROM READERS

WHAT IS THE "PX" FUNCTION AND HOW DO I USE IT?

THE PX FUNCTION WAS INADVERTANTLY LEFT OUT OF THE ASTRO BASIC MANUAL, SO WE HAVE HAD A LOT OF QUESTIONS ON IT'S USE. WHAT IT DOES IS CHECK X AND Y COORDINATES (PX(X,Y)) TO SEE IF ANY INDIVIDUAL PIXEL IS "ON" (FC) OR "OFF" (BC). YOU CAN ONLY READ, NOT WRITE WITH IT. TRY THE FOLLOWING:

```
>10 BOX 0,0,1,1,1
>20 PRINT PX(0,0)
```

THE COMPUTER WILL RESPOND WITH A "1", WHICH MEANS "TRUE". NOW, ADD LINE #30:

```
>30 PRINT PX(0,10)
```

THIS TIME YOU WILL GET "1" AND "0", BECAUSE THE PIXEL AT LOCATION 0,10 WAS "OFF". TO LEARN MORE ABOUT THIS FUNCTION, SEE THE TUTORIAL BY KEN LILL IN VOL. 5 NO. 1 OF THE ARCADIAN.

HOW CAN I USE FOUR COLORS AT THE SAME TIME WITH ASTRO BASIC?

TO USE FOUR COLORS IN BASIC, YOU ARE LIMITED TO TWO COLORS FOR EACH SIDE OF THE SCREEN. FIRST, YOU MUST SPLIT THE SCREEN BY SETTING &(9) TO A SPECIFIC VALUE DEPENDING ON WHERE YOU WANT IT SPLIT. 84 SPLITS IT IN THE VERY CENTER. THEN FC AND BC CONTROL LEFT COLORS, AND &(0)-&(3) CONTROL RIGHT COLORS.

```
>10 &(9)=84
>20 &(0)=126;&(1)=126
>30 &(2)=172;&(3)=172
>40 BC=248;FC=82
>50 BOX 0,0,160,44,1
```

THIS DEMONSTRATES FOUR COLORS AT ONCE, BUT AGAIN, ONLY TWO FOR EACH SIDE OF THE SCREEN. TRY DIFFERENT VALUES FOR &(9). NOTE: IT IS NORMALLY SET TO 50. (FOR TWO COLOR USE).

WHERE CAN I GET A COPY OF THE "PEEK N' POKE" MANUAL?

UNFORTUNATELY, THE "PEEK N' POKE" HAS BEEN OUT OF PRINT FOR SOME TIME NOW, BUT WE DO HAVE GOOD NEWS FOR THOSE WHO WANT IT. BRETT BILBREY, WHO WROTE MOST OF IT, IS CURRENTLY REWRITING THE MANUAL SINCE THERE HAS BEEN SO MUCH INTEREST. WE'LL LET YOU KNOW WHEN IT IS AVAILABLE.

WHAT INFORMATION CAN I GET ON PROGRAMMING THE ARCADE IN MACHINE LANGUAGE?

SOME OF THE THINGS AVAILABLE NOW ARE: GENERAL VIDEO ASSEMBLER--DAVE IBACH (NOT AN INSTRUCTION COURSE, BUT PROGRAMS TO ALLOW YOU TO PROGRAM THE ARCADE DIRECTLY IN MACHINE MNEMONICS. A MUST FOR THE SERIOUS PROGRAMMER. NOTE: YOU MUST HAVE AT LEAST 4K OF EXTENDED MEMORY: (BLUE RAM, VIPER, ETC.)

THE Z-80 MINICOURSE (OLD BASIC ONLY). BY BARRY ELLERSON. INCLUDES INSTRUCTIONAL TEXT AND A TAPE OF PROGRAMS.

THE MACHINE LANGUAGE MANAGER (CARTRIDGE) ALLOWS YOU TO PROGRAM MACHINE CODE (IN HEX) WITHOUT EXTENDED MEMORY. COMPLETE WITH INSTRUCTION MANUAL AND LISTING. BY "THE BIT FIDDLERS".

SOFTWARE REVIEW by Al Rathmell: The General Video Assembler (by Dave Ibach) provides Astrocade users with the ability to write Z80 mnemonic source programs and then edit and assemble them. The Editor/Assembler requires that the user have Astrovision Basic (#6004), a cassette tape machine, and a minimum of 4K add-on memory with its base address switchable between 6K (24576) and 2K (8192). (Note, both Blue Ram and the Viper support this.) The Assembler package (at $35) includes a cassette tape, a keypad overlay for use with the Editor, and a manual that explains the use of the system.

The manual is well-written and concise. The description of the software takes only 7 pages. Appendix A through D (one page each), provide operating instructions for each software module (Editor; Assembly Pass 1; Assembly Pass 2; and Collector). Appendix E gives a description of error codes that may be generated during assembly, and Appendix F is a walk-through of the Editor and Assembler using a sample source program provided.

After reading the short manual, and following the walk-through in Appendix F, I had no trouble editing and assembling the sample program provided. The editor includes single stroke entry of most often used opcodes (like the word-key entries in Basic) which are shown on a good quality keypad overlay.

After a source program is created and/or edited with the Editor module, it is written to a work tape. Pass 1 of the assembler is then loaded from the system tape. When Pass 1 asks for input, the tapes are switched and the source tape is processed by Pass 1. The tapes are again switched and Pass 2 is loaded from the system tape. With a single statement program, Pass 2 of the assembly occurs after loading, since the output from Pass 1 is contained in memory. The tapes are again switched and the machine language program resulting from the assembly is written to the work tape.

Because of the Arcade's limited memory, single segment source programs can only be about 1800 bytes long (about 100 lines of code). Longer source programs can be assembled with the "General Video Assembler" by segmenting them. A Collector module is povided to load the assembled segments together at the end. This is a rather tedious task, however, because each Pass 1 and Pass 2 must output to the work tape. This requires a lot of tape switching and book-keeping. The single segment assembly described above was fairly simple.

Although the "General Video Assembler" has some limitations, we finally have an assembler!!

ATTENTION SOFTWARE MANUFACTURERS:

If you would like to have one of your games reviewed in the "The Game Player", mail it post-paid to Michael Prosise, 48-G Ridge Road, Greenbelt, Maryland 20770. All tape cassettes submitted for review become the property of the reviewer, at no charge. Tapes must be in new Astro Basic.

ARCADIAN

February 18, 1983 Volume 5 Number 4

SOUND PORT – SOUND VARIABLE CONVERSION

by George Moses 1/6/83

```
1  NT=0;CLEAR ;PRINT "■PROGRAM TO
CONVERT";PRINT "■BALLY BASIC SOUND";PRINT
"■PORT &(16) TO &(23)";PRINT "■VALUES TO THE
2  PRINT "■MUSIC PROCESSOR VARIABLES";PRINT
;PRINT "■TO CONVERT THE OPPOSITE WAY INPUT A
ZERO HERE
3  SM=1;CY=-31;BOX 0,cy,160,9,2;PRINT "■CONVERT
WHICH PORT #?", ;BOX 0,CY,160,9,3;INPUT ""A;CY=40;BOX
20,CY,120,8,2;IF A=0GOTO 1000
4  IF (A◄16)+(A►23)NT=5;PRINT "■FROM &(16) TO
&(23)!";PRINT "■■■■■■■■■■■■■■■■■■■■■■";
NT=0;GOTO 3
5  C=255;BC=248;FC=247;CX=6;GOTO A×10
65  %(B)=0;A=A+8;B=B+2;RETURN
160  INPUT "■&(16)="B
161  GOTO C
162  MO=B;PRINT #1,"■MO=",B;GOTO 3
170  INPUT "■&(17)="B
171  GOTO C
172  TA=B;PRINT #1,"■TA=",B;GOTO 3
180  INPUT "■&(18)="B
181  GOTO C
182  TB=B;PRINT #1,"■TB=",B;GOTO 3
190  INPUT "■&(19)="B
191  GOTO C
192  TC=B;PRINT #1,"■TC=",B;GOTO 3
200  INPUT "■&(20)="B
201  GOTO C
202  VF=B÷64
203  VR=RM
204  PRINT #1,"■VR=",VR,"■■VF=",VF
205  GOTO 3
210  INPUT "■&(21)="B
211  C=63;GOTO 255
212  NM=B÷16
213  VC=RM
214  PRINT #1,"■VC=",VC,"■■NM=",NM
215  GOTO 3
220  INPUT "■&(22)="B
221  GOTO C
222  VB=B÷16;VA=RM
223  PRINT #1,"■VA=",VA,"■■VB=",VB
224  GOTO 3
230  INPUT "■&(23)=",B
231  GOTO C
232  NV=B
233  PRINT #1,"■NV=",NV
234  GOTO 3
255  IF B►C■NT=5;PRINT #1,"■TOO BIG! 0 TO",C,"■
PLEASE!";PRINT "■■■■■■■■■■■■■■■■■■■■■
■■■■■";NT=0;CX=0;GOTO A×10
256  GOTO A×10+2
1000  SM=1;CLEAR ;CY=8;PRINT "■INPUT ALL SOUND
VARIABLE■■SETTINGS AS PROMPTED. IF
■VARIABLE IS NOT SET INPUT A ZERO.
1010  FOR A=1TO 1000;NEXT A;CLEAR
1020  PRINT "■MO";PRINT "■TA";PRINT "■TB";PRINT
"■TC";PRINT "■VR";PRINT "■VF";PRINT "■VC";PRINT
"■NM";PRINT "■VA";PRINT "■VB";PRINT "■NV
1025  CY=8;CX=-5;PRINT "TO RETURN TO ";CX=13;
PRINT "PORT MODE";CX=-17;PRINT "INPUT NEGATIVE";
CX=31;PRINT "NUMBER
1030  B=20066;NT=0;FOR A=40 TO -40 STEP -8;
CY=A;CX=-59;INPUT "="%(B);IF %(B)◄0 RUN
1031  IF %(B)►255IF(A÷8►1)+(A=-40)GOSUB 65
1032  IF %(B)►63IF A=8GOSUB 65
1033  IF %(B)►3IF (A=0)+(A=-16)GOSUB 65
1034  IF %(B)►15IF(A=-8)+(A=-24)+(A=-32)
GOSUB 65
1040  B=B+2;NEXT A
1050  CY=40;BOX 17,0,100,88,2;A=20066;FOR B=16TO 19;
CX=0;PRINT #1,"&(",B,")=",%(A);A=A+2;NEXT B;PRINT;
CX=0;PRINT #1,"&(",B,")=",
1060  PRINT #1,%(A+2)×64+%(A);A=20078;PRINT ;
CX=0;PRINT #1,"&(21)=",%(A+2)×16+%(A)
1070  A=20082;PRINT ;CX=0;PRINT #1,"&(22)=",%(A+2)
×16+%(A);A=20086;CX=0;PRINT #1,"&(23)=",%(A)
1080  FOR A=40TO -40STEP -8;BOX -18,A,28,1,1;
NEXT A;FOR A=8TO-24STEP -16;BOX -8,A,8,1,2;NEXT
A;FOR A=5TO -27STEP -16;BOX -13,A,1,8,1;NEXT A
1090  CY=8;CX=13;PRINT "TO ESCAPE";PRINT;CX=19;
PRINT "PRESS GO";SM=0;IF KP=13;RUN
1100  GOTO 1090
```

A TUTORIAL: How to address the Arcade sound ports, either directly or thru the Astro sound variables.

by George Moses
P.O. Box 686, Brighton, MI 48116

Did you ever slip your AstroBASIC cartridge into its slot, spend an hour typing in a program from the Arcadian and get it running, only to discover that it didn't have any sound effects? Then you looked up at the top of the program listing and discovered that it was written in Old BASIC and was full of sound port settings that didn't seem to work in the new BASIC format. Well, this article is meant to dispel that helpless feeling when dealing with the Arcade's sound ports &(16) thru &(23).

The Astrocade has a programmable sound synthesizer with three voices, each with a port controlling its independent tone, and each with a separate volume control. There is also a master oscillator port that equally affects the tone of all three voices. And, a vibrato port that can give music the lush sound of an organ as well as chilling or motorizing sound effects. Two more ports deal with good ol' noise, as in bang! Whap! Thud!

For your information the Astrocade sound ports and their corresponding variables are arranged as follows:

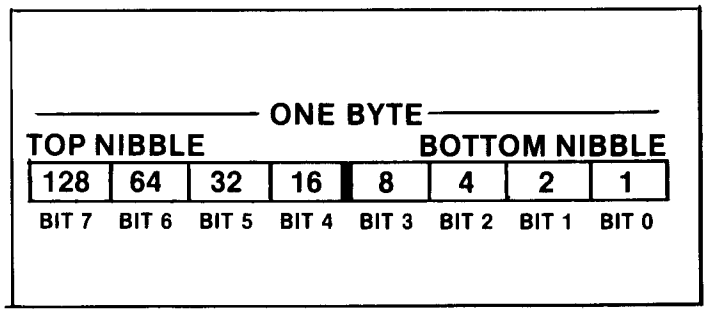
Variable	*Range*	*Port No.*	*Range*	*Controls*
MO	0-255	&(16)	0-255	Frequency of master oscillator.
TA	0-255	&(17)	0-255	Frequency of voice A.
TB	0-255	&(18)	0-255	Frequency of voice B.
TC	0-255	&(19)	0-255	Frequency of voice C.
VR	0-63	&(20)	0-63	Range of vibrato variation.
VF	0-3	&(20)	(0-3) × 64	Frequency (speed) of vibrato changes. VF deals with bits 6 & 7 of port 20. A two-bit setting has only 4 possibilities: 0, 1, 2, 3. Zero is fastest and 3 is slowest. Formula is *&(20) = VF × 64 + VR* to deal with shared port.
VC	0-15	&(21)	0-15	Volume of voice C controlled by first 4 bits of setting, (0-15).
NM	0-3	&(21)	0-63	Noise mode reads bits 4 & 5 of port 21 setting. Bits 6 & 7 are not used. If bits 4 & 5 are off, EG: &(21) is less than 16, noise mode is zero and vibrato is useable. With noise mode turned on, EG: &(21) greater than 15 and less than 64, vibrato port 20 is disabled.
VA	0-15	&(22)	0-15	Volume of Voice A controlled by first 4 bits of port 22 setting.
VB	0-15	&(22)	(0-15) × 16	Using VB volume B increments by one from 1-15. If using &(22) increment in steps of 16. Port 22 setting is *Volume B × 16 + Volume A.*
NV	0-255	&(23)	0-255	All 8 bits (0-255) control noise volume added to master oscillator. The upper 4 bits (128-255) also add noise volume to the output of voices A, B and C.

ARCADIAN

Volume 5 Number 4

February 18, 1983

CAUTION: This program uses almost all the memory and is full of user-assisting menus. All text words such as INPUT, TO, RETURN, etc. should be typed in using the one-byte AstroBASIC command words (underlined for your convenience) to conserve memory. Also, black boxes have been provided for ease in counting spaces that must be entered for proper screen formatting of text.



A SHORT LESSON IN BYTES, BITS, NIBBLES AND BINARY COUNTING.

To achieve any number from 0-255 in binary use 8 bits as shown, to represent 1 byte. Going from right to left in rising value, turn on or off the bits you need and add them up to get any number from 0-255. EG: Turn on bits 0-3, add them up and you get 15. Notice that each bit in the top nibble (bits 4-7) is 16 times the value of the corresponding bit in the bottom nibble (bits 0-3). The shared ports 20 and 21 and 22 use the upper and lower nibbles to perform different functions. That's why, when using direct port &( ) settings you have to know which bits are set with these shared ports.

So, now we have a choice. We can use the new AstroBASIC sound variables, or we can still use direct port settings. But we have to instruct the computer which method of sound control we are using, and that is done with the note timer variable NT. If NT = 0 the new sound variables are enabled and the direct port controls are shut off. If NT = −1 the direct port controls &(16) thru &(23) are turned on and the new sound variables are disabled. EG: The following two commands:

NT = 0;VA = 6;VB = 6
NT = −1;&(22) = 102

do exactly the same thing. They both set voices A & B to a volume level of six. ***(Volume B × 16 + Volume A = 102).***

Silencing the music processor when using the new variables requires only using the down arrow as a direct command. NT must equal zero or the down arrow will have no effect. The advantages of using the sound variables instead of direct port commands are in the time and effort saved in dealing with shared ports. Why do all that multiplying by 16 to reach the upper 4 bits of a shared port when Jay Fenton has done the work for you with his installation of variables like VA and VB for port 22; VC and NM for port 21 and VR and VF for port 20. And, you must admit. "↓" is a lot more efficient in silencing the sound than the routine: *"FOR A = 23 TO 17 STEP-1;&(A) = 0;NEXT A."*

If you have labored hard to get your sounds just the way you want them in one mode (PORTS OR VARIABLES) and you don't know how to translate them exactly into the other mode, the accompanying program is the answer to your prayers. Just type in the port setting and the computer will print out the corresponding variable settings. Or, if you wish to work in the reverse direction, George Moses has saved the day again! Following the directions on the screen for switching modes, input all eleven of your sound variable settings (zero if they're not set) and you'll get a printout of all the translated port settings. The ports will also be automatically loaded with your inputs so you can hear the sounds you have created.

THE MEMORY MAP OF ASTRO BASIC VARIABLES

Compiled by George Moses

In AstroBASIC the variables begin at memory location 20002 according to the data base locations mapped out on page 103 of the BASIC manual. I did a little research last week and found where each variable is located, and here we'll share all the information. "Who cares?", I can hear someone out there asking. Well, if you wish to load successive variables with a for-next loop as I did in lines 1030 through 1070 in the music variable program on the opposite page, it's really nifty to know where those variables are! Bet you'll find many more uses for this information once you get into some creative programming! Let me know what you come up with.

SINGLE LETTER VARIABLES

20002 ..... ***A***
20004 ..... ***B***
20006 ..... ***C***
20008 ..... ***D***
20010 ..... ***E***
20012 ..... ***F***
20014 ..... ***G***
20016 ..... ***H***
20018 ..... ***I***
20020 ..... ***J***
20022 ..... ***K***
20024 ..... ***L***
20026 ..... ***M***
20028 ..... ***N***
20030 ..... ***O***
20032 ..... ***P***
20034 ..... ***Q***
20036 ..... ***R***
20038 ..... ***S***
20040 ..... ***T***
20042 ..... ***U***
20044 ..... ***V***
20046 ..... ***W***
20048 ..... ***X***
20050 ..... ***Y***
20052 ..... ***Z***

COLOR VARIABLES

20054 ..... ***BC***
20056 ..... ***FC***

NOTE TIMER

20058 ..... ***NT***

SCREEN FORMATTING VARIABLES

20060 ..... ***CX***
20062 ..... ***CY***
20064 ..... ***XY***

MUSIC PROCESSOR VARIABLES

20066 ..... ***MO***
20068 ..... ***TA***
20070 ..... ***TB***
20072 ..... ***TC***
20074 ..... ***VR***
20076 ..... ***VF***
20078 ..... ***VC***
20080 ..... ***NM***
20082 ..... ***VA***
20084 ..... ***VB***
20086 ..... ***NV***

REMAINDER OF LAST DIVISION

20088 ..... ***RM***
SCROLL MODE VARIABLE ***20090*** ..... ***SM***

PLAIN BASIC TALK by Ken Lill

AN EDITORIAL SERIES FOR NON-HACKERS THAT WANT TO KNOW HOW & WHY

Article #3: STRINGS And Things!!

A STRING (otherwise known as an ARRAY) is a group of numbers that are in a sort of "memory" space. The nice thing about a STRING number is that it takes up only 2 BYTES of memory to put a 5 digit number EVEN WITH A NEGATIVE SIGN (for a total of 6 possible BYTES). There are a couple of draw-backs to using STRINGs, though. One is you can't exceed the numbers -32768** or 32767. The other is it takes up more BYTES to "retrieve" the number from a STRING than it does to retrieve it from a Variable. Another drawback is the starting position of the @() STRING. It starts at the last BYTE of the program you have entered to that point. Lengthening your program in any way will result in the program material to be written into the @(0) STRING position, and all others consecutively, until your program stops!

One thing that makes working with STRINGS nice is that it is extremly easy to use them inside of a LOOP because the ARCADE's STRING system deals with numbers.

To enter a number into a STRING position, as in @(1), you would just type in: @(1)=-23456. REMEMBER you MUST enclose the number of the STRING position within a set of parentheses,()! If you don't, it simply will not work!! The ASTRO, or new, BASIC also uses a second STRING setup, the *() STRING.

The @() STRING works the same way in either BALLY or ASTRO BASIC. Those of you that haven't as of yet been able to get an ASTRO-BASIC catrige should skip the section about the *() STRING because the BALLY does NOT have this feature!!

Storing LETTERS in the STRING(S) can be done easily if you remember that ONLY the ASCII number will be stored. For the LETTER "A" the ASCII number is 65. For the LETTER "B" it is 66, etc., until you get to the LETTER "Z", which is 90!! All of the other funtions of the "KEYPAD" are also available this way! The only way you can get the "letter" to appear on the screen is to use the TV= funtion like this:

```
100 TV=@(A)
```

If you were to try to put up the number in the STRING and get a letter to appear, it would NOT work unless you use TV=, it would just print out the NUMBER! More will be discussed about this in Article #4 (See the end of this Article)!!

Now let's try this sample program:

```
)10 CLEAR;FOR A=0TO 9
)20 @(A)=A
)30 NEXT A
)40 FOR A=0TO 9
)50 PRINT #0,A," @(",A,")=",@(A)
)60 NEXT A
```

Your Screen should end up looking like this:

```
0 @(0)=0
1 @(1)=1
2 @(2)=2
3 @(3)=3
4 @(4)=4
5 @(5)=5
6 @(6)=6
7 @(7)=7
8 @(8)=8
9 @(9)=9
```

What has happened is that while the ARCADE was going through the LOOP, it was making the @(A) address equal to the number that A was equal to! Then it went to the NEXT A and kept doing the same until it finished the LOOP! Now let's try changing line 20:

```
)20 @(A)=A+5
```

Hit GO RUN GO and your screen will look like this:

```
0 @(0)=5
1 @(1)=6
2 @(2)=7
3 @(3)=8
4 @(4)=9
5 @(5)=10
6 @(6)=11
7 @(7)=12
8 @(8)=13
9 @(9)=14
```

Notice how in each case that 5 was added to A and that total was put into the STRING address that A was at! With this in mind, can you see how easy it is to add or minipulate numbers in a STRING?

One little line to use to find out exactly how many STRING locations you have available, as they are NOT included in the subtraction from SZ, is to type in the following line WITHOUT TYPING IN A LINE NUMBER (This line is a direct command to the ARCADE,and NOT part of the program. It will NOT use up any memory!):

```
PRINT SZ÷2-1+RM
```

This line will give you the remaining available number of STRING addresses!! The explanation for this is : You cannot have ZERO (0) BYTES left in your memory so if you divide SZ by 2 and take away 1, you will end up with the number of addresses left if there is an even numbered SZ. If the RM=1, then the amount of STRING addresses will be, in effect SZ÷2 because you MUST HAVE ONE BYTE MINIMUM remaining or else the ARCADE will print SORRY, meaning that you don't have enough memory to make the program work!!!

Now let's say that you want to put a number of BOXES on the screen and they are all at different locations, with different sizes, and they are different "types" (1,2,or3)! Try this program:

```
'10 CLEAR :FOR A=0TO 5
)20 PRINT #0,"@(",A,;INPUT ")="@(A)
)30 NEXT A;CLEAR
)40 FOR A=0TO 4STEP 2
)50 BOX @(A)÷100,RM,@(A+1)÷1000,RM÷10,RM
)60 NEXT A
```

When the screen has @(0)= on it, type in the number 0, then hit GO. Then it will say @(1)=, then type in 10101. @(2) will be 2020. @(3) will be 5053. @(4) will be -1010. @(5) will be 20203. Now hit GO. You'll notice that this put up 3 boxes in different locations and sizes! It also made the first box a "1" and the other 2 REVERSING (3)!! BYTE wise, storing all of those numbers into the STRING locations took up only 12 BYTES!! If you were to put them in seperate box commands, they would take up 25 BYTES!!! Now imagine doing 35 different BOXES, the SAVINGS would be anywhere from 35 to a possible 280 BYTES!! Just remember that you CANNOT use any number LESS THAN -32768 or GREATER THAN 32767!

Now let's see just what happened. @(0)=0. Look at the BOX command and see that it is asking for the "X" position (Left/Right) to be @(0)÷100. This is 0÷100=0. Next it asks for the "Y" postiton to be RM, which is the ReMainder of the LAST DIVISION problem done by the ARCADE! 0÷100=0 with a RM of 0!! So the "Y" position (UP/DOWN) is 0! The next part is asking for the "width" of the BOX. A+1=1. @(1)=10101. The command is: @(A+1)÷1000, so, 10101÷1000=10 with a RM of 101. The width will be 10 pixels. The height is next. RM÷10=10 with a RM of 1!! The height is 10 pixels. Last, but not least, is the "type" of BOX (1=FC 2=BC 3=Reversing, or the OPPOSITE of what is on the screen at that time, in that place!). Our command calls for the RM, which is 1. We now have a FC BOX 10 pixels wide and 10 pixels high located in the center of the screen!

@(4) gives us NEGATIVE "X" and "Y" locations. RM of a NEGATIVE number is always NEGATIVE unless you were to say ABS(RM). Then ALL "Y" locations would end up POSITIVE!!

One thing you must remember, this method is generally not the best way if you are only making a few BOXES in your program. The reason being that it takes more BYTES to write in the BOX command. If in doubt, count the number of BYTES it takes to make the BOX command, and how many you saved by putting the numbers into a STRING. If the number of BYTES used to make the command is MORE than the amount you saved by using the STRING, you are LOSING BYTES.

If you just want to store the STRING numbers on tape, and NOT any other part of the program, just TYPE in WITHOUT A LINE NUMBER!!!

```
:PRINT;FOR A=0TO 55;PRINT #0,"@(",A,")=",@(A);NEXT A;
PRINT ":RETURN ";:RETURN
```

Make sure your recorder is running and in the RECORD mode BEFORE you press GO!

This line is ONLY for BALLY BASIC (The cartridge that needs the Interface plugged into Hand Control #3 AND the Light Pen Sockets). Those of you with ASTRO BASIC type in this:

```
:PRINT @(0),56
```

To INPUT this from your tape, do this:

```
:INPUT @(0)
```

This will automatically input all 56 numbers and then look OR wait for further instructions!!

The BALLY BASIC command is:

```
:INPUT
```

** You CANNOT directly assign the number -32768 to ANY part of your program!! The BASIC will ONLY let you do mathmatical calculations to use THAT number. You CAN retreive it from it's location, IF you have ASTRO-BASIC, BUT you can't say "@(A)=-32768"!! You CAN use -32767 like any other number in EITHER BASIC!!

ASTRO BASIC *() STRING

THE MAIN DIFFERENCE between the @() STRING and the *() STRING is the location of their starting points!!!

This can be very useful if you are making up a new program and you are constantly making the program longer! The *() STRING starts at the very last BYTE of your program space and works TOWARD your program!! It also takes up 2 BYTES to use each address, AND IT'S TOTAL IS ADDED TO THE TOTAL OF THE @() STRING, MULTPLIED BY 2, AND THEN COMPARED WITH THE "SZ" TOTAL. If you have a greater SZ number, divide the DIFFERENCE by 2 to find out how many addresses of STRINGs you can still use!! REMEMBER-YOU MUST END UP WITH A SZ OF AT LEAST 1!

ONE NOTE: When :PRINTing the *() STRING numbers you MUST work in reverse, I.E.:

```
:PRINT *(55),56
```

This line will PRINT on your tape ALL of the numbers and their locations of the *(0) to *(55) STRING!! Putting 0 in place of the 55 will ONLY :PRINT OUT *(0)!!!

I hope this article has helped you understand the STRING feature(s) of the BASIC Cartridge(s) you are using. If you have any questions about this article, or any other things that you may want to know, please write me, Don Gladden, or Robert Fabris. I will be glad to answer all questions, PROMPTLY!!!

Volume 5 Number 4 ARCADIAN February 18, 1983

THE GAME PLAYER

By Michael Prosise

. . . has some fun with

1) LOST IN SPACE
Edge Software, Tape #4

2) NAM-CAP
New Image, Tape #1500

LOST IN SPACE

Somewhere in the vast, empty portals of outer space, a lonely one-man Pod drifts aimlessly onward, searching for home. As asteroids and stars wheel past him, he reaches out for direction, a beacon, a familiar galaxy, anything that can lead him from the cold darkness of the universe . . .

LOST IN SPACE is the game this lonely space traveler is playing, a game quite unique in concept, in which the player must find his way out of a maze where he is only able to view one small section at a time as he maneuvers himself through with a joystick.

The title is not descriptive of this game in the graphic sense, but only in the concept and basic idea. This is a one-player maze game, in color, with nice sound effects and three levels of difficulty to choose from.

The game unfolds upon the T.V. screen with a famous five-note theme from a recent popular science fiction motion picture. After this music, you watch the computer construct a maze. Upon completion of the maze, the maze disappears. But for one brief second before doing so, you are shown your position in the maze and the location of the exit. After that, all you see is a blue screen and your position. Using the joystick, you move up, down, left or right as long as there is no wall blocking you. If there is, you simply go another direction. Eventually, if you are skilled enough, (this is not a game of luck) you will escape " . . . the empty portals of space."

LOST IN SPACE requires concentration and good use of one's memory. You must try to "picture", or visualize in your mind where you are in the maze. Should you forget, or feel hopelessly lost, a squeeze of the trigger will bring up the complete maze on the screen, with your present location shown. However, it is only displayed for about one second, and there is a very limited number of times you may see it.

LOST IN SPACE is a challenging game, and should be enjoyable for any age group. It was well received by all who played it. One cannot quite master this game because every maze is different. The only item in the program that bothered THE GAME PLAYER was the length of time required by the computer to draw the level three maze, which took 2 minutes and 15 seconds. With a little machine language programming, EDGE SOFTWARE could probably eliminate most of that time. With the exception of that, LOST IN SPACE is a good quality game.

NAM-CAP

Whacka-whacka-whacka??? . . . Yes! Has the little yellow gobbler finally made it to BALLY/ASTROCADE? Well-l-l-l, a hint is in this game's title, which might be spelled backwards.

Don Gladden of NEW IMAGE has come up with quite an entertaining version (in reverse) of the popular Midway coin-op PAC-MAN. In fact, there are six variations of NAM-CAP on the cassette, each unique in it's own way.

So what is a NAM-CAP you might be wondering. To use Don's words, the little guy finally ate too many dots and ghosts. Now he's spitting them out! The object of this game is to fill the maze with dots.

What NEW IMAGE has done is take the PAC-MAN game concept and reversed it. You have a maze, with tunnels on each side, that is devoid of dots. You steer the NAM-CAP guy through the maze, trying to fill it with dots, while simultaneously avoiding the pursuing block-shaped object. During the chase, your guy will, of it's own doing, deposit a stationary ghost at three different places that neither you or your pursuer may pass through. To attempt this will mean your destruction.

NAM-CAP is for one to four players, is in color, and offers the choice of one to ten turns. The graphics are good; in fact, the ghosts are just like the one's in PAC-MAN. There are several different mazes. A new one will appear each time you complete one. In the six versions, the speed of movement is faster than some of the others. In version four, you disappear after 500 points, the maze disappears at 1000 points and after 1500 points both disappear! It's fun.

Of the PAC-MAN type games that have appeared so far for the BALLY/ASTROCADE, NAM-CAP is probably the closest to the coin-op as far as feel of play and visual aspects are concerned. Although the maze layout is different, it functions just as well. Those who played it liked it quite a bit. They even thought it was better than Wavemaker's PACK RAT. The sound effects are nice also, and another good feature is that high score of the day, along with the final score for all players, is displayed at the end of each game.

NAM-CAP is fun to play, much like PAC-MAN, and should be available by the time you read this.

<WAVEMAKER8> MUSIC KEYBOARD

FOR 2 VOICE MUSIC
BY MIKE PEACE 1982

Peace's Pertinacious Piano-Playing Program!

Commentary by George Moses

Well, folks. Mike Peace has done it again. Just when we thought it was safe to go back to listening to our record players and playing our harmonicas he comes out with this new technique that'll send all of us scurrying to dust off our Bally Arcades as the fashionable musical instrument of the day. The following program will allow you to create music for whatever program you have that needs just a touch of music to spice it up. You will be using two voices and storing the information in single strings. Each function of the keyboard is represented by a button and a word above it.

TAPE This allows you to enter recorded music or record a piece on tape. To use: Move the cursor to the button and pull the trigger. If you have a song already in memory it will transfer the information to tape. If you have set the memory to NEW it will INPUT from tape.

PLAY This key does just that. Any song in memory will play to the end and you can then continue to input additional notes.

MEMO Sets the keyboard into a memory mode and stores each note played on the keyboard in the strings.

TEST Allows playing individual notes without them being entered into memory. If set and the PLAY key is pressed, it slows the music and gives a read-out of the memory location of each note as it is played.

VIBR Sets the vibrato on.

OFF Turns off the vibrato

NEW Sets all memory to zero and allows INPUT of songs from tape or allows you to start playing a new song into memory from the keyboard.

REST Moving the cursor into this area and pulling the trigger will give you one note of silence in the song.

ERASE A trigger pull on this bar will erase the last note stored from memory. You will see the number in the upper right of the screen decrease by one each time you do this.

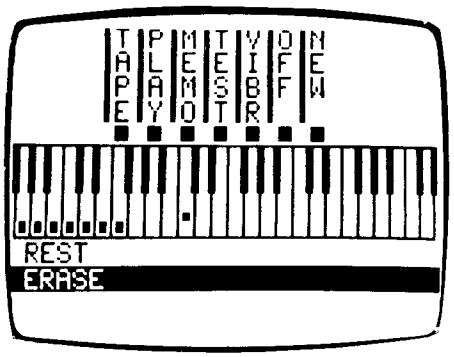
The keyboard has all notes including sharps and flats. Pressing any key is done by moving the cursor to that key and pulling the trigger. To put two notes in memory for a harmonious chord, pull the trigger and hold it until the note holds. Now move the cursor to the other key in the chord and pull the trigger. Both notes will be stored in memory and when played back, they will play at the same time.

ONE CAUTION: BASS notes are noted by the black boxes on the keys. These cannot be played or stored together with other bass notes. To play a bass note, be sure to play it first then enter the other note second. Play with this program to get the hang of it. Store some songs on a tape. Once this is done, set up a program like this:

```
10 FOR A=1TO @(0);TA=@(A)÷100;TB=RM
20 FOR VA=15TO 1STEP -1;VB=VA-1;NEXT VA;
NEXT A
```

ENTER your music into the program in this manner: KEY in ***:INPUT @(0);RUN GO*** Start tape of your music data to load and the music should begin to play in just a few brief seconds. YOU'LL LOVE IT!

To add a continuous play feature add line ***30 :INPUT @(0); RUN*** If you have a number of songs with rests between them- they will all play continuously.



ONLY
AB

NOTE:■DENOTES A SPACE IN THE PROGRAM
ALL OTHER SPACES ARE FOR CLARITY

```
1 .BY M.PEACE
5 MO=49;CLEAR ;B=0;X=-16;Y=-18;G=0;D=0;
P=0;C=0;W=305
8 BOX -1,5,159,1,1;BOX -1,-25,157,1,1
10 FOR A=-79TO 79STEP 6;BOX A,-9,1,30,1
20 BOX A,-3,3,15,B◄3;B=B+1;IF B=4B=1;C=C+1;
IF C=2B=0;C=0
25 BOX A-3,-21,3,4,A◄-36
30 NEXT A;CY=-30;PRINT "■REST";CY=-39;PRINT
"■ERASE";BOX 0,-39,160,9,3
34 CY=40;GOSUB W;PRINT "T■P■M■T■V■O■N
35 GOSUB W;PRINT "A■L■E■E■I■F■E
36 GOSUB W;PRINT "P■A■M■S■B■F■W
37 GOSUB W;PRINT "E■Y■O■T■R
38 FOR A=-40 TO 39STEP 12;BOX A,9,5,5,1
39 BOX A-5,28,2,31,3;NEXT A
40 A=JX(1)×3;X=X+A
50 Y=Y+JY(1)×9;IF PX(X,Y)IF Y◄-9X=X+A
51 IF X◄-79X=77
52 IF X►79X=-79
53 IF ABS(Y)►27Y=-36
55 N=X÷3+26;IF Y=9IF PX(X,Y)IF TR(1)GOSUB 300
56 IF (*(N)=0)+(X=-1)X=X+A;GOTO 55
60 BOX X,Y,3,3,3;IF P GOTO 200
70 IF &(16)=0GOTO 70
71 IF Y=-36IF TR(1)N=6;GOSUB 300;GOTO 70
74 IF TR(1)GOSUB 90
80 BOX X,Y,3,3,3;GOTO 40
90 IF Y=-27N=5;GOSUB 300;v;E=0;D=2;
GOSUB 100;RETURN
91 IF Y◄9TA=*(N);FOR VA=16TO 1STEP -1;
FC=N×16;NEXT VA;GOSUB 100
92 RETURN
95 CY=33;CX=50;PRINT #3,G;RETURN
100 IF R RETURN
110 D=D+1;IF D►1D=0;G=G+1;@(G)=E×100+TA×
(TA◄95);GOSUB 95;VB=0;GOTO 125
120 E=TA
121 FOR Z=1TO 99;NEXT Z;IF TR(1)=0TA=0;GOTO 110
124 VB=5;TB=E
125 IF TR(1)=0RETURN
130 GOTO 125
200 A=G;FOR G=1TO A;TA=@(G)÷100;TB=RM;
IF T GOSUB 95
210 FOR VA=15TO 1STEP-1;VB=VA-1;NEXT VA;
NEXT G;G=A
220 P=0;GOTO 80
300 P=0;VC=4;FOR TC=60TO 1STEP -1;NEXT
TC;VC=0;GOTO 300+N
305 CX=-39;RETURN
306 G=G-(G►0);VB=0;D=0;GOSUB 95;RETURN
313 IF G►0@(0)=G; :PRINT @(0),G+2
314 IF G=0 :INPUT @(0);G=@(0)
317 P=1;RETURN
321 R=0;T=0;RETURN
325 R=1;T=1;RETURN
328 VR=1;VF=2;RETURN
332 VR=0;RETURN
336 G=0;GOTO 306
```

Why do hundreds of **astrocade** users come to ABC HOBBYCRAFT for hardware & software?

LARGE SELECTION

We carry ALL Astrocade products - hardware and software - in stock, including hard-to-find items like hand control cables! In addition, ABC has most popular brands of independent software. L&M, Wavemakers, Tiny Arcade, Esoterica, Bit Fiddlers and MORE! We pioneered in mail order software for Astrocade, and we preview EVERYTHING we sell, so we can offer you the BEST items available!

SPECIAL SERVICES

Our periodic Astrocade Newsletter keeps you informed of the latest news on your system, and it's FREE to all continuing customers! Also, ABC offers a FREE Videocade advance order service. Order now, and get shipping when the new Videocades are first released. NO MONEY DOWN, and NO EXTRA FEES!

QUICK SERVICE

We accept phone orders from anywhere, when you want fast delivery. Use your VISA or Master Card, or we'll ship COD if you prefer! Most orders go out UPS within 24 hours!

GREAT BARGAINS

Our newsletter's most popular feature is GUY'S BARGAIN BASEMENT featuring terrific deals on Astrocade merchandise in EVERY issue! Not just small savings, but GREAT prices on popular items! Call us and we'll tell you what's new in the BARGAIN BASEMENT today!

EXPERIENCED STAFF

The biggest reason people call ABC is OUR people! ABC's Astrocade representatives Guy McLimore and Scott Collins are among the most experienced Astrocade users around. They know the system inside out, and keep a close eye on what's new and interesting! ABC has been selling the system since it's introduction as the Bally ARCADE, longer than just about ANYONE else! Call us for the LATEST Astrocade news and gossip, and the REAL story on what's happening!

Because ABC knows **astrocade** !

Write for our FULLY-ILLUSTRATED, 16-page catalog! (If you're in a hurry, CALL...)

ABC HOBBYCRAFT
2155 E. Morgan Av.
Evansville, IN 47711
Phone (812) 477-9661
(No collect calls, please...)

ATTENTION ALL USER GROUPS AND OTHER INTERESTED PARTIES!!!

YOU MAY HAVE READ IN THE "SOURCEBOOK" THAT THE MICHIGAN ASTRO-BUGS HAVE BEEN ACTING AS A "CLEARING HOUSE" FOR USER GROUPS. WHAT DOES THAT MEAN? WELL, WE ARE TRYING TO HELP USER GROUPS NATIONWIDE TO GET STARTED AND TO SHARE INFORMATION WITH US AND EACH OTHER. OUR GROUP HAS BEEN TOGETHER FOR OVER THREE YEARS NOW, AND HAS OVER 100 MEMBERS. (BOTH LOCAL AND OUT-OF-STATE). IF YOU ARE INTERESTED IN EITHER STARTING OR JOINING A USER GROUP, WE SUPPLY, FOR $2.00 POSTAGE AND HANDLING, A LIST FROM OUR FILES (OVER 1000 NAMES) OF USERS IN YOUR AREA, (50 MILE RADIUS), AND A BROCHURE ON TIPS FOR STARTING A USER GROUP. (HOW TO HAVE AN INTERESTING MEETING, IDEAS TO SHARE, ETC.).

IF YOU WOULD JUST LIKE TO GET YOUR NAME AND ADDRESS IN THE FILE, SEND IT TO US AND WE'LL PUT IT THERE. (PHONE # OPTIONAL).

IF YOU ALREADY HAVE AN ACTIVE USER GROUP, WE'D LIKE TO KNOW ABOUT IT SO THAT WE CAN REFER PERSONS IN YOUR AREA TO YOU. SINCE THE ADVERTISMENT IN "ELECTRONIC GAMES" MAGAZINE, WE HAVE HAD CALLS AND LETTERS FROM PERSONS ALL OVER THE U.S. AND CANADA. ALSO, WE WOULD LIKE TO EXCHANGE INFORMATION AND IDEAS, SO PLEASE GET IN TOUCH!!!

IF YOU ARE INTERESTED IN JOINING THE ASTRO-BUGS, OUR MEMBERSHIP FEE (DUES) IS $5.00 PER YEAR AND INCLUDES:

1) A PERIODICAL NEWSLETTER ABOUT ASTRO-BUG HAPPENINGS, ASTROCADE NEWS, PUZZLE CONTESTS, AND OTHER ASSORTED INFORMATION.
2) DISCOUNTS ON MEMBER-DEVELOPED SOFTWARE AND HARDWARE.
3) FREE CONSULTATION ON PROGRAMMING AND TECHNIQUES.
4) LOTS IF FUN!!!

TO JOIN, SEND $5.00 WITH YOUR NAME & ADDRESS TO:

PEGGY GLADDEN, SEC.
MICHIGAN ASTRO-BUGS
59400 NINE MILE ROAD
SOUTH LYON, MICHIGAN
48178

NOW AVAILABLE!!!

ASTRO-BUGS CLUB TAPE #1

TWELVE MEMBER DEVELOPED PROGRAMS ON ONE TAPE WITH FILE SEARCH FOR EASY LOADING. (AVAILABLE IN ASTRO-BASIC ONLY).

A TERRIFIC DEAL AT ONLY $10.00 FOR NON-MEMBERS, $4.00 FOR MEMBERS PLUS .50 POSTAGE & HANDLING.

THESE PROGRAMS HAVE NEVER BEFORE BEEN IN PRINT IN ANY PUBLICATION!!!

AUTHORS INCLUDE:

GEORGE MOSES
BOB WEBER
DON GLADDEN
STEVE WALTERS
DAVE IBACH
BRETT BILBREY

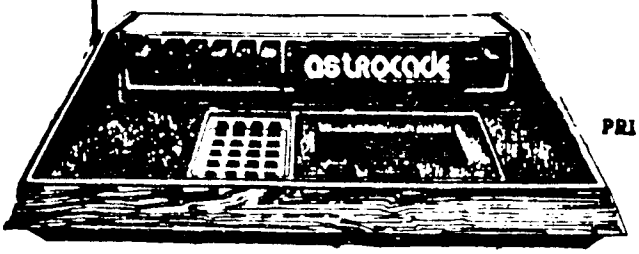
WE ARE NOT TELLING YOU WHAT PROGRAMS ARE ON THE TAPE, BUT WE DO GUARANTEE THAT YOU'LL BE SATISFIED!!!

TO ORDER, SEND TO THE ABOVE ADDRESS.

KEEP ON A-BUGGIN'!!!!

February 18, 1983 THE [illegible] SPECIALISTS Volume 5 Number 4

HOME ARCADE ELECTRONICS



Authorized Sales, Parts & Repair
3742 Maxson Road El Monte, CA 91732
(213) 443-4189

PRICE LIST

Also stocking third-party software - SPECIAL - Buy 3 program cassettes and deduct 10%!

		SUGGESTED PRICE	OUR PRICE
ACTION/SKILLS SERIES			
2001 - 280 ZZZAP/Dodgem		$24.95	$19.95
2002 - Seawolf/Missile		24.95	19.95
2003 - Panzer Attack/Red Baron		29.95	24.95
2004 - Brickyard/Clowns		29.95	24.95
2005 - Star Battle		24.95	17.95
2009 - Astro Battle		29.95	24.95
2010 - Dogpatch		29.95	24.95
2011 - Galactic Invasion		29.95	24.95
2012 - Space Fortress		29.95	24.95
2014 - Grand Prix 1,2,3/Demolition Derby		29.95	24.95
2015 - Pirate's Chase	**NEW**	29.95	24.95
2017 - The Incredible Wizard (Like Wizard of Wor)		34.95	27.95
2018 - Solar Conqueror (Like Asteroids) } MARCH		34.95	27.95
2019 - Cosmic Raiders (Like Defenders) } MARCH		34.95	27.95
2020 - Mong-like Game (Name to be announced)		34.95	*CALL
SPORTS SERIES			
3001 - Baseball/Tennis/Hockey/Handball		29.95	24.95
3002 - Football		29.95	19.95
3005 - Astrocade Pinball		29.95	24.95
3006 - Bowling		29.95	*CALL
3007 - Soccer		29.95	*CALL
EDUCATION SERIES			
4001 - Bingo Math/Speed Math		19.95	9.95
4002 - Letter Match/Spell 'N' Score/Crosswords		29.95	19.95
4003 - Music Maker		59.95	*CALL
4004 - Biorhythm		29.95	24.95
4005 - Creative Crayon		59.95	*CALL
4005P- Creative Crayon w/Light Pen		74.95	*CALL
STRATEGY SERIES			
5001 - Amazin' Maze/Tic Tac Toe		24.95	17.95
5002 - Black Jack/Poker/Acey Deucey		29.95	19.95
5004 - Conan™ The Barbarian		34.95	*CALL
5005 - Artillery Duel	**NEW**	34.95	27.95
FUNCTIONAL SERIES			
6002 - Bally Basic (Discontinued model, 300 baud)		54.95	~~17.95~~ 12.50
6004 - Astrocade Basic (Includes audio interface. 2000 baud		59.95	~~45.95~~ 39.95
COMPUTER KEYBOARD			
~~6008 - ZGRASS-100 Computer w/Keyboard~~ (specification is obsolete)			
ACCESSORIES			39.95
ACI-0100 Audio Cassette Interface (Discontinued, 300 baud)			~~59.95~~
ACI-0200 Hand Controls (Set of 2)		54.95	44.95
HEI-1001 1/8"x 1/8" mini plug patch cord, 6 foot, Shielded			2.95
HEI-1002 Astrocade TV/Game Switch box			2.95
HEI-1003 Set of 3 Heat Sinks (Bondable to Custom Chips w/epoxy)			3.95
HEI-1004 Hand Control Cable Replacement (Factory Part)			~~4.50~~ 5.50
HEI-1005 6 foot extension for Hand Control(Plugs in, Also fits Atari™)			~~12.95~~ 9.95
Twelve ~~HEI-1006 Tape Recorder Head Demagnatizer(Electronic Cassette Type)~~			~~29.95~~
~~HEI-1007 Cassette Tape Eraser (Bulk Type)~~			~~21.95~~
HEI-1008 Portable Cassette Recorder, Sanyo™ with 120VAC plug, Tape count			~~44.95~~ 39.95
HEI-1009 Blank Data Cassette Tape			10 for $9.00

REPAIRS

Astrocade or Bally Arcade (Includes Custom Heat Sinks) $29.95 plus $5.00ship.
Hand Controls (No shipping charge when sent w/unit) $ 4.50 plus $2.25 for one and $2.75 for two.
All repairs include 90 day warranty for work performed!
Prices Quoted Do Not include parts. Please ship UPS or US Postal Service. Please include with your unit a Money Order or Cashiers Check. Please Do Not include your dust cover as it may become damaged.

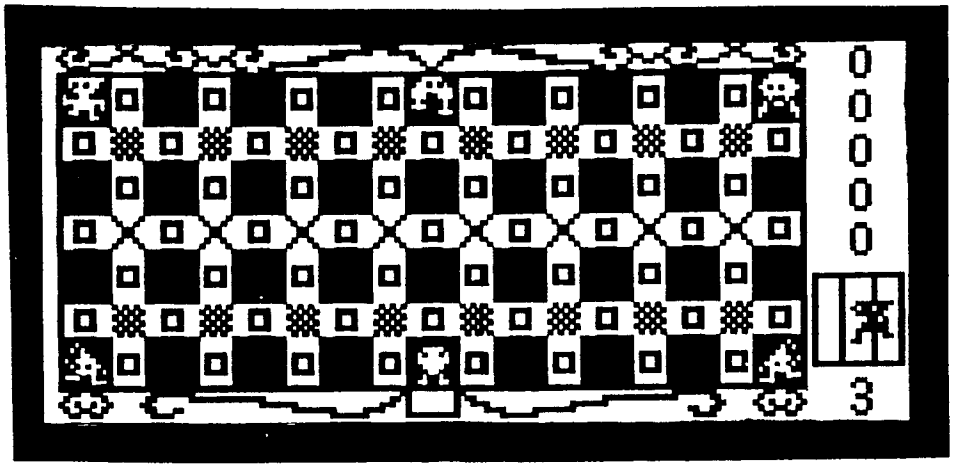
HOME ARCADE ELECTRONICS HAS ALL THE PRODUCTS AND NEW RELEASES, PARTS, AND A FULLY STOCKED REPAIR FACILITY. ALL AT ONE LOCATION! WE OFFER YOU FRIENDLY SERVICE, COMPETITIVE PRICES, AND **FREE** SHIPPING OF ALL VIDEOCADES AND SOFTWARE. MONEY ORDERS OR CASHIERS CHECKS WILL RECIEVE FASTER SERVICE! CALIFORNIA RESIDENTS PLEASE ADD 6½%SALES TAX. *For Availability

SPECIAL!! ASTROCADE UNIT WITH ASTRO BASIC CARTRIDGE
LIST $299.95 NOW ~~$199.95~~ 149.95 plus $5.00 shipping.

User Group Meeting 26 Feb

CANDY MAN

This detailed illustration is the true screen image seen when the game is played.



7 animated characters on screen simultaneously.

Candy Man is an interesting fast action arcade game.

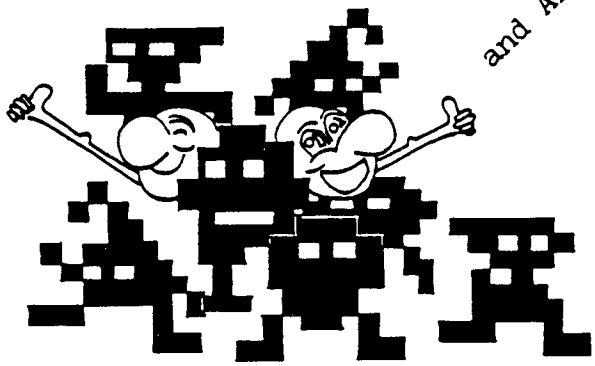
Your Candy Man is eating up life savers and is being chased by Jokers & Gremlins. If they catch you, you're dead and your Candy Man will take a nose dive only to rise from the dead again if another life remains.

What makes this game so unique is the different shape each moving graphic character has, with animated moving arms, legs, heads and eyes.

It's complete with blue screen bonus lives and score. When the screen turns blue your Candy Man can run over those pesky Jokers and mash them flat. With over 25 screens of ever increasing action and sound tempo, the longer you can play the more challenging it becomes.

This beautifully executed game was written by the authors of Exitor's Revenge, Greg Miller and Andy Guevara and is in smooth machine animation, for expert cartridge quality.

Fast Action and Animation



CANDY MAN
Tape Cassette #18 $15.95
Also Includes
RIVER CITY GAMBLER
An exciting dice game for 1 to 4 players. The computer playes too.

L&M SOFTWARE
8599 Framewood Dr.
Newburgh IN. 47630

ARCADIAN

February 18, 1983 Volume 5 Number 4

GLAD TO BE BACK!!!

MANY, MANY THANKS FOR ALL THE CARDS, LETTERS, AND CALLS FROM WELL-WISHERS WHILE I'VE BEEN RECUPERATING FROM MY RECENT SURGERY. NOW I AM ABOUT 75% BACK TO NORMAL(???) AND FINALLY CAN CONTINUE MY JOB. THANKS ALSO FOR ALL YOUR PATIENCE.

DON GLADDEN

RANDOM NUMBERS

MANY, MANY GAMES THAT MEN HAVE PLAYED THROUGH THE AGES HAVE DEPENDED ON RANDOMNESS. (CHANCE). DICE, CARDS, SPINNING WHEELS ETC. ARE ALL EXAMPLES OF "RANDOM" NUMBERS USED IN MANY DIFFERENT GAMES. SO, IN ORDER FOR OUR COMPUTER TO BE AN EFFICIENT GAME-PLAYER, IT HAS TO BE ABLE TO PICK A RANDOM NUMBER, AND IT CAN. AND IT'S VERY SIMPLE TO DO, AS WE SHALL SEE.

WE CAN TELL THE COMPUTER TO PICK A RANDOM NUMBER EITHER IN A DIRECT COMMAND, OR INSIDE OF A PROGRAM. (JUST LIKE ANYTHING ELSE--SEE LESSON #1). BUT WE HAVE TO TELL HIM WHAT RANGE OF NUMBERS TO PICK IT FROM. THE COMPUTER WILL ALWAYS SET NUMBER #1 AS THE LOW LIMIT HE WILL PICK, (EXCEPT IN ONE CASE THAT WE'LL SEE LATER), BUT YOU SET THE HIGH LIMIT. LET'S SAY YOU WANT A NUMBER BETWEEN 1 AND 10. KEY IN:

```
>PRINT RND (10)        (GO)
```

HE WILL RESPOND WITH A NUMBER BETWEEN ONE AND TEN, AS DIRECTED. SIMPLE!!! TRY DIFFERENT NUMBERS AND CHECK THE RESULTS.

WELL, WHAT IF WE WANT A HIGHER VALUE? MAYBE WE NEED A NUMBER BETWEEN TWO AND TEN INSTEAD. SINCE ONE IS ALWAYS THE LOW LIMIT ON THE RANGE HE PICKS, WE HAVE TO DO A BIT OF SIMPLE MATH OURSELF. (WE CAN'T EXPECT OUR COMPUTER TO DO EVERYTHING NOW, CAN WE?) TRY THIS:

```
>PRINT RND (9)+1
```

VOILA!!! WHAT DID WE DO? WE TOLD HIM TO PICK A NUMBER BETWEEN ONE AND NINE, THEN HAD HIM ADD ONE TO IT. THE RESULT IS NOW BETWEEN TWO AND TEN. JUST WHAT WE NEEDED. WE CAN USE ANY RANGE OF NUMBERS WITH JUST A BIT OF THINKING. HERE ARE A FEW EXAMPLES:

```
BETWEEN:
10 AND 20      RND (11)+9
-5 AND 5       RND (11)-6 (DON'T FORGET ZERO)
150 AND 200    RND (51)+149
2 AND 8 BY 2S  RND (4)*2
-10 AND -1     RND (10)-11 >OR< -RND(10)
```

THE ONE EXCEPTION THAT WE MENTIONED ABOVE, WHERE NUMBER ONE IS NOT THE LOWEST NUMBER IN HIS RANGE, IS IF WE TELL HIM TO PICK RND (0) (ZERO). (ASTRO-BASIC ONLY). WHEN WE DO THIS, HE WILL PICK A NUMBER BETWEEN HIS TOTAL RANGE. (-32767 TO 32767). (HE CANNOT "PRINT" OR WORK WITH ANY NUMBERS HIGHER OR LOWER THAN THESE.)

SO, IT IS REALLY PRETTY SIMPLE TO WORK WITH RANDOM NUMBERS, AND AN AWFUL LOT OF GAMES CAN BE WRITTEN WITH THIS KNOWLEDGE. TRY YOUR HAND AT SOME NUMBER-GUESSING GAMES SUCH AS THE ONES LISTED IN THE BASIC MANUAL.

LOOPS (FOR-TO-NEXT-STEP)

THERE HAVE BEEN MANY WOULD-BE PROGRAMMERS WHO HAVE SHIED AWAY FROM LEARNING BECAUSE THEY HAVE LOOKED AT A LISTING OF A PROGRAM AND THOUGHT TO THIERSELF, "I COULD NEVER FIGURE ALL THAT OUT EXACTLY THE SAME WAY". WELL, TAKE HEED: A LITTLE-KNOWN FACT AMONG THOSE WHO ARE STILL WET BEHIND THE EARS WHEN IT COMES TO WRITING PROGRAMS IS: BELIEVE IT OR NOT, THERE ARE USUALLY MANY, MANY WAYS THAT YOU CAN DO THE SAME THING IN A PROGRAM! READ ON:

SUPPOSE WE WANT THE COMPUTER TO COUNT TO FIVE, AND SHOW US THE COUNTING IN THE CENTER OF THE SCREEN HORIZONTITALLY. USING WHAT WE HAVE ALREADY LEARNED, HERE IS ONE WAY TO DO IT:

```
>10 CLEAR
>20 CX=0;PRINT #1,1
>30 CX=0;PRINT #1,2
>40 CX=0;PRINT #1,3
>50 CX=0;PRINT #1,4
>60 CX=0;PRINT #1,5
```

THIS WILL WORK FINE, BUT THE COMPUTER IS NOT REALLY "COUNTING", HE'S JUST PRINTING THE NUMBERS. (THEY ARE NOT STORED ANYWHERE SO WE CANNOT USE THEM FOR ANYTHING). ALSO, THIS USES QUITE A BIT OF MEMORY, AND REMEMBER, MOST OF US ARE WORKING WITH JUST 1800 BYTES, SO WE NEED TO SAVE ALL WE CAN. LET'S USE THE VARIABLE "A" TO DO OUR COUNTING. (ANY OTHER VARIABLE WILL WORK JUST AS WELL):

```
>10 CLEAR              (CLEAR SCREEN)
>20 A=1                (FIRST NO. TO PRINT)
>30 CX=0;PRINT #1,A    (PRINT IT IN CENTER)
>40 A=A+1              (ADD ONE TO "A")
>50 IF A>5GOTO 70      (IF MORE THAN 5 QUIT)
>60 GOTO 30            (GO BACK, DO IT AGAIN)
>70 STOP               (ALL DONE)
```

THIS PROGRAM DID EXACTLY THE SAME AS THE FIRST ONE EXCEPT THAT THIS TIME THE COMPUTER ACTUALLY "COUNTED". (THE NUMBERS WERE STORED IN "A" WHILE HE WAS COUNTING). AND WE SAVED 15 BYTES OF MEMORY!!!

WHEN WE GO BACK TO A PREVIOUS LINE IN A NUMBER OF TIMES IN A PROGRAM, IT IS CALLED A "LOOP", BECAUSE WE ARE "LOOPING" BACK AND FORWARD. A MORE EFFICIENT WAY OF LOOPING IS TO USE THE "FOR-TO-NEXT" COMMANDS. (WE'LL SEE WHAT "STEP" DOES A LITTLE LATER). LET'S CHANGE OUR PROGRAM AGAIN:

```
>10 CLEAR
>20 FOR A=1TO 5
>30 CX=0;PRINT #1,A
>40 NEXT A
```

NOW "RUN". WHAT DO YOU KNOW, IT WORKS!!! AND WE HAVE SHORTENED OUR PROGRAM CONSIDERABLY.

WHAT DID WE DO? WELL, LET'S EXAMINE EACH LINE:

LINE#10-CLEARS THE SCREEN
LINE#20-HERE WE ARE TELLING OUR COMPUTER: "START COUNTING FROM ONE TO FIVE". HE WILL SET 'A' TO ONE, AND PROCEED TO THE NEXT LINE
LINE#30-PRINT WHATEVER VALUE IN 'A' IN THE CENTER OF THE SCREEN.
LINE#40-NOW WE ARE TELLING HIM "NEXT NUMBER PLEASE!" HE WILL GO BACK TO LINE #20, ADD ONE TO 'A', AND REPEAT THE PROCESS, (LOOP), UNTIL 'A' IS MORE THAN FIVE. THEN HE WILL STOP LOOPING AND MOVE ON. (IN OUR EXAMPLE HERE, HE WILL QUIT, BECAUSE THAT'S THE END OF OUR PROGRAM). THE NICE THING HERE, (EXPERIMENT), IS THAT ANYTHING THAT WE PUT IN BETWEEN THE "FOR" AND "NEXT" LINES, (#20 AND #40), WILL BE REPEATED FIVE (OR WHATEVER NUMBER YOU WANT) TIMES. CHANGE LINE #30:

```
>30 B=RND (10):CY=0:PRINT #1,B
```

THIS TIME WE HAD HIM PICK A RANDOM NO.(1-10) FIVE TIMES AND PRINT IT. TRY YOUR OWN IDEAS HERE.

"STEP"

NOTICE THAT IN THE ABOVE CASE, THE COMPUTER COUNTED BY ONES. WELL, HE CAN ALSO COUNT BY TWOS, THREES, HUNDREDS, THOUSANDS, EVEN MINUS NUMBERS! TO DO THIS WE USE THE COMMAND WORD "STEP". HERE IS HOW:

```
>10 CLEAR
>20 FOR A=1TO 20STEP 2
>30 CX=0:PRINT #1,A
>40 NEXT A
```

NOW HE'S COUNTING BY TWOS! TRY THIS--CHANGE LINE #20, AND ADD LINE #50:

```
>20 FOR A=10TO 0STEP -1
>50 PRINT "BLAST OFF!
```

YOU CAN COUNT EITHER FORWARDS OR BACKWARDS ANYWHERE FROM -32767 TO 32767 WITH ANY STEP THAT YOU WISH. HERE ARE A FEW SAMPLE PROGRAMS TO TRY. CHANGE THEM AROUND AND EXPERIMENT:

```
>10 CLEAR
>20 FOR A=-77TO 0STEP 6
>30 CX=A:PRINT "HI THERE
>40 NEXT A

>10 CLEAR
>20 FOR A=1TO 500
>30 CX=0:CY=0:PRINT #1,A
>40 NEXT A

>10 CLEAR:FC=7   ("FC"--FOREGROUND COLOR)
>20 FOR A=1TO 256
>30 BC=A         ("BC"--BACKGROUND COLOR)
>40 NEXT A

>10 CLEAR
>20 FOR A=1TO 50
>30 PRINT "HELLO ",
>40 NEXT A
```

NEXT MONTH: SUBROUTINES (GOSUB-RETURN) AND GRAPHICS (BOX-LINE)

HARDWARE REVIEW by Al Rathmell...

The memory expansion board by R & L is a high quality, well designed printed circuit. The board is fully socketed to accept standard 24-pin (2K x 8 bit) static RAM, ROM, EPROM, or EEPROM memory circuits. Each of the 32 memory chips (which must be purchased separately) can be selected or de-selected by 'dip' switches on the board. A 17-page manual describes the installation and operation of the memory expansion board. (A 5-volt power supply must be provided by the user, but plans are supplied.) Some small utility software routines for moving data from one memory area to another are included in the manual. Although rather expensive, this expansion board would provide some interesting new capability for the Astrocade Arcade. In addition to larger programs, some innovative graphic techniques could be developed. For examble, multiple screen images could be stored in high memory, then down-loaded sequentially to screen memory to produce special effects. The system software or Basic could be up-loaded to expansion RAM, modified, and then down-loaded and executed in RAM rather than ROM.

The expansion memory board from R & L is probably not for the casual Astrocade user, but may be valuable to the experimenter (or program developer) with an understanding of the Astrocade hardware and software.

A PROGRAMMING AID TO VERIFY EACH LINE STATEMENT IN A PROGRAM. AB/BB

ENTER WITHOUT A LINE NUMBER: N=-24576

```
1 FOR N=NTO %(20000)-8:IF %(N)<256#13NEXT N
2 IF KPCLEAR :N=N+2:LIST %(N),1:NEXT N:STOP
```

(NOTE) USE %(20050) INSTEAD OF %(20000) FOR BB

PRESS ANY KEY TO GET THE NEXT LINE LISTED. YOU MAY HALT AND CHANGE A CHARACTER OR ADD TO THE CONTENTS OF THE PROGRAM, AND THEN PICK UP WHERE YOU LEFT OFF BY USING:RUN GO. IF SOME OF THE CONTENTS OF THE PROGRAM ARE REMOVED, THEN YOU MUST TELL THE COMPUTER WHERE TO RESTART AS: N=N MINUS THE 52 REMOVED AND THEN: RUN GO.

THIS PROGRAM WILL LIST THE ENTIRE CONTENTS OF A PROGRAM, ONE LINE AT A TIME, REGARDLESS OF HOW THEY ARE NUMBERED, WITHOUT MISSING A LINE. IT IS MUCH LESS CONFUSING THAN LISTING AN ENTIRE SCREEN FULL AS DOES THE SM (SCROLL MODE) OF ASTRO BASIC.

JIM DUNSON
13900 RIVER RD.
PERDIDO KEY, FL 32507
(904) 492-1470

```
  1 .
  2 .GOBBLERS
  3 .
 10 CLEAR ;BC=2;FC=144;NT=0;K=0;@(2)=0;@(3)=0;GOSUB 320
 15 CLEAR ;NT=0;K=K+1;L=50;P=1;U=38;&(10)=34;BC=4;FC=80;GOTO 230
 20 C=23-(@(P-1)-6)÷10x15;R=RMx15-68;RETURN
 30 FOR P=1TO 2;GOSUB 20;W=@(P-1);V=@(W);@(W)=0;IF V@(P+1)=@(P+1)+V;FOR X=1TO V
;MU=84;MU=86;MU=88;NEXT X
 40 IF V L=L-1
 50 BOX R,C,13,13,1;NEXT P;NT=0;CX=66;CY=U;PRINT @(2);CX=25;CY=U;PRINT @(3)
 52 IF L=48BOX 0,U,18,7,2;IF K>1CX=-23;CY=U;PRINT "GAME",#4,K
 54 IF L=0GOTO 260
 56 NT=1;FOR P=1TO 2;B=JX(P);IF BGOTO 60
 58 B=-10xJY(P)
 60 @(P+3)=B;IF BGOSUB 20;X=B÷5;Y=RMx2;BOX R+Y,C-X,13-XxX,13-YxY,2
 70 NEXT P;FOR P=1TO 2;GOSUB 20;B=@(P+3);IF BGOSUB 20;GOSUB 90;GOSUB 20;BOX R,C
,13,13,3
 80 NEXT P;M=M+1;GOTO 30
 90 BOX R,C,13,13,2;IF B=0RETURN
100 X=P-1;A=B+@(X);IF (A<6)+(A>55)A=@(X)
110 IF @(2-P)=A A=@(X)
120 @(X)=A;RETURN
130 NT=1;FOR H=9TO 54STEP 3;BOX 0,0,H+96,H,3;MU=H+40;NEXT H;&(10)=144;CY=-32;FO
R T=0TO 250;NEXT T;RETURN
140 FOR T=0TO 500;NEXT T;RETURN
150 FOR T=0TO 35;NEXT T;RETURN
190 BOX R,C,7,7,1;BOX R-1,C+2,2,2,2;D=@(A);IF D>1BOX R+2,C-1,2,2,2
200 IF D>2BOX R+2,C+2,2,2,2
210 IF D=4BOX R-1,C-1,2,2,2
220 MU=Dx18;MU=D+20;RETURN
230 CX=-48;CY=U;PRINT "ONE MOMENT PLEASE";NT=1;FOR A=6TO 55;@(A)=RND (4);@(0)=A
;GOSUB 20;GOSUB 190;NEXT A
240 @(0)=28;@(1)=33;NT=0;BOX 0,U,102,7,2;BC=2;FC=141;CX=-24;CY=U;PRINT "GET REA
DY
250 FOR S=34TO 180;&(10)=S;NEXT S;BOX 0,U,54,7,2;BC=1;FC=172;CX=-6;CY=U;PRINT "
GO!";GOTO 30
260 NT=0;BOX 0,-7,160,73,2;FC=245;CY=0;IF @(2)=@(3)CX=-47;PRINT "THIS GAME IS T
IED";GOSUB 130
270 CX=-42;IF @(2)>@(3)PRINT "PLAYER ONE WINS";GOSUB 130;NT=9;PRINT "5809808876
505505607808800
280 IF @(2)<@(3)PRINT "PLAYER TWO WINS";GOSUB 130;NT=12;PRINT "3303505302101203
54230010
290 IF K>1GOTO 300
295 NT=0;CY=-32;PRINT "TR(1) STARTS NEW GAME AT 0";PRINT " TR(2) ACCUMULATES SC
ORES",;FOR S=144TO 180;&(10)=S;NEXT S;FC=44
300 IF TR(1)RUN
305 IF TR(2)GOTO 15
310 GOTO 300
320 CX=-41;CY=0;PRINT "G O B B L E R S";BOX -58,0,13,13,1;BOX -56,0,9,9,2;BOX 5
8,0,13,13,1;BOX 56,0,9,9,2
330 GOSUB 140;E=-46;F=46
340 NT=15;GOSUB 150;MU="*";MU="$";BOX E-12,0,13,13,2;BOX E,0,13,13,1;BOX E+2,0,
9,9,2
350 GOSUB 150;MU="%";MU="$";BOX F+12,0,13,13,2;BOX F,0,13,13,1;BOX F-2,0,9,9,2;
E=E+12;F=F-12;IF F<10GOSUB 140;RETURN
360 GOTO 340
```

Klaus Doerge
11 Westcreek Place
Plano, TX 75074

```
  10          NT=0;GOTO 80
  20 D=(C*10)+(B÷12*2);XY=0;LINE @(D)÷2,@(D+1)÷2,3
  30 E=B*2;XY=0;LINE @(E),@(E+1),3
  40 FOR F=A*2TO 119STEP 2;XY=0;LINE @(F),@(F+1),3;FOR T=1TO R;NEXT T;XY=0;LINE
@(F),@(F+1),3;NEXT F;A=0;XY=0;LINE @(E),@(E+1),3
  50 B=B+1;IF B=60B=0;C=C+1
  60 IF C=12C=0
  70 XY=0;LINE @(D)÷2,@(D+1)÷2,3;GOTO 20
  80 CLEAR ;FC=140;BC=0;BOX 0,0,160,88,1;BOX 0,0,100,84,3
  90 CX=-2;CY=36;PRINT "12
 100 CY=32;CX=-27;PRINT "11",;CX=25;PRINT "1
 110 CY=18;CX=-41;PRINT "10",;CX=38;PRINT "2
 120 CX=-40;CY=0;PRINT "9",;CX=41;PRINT "3
 130 CY=-16;CX=-37;PRINT "8",;CX=38;PRINT "4
 140 CY=-32;CX=-24;PRINT "7",;CX=25;PRINT "5
 150 CY=-36;CX=1;PRINT "6
 160 @(0)=0;@(1)=30;@(2)=4;@(3)=30;@(4)=9;@(5)=30;@(6)=13;@(7)=29;@(8)=17;@(9)=2
8;@(10)=21;@(11)=27
 170 @(12)=24;@(13)=25;@(14)=27;@(15)=23;@(16)=29;@(17)=21;@(18)=31;@(19)=18;@(2
0)=32;@(21)=15
 180 @(22)=33;@(23)=12;@(24)=34;@(25)=9;@(26)=35;@(27)=6;@(28)=35;@(29)=3;@(30)=
35;@(31)=0
 190 B=28;FOR A=32TO 60STEP 2;@(A)=@(B);@(A+1)=-(@(B+1));B=B-2;NEXT A
 200 B=2;FOR A=62TO 90STEP 2;@(A)=-(@(B));@(A+1)=-(@(B+1));B=B+2;NEXT A
 210 B=28;FOR A=92TO 118STEP 2;@(A)=-(@(B));@(A+1)=@(B+1);B=B-2;NEXT A
 220 FOR A=0TO 118STEP 2;BOX @(A),@(A+1),1,1,1;NEXT A
 230 R=378
 240 CY=40;INPUT "H"C;CY=40;INPUT "M"B;CY=40:INPUT "S"A;BOX -65,40,30,8,1;GOTO 20
```

AB+BB

George Moses
110 East North St.
Brighton MI 48116

ANALOG CLOCK, above, provides a good representation of a clock face - the old fashioned kind with hands. On request, enter the current Hour, Minute, and Second, and the clock will keep quite accurate time. (If the cursor is hidden behind the TV's mask at the upper left, add CX = -70 to the beginning of Line 240.)

The General Video

ASSEMBLER

- Standard Z80 mneumonics
- Complete editing like Basic
- Unlimited object program size via source segmenting
- Requires AB with taping & 4K of add-on memory switchable between 2K & 6K {like Blue RAM or Viper}
- $35 {payable to David Ibach}

General Video
19553 Dartmouth Pl.
Northville, Mi. 48167

DISPLAY DEVICES TO BE MADE AVAILABLE - We illustrated one of these on page 120 of Volume 4, and utilized eight of them at the CES last month. Now the manufacturer has received authority to sell them on the open market - check their ad on page 63. Of course, there are no electronic parts - but it is wired with a 110volt circuit with plug outlet, and some light outlets at the top.

THINKING OF A PROJECT? Let me know if you are working on some scheme to increase the utility of the Arcade unit. Purpose is to set up some communications between people.

ARCADIAN

Volume 5 Number 4 February 18, 1983

THE FOLLOWING PARAGRAPH & MODIFICATIONS WERE ACCIDENTALLY LEFT OUT OF "CHRDIS II" IN LAST MONTH'S ISSUE:

NOTICE THAT OUR CALL IS MADE NOW TO %(20237) SO AS TO LOAD THE IX REGISTER WITH OUR ALT. FONT TABLE ADDRESS. SINCE YOU ARE GOING TO WANT BIGGER AND/OR MORE CHARACTERS, YOU MAY WANT TO GO DEEPER INTO THE STACK AREA, OR EXPERIMENT WITH STORING STUFF AT THE BOTTOM OF THE SCREEN. JUST BE SURE TO LOAD THE ALT. FONT TABLE WITH THE PROPER CHR HEIGHT & WIDTH AND THE CORRECT ADDRESS OF YOUR BLOCK VALUES.

MAKE YOUR HOUND HAPPY WITH THE FOLLOWING MODIFICATIONS:

```
%(20271)=12     ADD LINES: >25 C=C+1:IF C>129
%(20272)=142                   C=128
%(20273)=120               >26 %(20254)=C
%(20274)=120               >95 %(20247)=
%(20275)=72                    %(20254)
%(20276)=72
```

CHRDIS III

BY MIKE SKALA

CHARACTER DISPLAY PARAMETERS

THIS IS THE THIRD AND FINAL SEGMENT IN MY THREE PART SERIES EXPLAINING THE ON-BOARD SUBROUTINE "CHRDIS". WE WILL FINALLY LOOK AT THE "C" BYTE WITHIN "CHRDIS", WHICH IS AN OPTION BYTE USED TO CONTROL THREE SEPERATE FUNCTIONS IN ALL SYSTEM ALPHANUMERIC DISPLAY ROUTINES: SIZE, TYPE OF SCREEN WRITE, AND COLOR.

FIRST WE BETTER BE SURE WE UNDERSTAND HOW IMAGES AND OUR BASIC TEXT ARE USING OUR RAM TO ENSURE WE DON'T LET THEM CONFLICT. OUR TEXT IS STORED IN THE EVEN NUMBER BITS OF RAM, THE GRAPHICS CAN THEN USE ONLY THE ODD BITS. THAT MEANS WE CAN SET AN ODD BIT TO ONE, OR TURN IT ON (FC), OR WE CAN RESET THE BIT TO ZERO, OR TURN IT OFF (BC). SINCE THESE ONBOARD SUBROUTINES WERE DESIGNED FOR FOUR COLOR IMAGES, THEY ARE ALWAYS WORKING WITH TWO BITS AT A TIME, I.E., THEY ARE GOING TO LOOK AT THE GRAPHICS THAT WERE BUILT IN A ONE BIT PER PIXEL FORMAT AND EXPAND THEM INTO TWO BITS PER PIXEL. FIG.#1 SHOWS A TYPICAL BYTE OF RAM, AND FIG.#2

FIG. #1

G	T	G	T	G	T	G	T
7	6	5	4	3	2	1	0

BIT#

FIG #2

0	0
0	1
1	0
1	1

SHOWS THE FOUR POSSIBLE COMBINATIONS WE CAN EXPAND INTO. WE HAVE THREE DIFFERENT WAYS WE CAN DO A WRITE: 'PLOP', 'OR', AND 'XOR'. 'PLOP' (FIG.#3) WILL SIMPLY REPLACE OUR RAM VALUE WITH OUR IMAGE VALUE. YOU CAN SEE THAT THIS WILL DESTROY OUR TEXT BITS, SO FORGET ABOUT 'PLOPPING'. AN 'OR'(FIG.#4) WILL FIRST LOOK AT THE RAM, AND THE RESULT WILL BE 'ON' IF EITHER OR BOTH THE IMAGE BIT AND RAM BIT WAS ON. IF BOTH WERE OFF, THE RESULT WILL BE OFF. AN 'XOR' (FIG.#5 A&B) IS AN EXCLUSIVE 'OR'. THIS WILL SET THE RESULT IF THE IMAGE

PLOP FIG. 3

IMAGE	1	0
RAM	0	1
RESULT	1	0

OR FIG. 4

I	1	0
R	0	1
RES.	1	1

XOR FIG. 5

	A		B	
I	1	0	1	0
R	0	1	1	1
RES.	1	1	0	1

BIT OR THE RAM BIT WAS ON, BUT RESET IF BOTH WERE ON. THIS IS WHAT WE'VE BEEN USING IN THE PREVIOUS TUTORIALS, WHERE YOU 'XOR' AN IMAGE TO A BLANK AREA AND THE GRAPHIC APPEARS, THEN 'XOR' IT TO THE SAME PLACE AND IT IS ERASED. I HOPE YOU CAN SEE BY NOW THAT IF WE EXPAND INTO 00 OR 10 AND USE 'OR' & 'XOR' WE CAN STILL WRITE TO THE SCREEN WITHOUT DISTURBING OUR TEXT. IF THIS IS STILL CONFUSING, JUST REMEMBER NOT TO EXPAND INTO 01 OR 11 AND DON'T 'PLOP'. YOU MAY ALSO WISH TO LEARN MORE ABOUT BINARY LOGIC (OR, XOR,ETC.) AS IT IS USED QUITE A BIT IN MACHINE CODE.

LET'S PROCEED. FIG.#6 SHOWS HOW THE 'C' BYTE IS CONSTRUCTED. STARTING BACKWARDS (AS ALWAYS) BITS 1 & 0 ARE WHAT AN OFF BIT IN OUR GRAPHIC WILL BE EXPANDED INTO (00 HERE

FIG. 6

ENLARGE FACTOR	XOR	OR	ON COLOR		OFF COLOR	
7	6	5	4	3	2	1	0

WILL SET IT EQUAL TO BC). BITS 3 & 2 ARE WHAT AN ON BIT IS EXPANDED INTO (10 WILL EQUAL FC). YOU COULD SET BITS 3 & 2 TO 00, AND BITS 1 & 0 TO 10 AND GET A "REVERSE" IMAGE.

BITS 5 & 4 CONTROL THE TYPE OF SCREEN WRITE. DON'T SET EITHER AND YOU'LL GET A 'PLOP' (A NO-NO), SET BIT 5 TO GET AN 'XOR', SET BIT 4 TO GET AN 'OR'. I THINK WE'VE KILLED THIS SUBJECT ALREADY.

BITS 7 & 6 CONTROL A CUTE TRICK WE'VE SEEN AS FAR BACK AS VOL. #1 OF THE ARCADIAN, AND IN NEARLY EVERY GAME CARTRIDGE. THIS ALLOWS US TO DISPLAY ANY CHARACTER (ASCII OR HOMEMADE) IN NORMAL SIZE OR IN AN ENLARGED FASHION. (SEE FIG.#7). TWO THINGS TO REMEMBER HERE: THE ADDRESS OR LOCATION OF THE CHARACTER ALWAYS REFERS TO THE UPPER LEFT HAND CORNER, NOT THE CENTER, AND KEEP YOUR IMAGE OUT OF THE SCRATCHPAD AREA AT THE BOTTOM OF THE SCREEN.

FIG. 7

BIT# 7	BIT# 6	FINAL SIZE
0	0	NORMAL
0	1	2X
1	0	4X
1	1	8X

SO JUST BUILD THIS "C" BYTE IN BINARY AND CONVERT TO DECIMAL, LIKE WE CONVERTED OUR BLOCK VALUES FOR OUR PUPPY IN THE LAST ARCADIAN.BE SURE TO PUT THE PROPER "C" BYTE IN BOTH THE "CHRDIS" IN YOUR MACHINE CODE ROUTINE

WELL, THIS SHOULD GIVE YOU HACKERS SOME HANDY TOOLS TO GENERATE SOME PRETTY CLASSY PROGRAMMING. IF YOU HAVE ANY FURTHER QUESTIONS YOU CAN CONTACT ME DIRECT BY MAIL OR PHONE (EVENINGS). ALSO, DON'T BE AFRAID TO SHOW APPRECIATION BY SENDING A FEW OF YOUR PROGRAMS. I'D LOVE TO SEE THEM!!!

MIKE SKALA 544 E. OVERLOOK
EASTLAKE, OHIO 44094 (216) 951-2564

YOUR OWN PERSONAL ARCADE

The Ultimate in Astrocade Accessories is now available in limited supply.

This full color, heavy construction game cabinet is custom made to mount the Astrocade Game Machine. It changes your home game into the Professional Arcade. Loads of storage so you can easily catalog all your cartridges.

Only $312.00 plus shipping.

Call today - 1-408-423-9211

Allow 4 weeks for delivery.

Santa Cruz Wire & Mfg. Co.
411 Swift St., Santa Cruz CA 95060

SHIP TO:(Please Print)

NAME_____

ADDRESS_____

CITY_____STATE_____ZIP_____

Payment enclosed, Check or money order only:
Make payable to Santa Cruz Wire.

A PRODUCT OF SCW, CONSUMER DIVISION

ADS

Bally Arcade, 2 controllers, AstroBasic plus 10 Videocades and 2 cassette games -$400. Steve Roach 817-540-0371 days, 488-9434 home

FOR SALE Bally Computer System, includes 2 controllers, BBasic, FBall, Wizard, 280 Zzzap. ABattle, SBattle. Perfect working condition - just received factory tuneup. Vol 4 of Arcadian and all Cursor. First $250 takes it all. Tom Matun, 3280 Estate Circle, Youngstown, OH, 44511 (216)792-0708

FOR SALE Bally Arcade,includes 4 controllers,12 cartridges, (Wizard, PChase,BPin,GInvasion,etc) excellent condition $300. Duane Dziedzic 511 E.Grand Ve, Rosholt, WI 54473 (715)677-3211

FOR SALE Arcade excellent condition, 1year old, 2 controllers, ABasic, patch cord, 35 games on tape from Arcadian, SWolf,RBaron, Tanks, $350 money order. Brian Reiswig Star Route 143, Brownsville, CA 95919 (916)675-2994

FOR SALE 2 new Astrocades incl. 2 controllers and ABasic.. $212 each. Al #2001, 2002, 2005 at $17 each; #2004, 2009, 2011, 2012, 2014, 3001, 3002 at $21 each. All new, unused. Jerry Heere, (215) 678-5068 from 6 to midnite EST or anytime weekends.

ARCADIAN

Robert Fabris, Drenched
3626 Morrie Drive
San Jose, CA 95127-9990

The SOURCE TCD 959