



- RIGHT; no frills this time - not even room for the ads.
- ZGRASS machine photograph on the other side of this page. This is the configuration going into production. Note the separate keyboard with coiled cord, and the very thin (1½") containers for the mother board (bottom box) and the disc drive unit. Note also that the disc drive(s) shown are optional extra equipment - the controllers are included but not the drives. The separate power supply is big enough to handle four disc drives, the Zgrass unit, plus 256K additional (optional for high resolution (320x204) graphics) memory. Included in the software are: full screen text editor; string manipulation; multi-dimensional arrays and strings; 6 user-definable keys; and new graphics commands: ELLIPSE, ROTATE, STRIPE, SHRINK, PATTERN, and more. This system will accommodate dot matrix or letter quality printers, graphic digitizers ("bit pad"), voice synthesizers, modems, remote keyboard, remote appliance controllers, & computer terminals. One of our subscribers has collected a large amount of printed data on ZGRASS, and is selling copies of the 300 page document at \$27.50 postpaid (no COD)- Michael Walter 23181 Broadway Ave., Oakwood Village, OH 44146 (216) 439-3827
- ASTROCADE MOVING ALONG as the reorganization plan was filed with the court on Oct. 7, after being approved by the creditors' committee. A new executive officer is in place - Bud Wolford - a management consultant specializing in bankruptcy cases. All indications are that this gadget will start rolling again. ASTROCADE is interested in new programs so that they can do some catching up on the market, and so you programmers out there should consider contacting them. They would need people comfortable with assembly language programming, although if you have a great BASIC program, they might consider a conversion as was done with John Perkins' Artillery Duel.

THE GAME PLAYER

Conquer's the solar system ...

SOLAR CONQUEROR Astrocade

After many, many months of waiting, ASTROCADE has released two new cartridges, SOLAR CONQUEROR and COSMIC RAIDERS.*

The many months of waiting were well worth it, however, for SOLAR CONQUEROR is well-designed, challenging and a fun game to play!

New to the game programming aspect is a unique feature not previously found in home computer game-playing systems. I am referring to the ability of a player to move his ship in one direction, and then quickly change directions while his ship continues to move in the previous direction. Called the "slipper" effect by ASTROCADE, it is the same type of object maneuvering as in the coin-op OMEGA RACE. The player has complete control of his ship over the entire screen, able to go in circles, zig-zags, any direction or position you desire. This allows you the same rapid-fire strafing ability as is found in OMEGA RACE and ASTEROIDS.

SOLAR CONQUEROR is for one to four players, with individual selection of one to nine ships, and individual selection of a difficulty level. The joystick steers the ship and controls its speed, while the trigger fires the bullets. You can have as many as eight bullets on the screen at one time, which permits quite rapid firing!

The object in SOLAR CONQUEROR, as written in the instruction pamphlet, is to "score the most points by destroying enemy defenses, defeating their planets, and conquering their solar systems."

On the far right of the screen appears the edge of a planet. You will be defending yourself against Kamikaze combat ships, ground-to-air missiles, and killer satellites. In addition, there will be several asteroids floating around. These deadly objects can enter the screen area from most anywhere, and move faster as your score gets higher. The overall level of difficulty increases as you advance to each new solar system.

LAST ISSUE - NO MORE

REMINDERS - NEXT

VOLUME IS \$15.00

To advance to a new solar system, you must first destroy all of its planets. Planets are destroyed by defeating all its defenses. A good strategy that has worked for me is to knock out the surface mounted missile launchers first. This will give you about ten seconds to fly around and shoot down other objects. The missile launcher will eventually rebuild itself, so stay alert. Do not stay in one spot. Keep moving! You have superb maneuverability, so learn to use it.

The graphics in SOLAR CONQUEROR are colorful, although the details are somewhat average. Sound effects are excellent! After defeating each solar system, the t.v. screen will become your ship's viewer screen for about 30 seconds, enabling you to watch as you make the jump to light speed. It is a well done graphics display that looks much like the jump to light speed as shown in the motion picture Star Wars.

Overall, this new cartridge from ASTROCADE is excellent. We are enjoying it immensely. And although its price of \$34.95 is ridiculously high, (you can buy a brand new Astrocade unit at Wards for only \$49.95 here in Washington!) it is still somehow worth it. So if you can afford it, we highly recommend it. Everyone who's played it loves it!

*(Lack of funds prohibits us from being able to review COSMIC RAIDERS at this time.)

COMING SOON in THE GAME PLAYER, a review of a new five-game tape from a new software firm in Canada, ASTROGAMES. And hopefully a look at ASTROCADE'S other new cartridge, COSMIC RAIDERS. Also, we hope to preview L&M Software's first cartridge, Ms. CANDYMAN.

Your best score on any game is welcome and will be published. Your questions and comments are also welcome. Write to us at: GAME PLAYER, 48-G Ridge Road, Greenbelt, Maryland 20770. (Please send a 20¢ stamp if you want a reply.)

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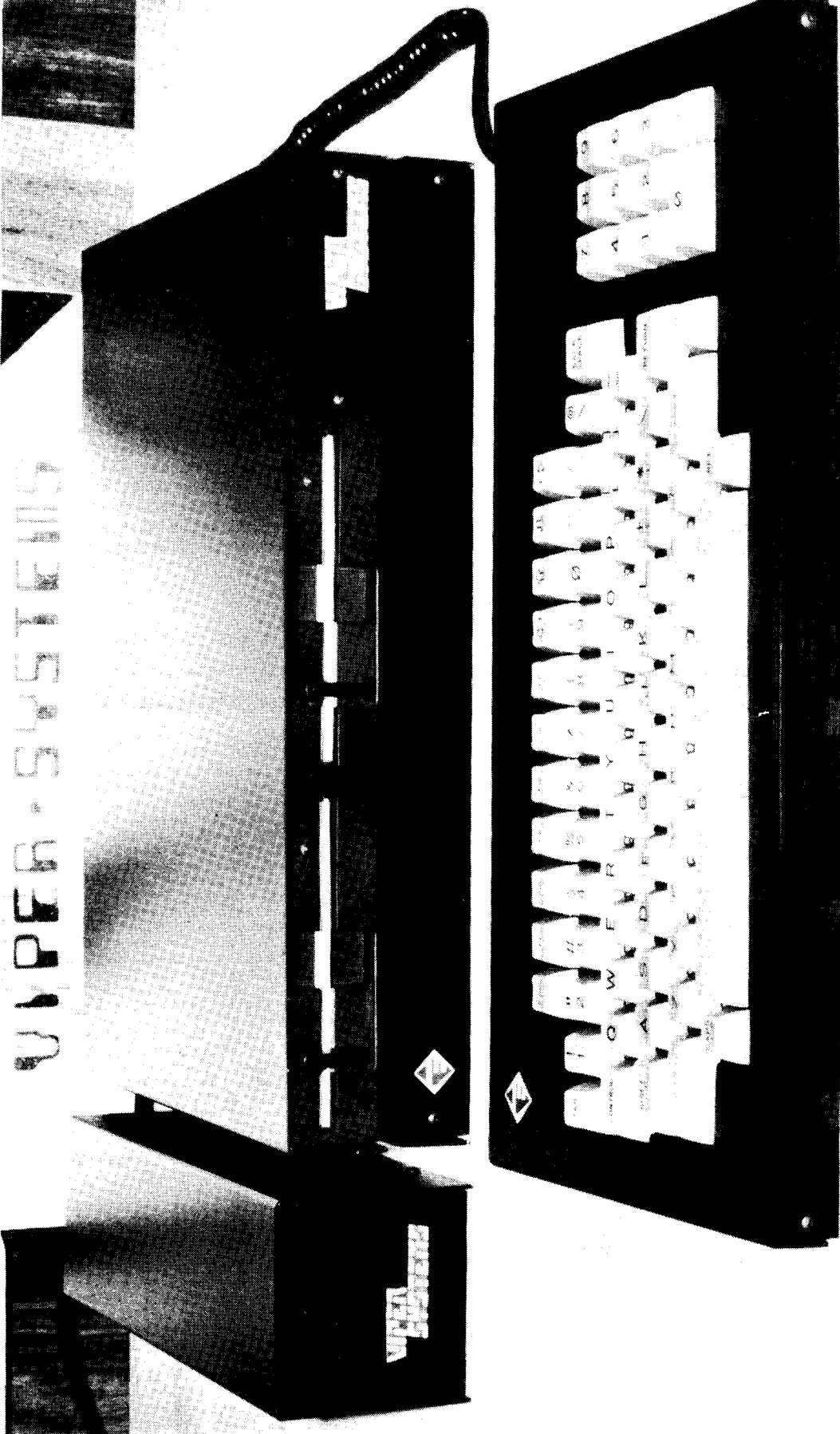
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PEEK AND POKE (%) FOR BEGINNERS

BY DON GLADDEN

NOW THAT WE'VE COVERED ABOUT ALL OF THE COMMAND WORDS AND FUNCTIONS OF ASTRO-BASIC, WE'LL GIVE YOU A SHORT EXPLANATION OF WHAT THE % (PEEK/POKE) DOES. IF YOU ARE A BEGINNING PROGRAMMER, YOU MAY NOT FIND TOO MANY IMMEDIATE USES FOR THIS FUNCTION, BUT IT CAN BE VERY USEFUL AT TIMES, WHICH YOU WILL SEE AS YOU MOVE ONWARD TO BIGGER AND BETTER THINGS.

GOING BACK AGAIN AND REMEMBERING THAT OUR COMPUTER WORKS ONLY WITH NUMBERS, (I KNOW I'VE SAID IT BEFORE!), WE MIGHT THINK OF WHAT IS IN THE COMPUTERS' MEMORY AT ANY GIVEN TIME AS A LONG, LONG LIST OF VALUES. THIS LIST CONTAINS SOME VALUES THAT CANNOT BE CHANGED, (ROM), AND SOME THAT CAN, (RAM). WITH "PEEK", WE CAN READ THE VALUES IN EITHER RAM OR ROM, AND WITH "POKE" WE CAN CHANGE THE VALUES IN RAM. (IF WE TRY TO CHANGE ROM, IT SIMPLY WILL NOT WORK). WHY WOULD WE WANT TO DO THIS? WELL, IF YOU GET INTO MACHINE LANGUAGE PROGRAMMING, THIS IS HOW YOU WOULD ENTER YOUR MACHINE CODE USING THE ASTRO-BASIC CARTRIDGE. ONE EXAMPLE OF WHERE THIS WAS DONE IS IN THE "256 COLOR" PROGRAM IN THE BASIC MANUAL. THIS IS ACTUALLY A MACHINE CODE PROGRAM SIMPLY ENTERED WITH BASIC AND THEN "CALLED". HOW THE VALUES ARE ARRIVED AT IS A WHOLE NEW BALL GAME, AND WILL BE COVERED IN FUTURE TUTORIALS. ANYHOW, THIS BIG LIST OF VALUES THAT WE HAVE PROVIDES A SEPERATE "ADDRESS" FOR EACH VALUE OR BYTE. THE ONLY PROBLEM IS THAT WITH OUR "PEEK" AND "POKE", WE ARE ACTUALLY READING OR WRITING TWO BYTES AT A TIME. SO OUR TWO-BYTE VALUES HAVE TO BE CRUNCHED INTO ONE VALUE WHEN "POKE"ING, (ALTHOUGH WE CAN CHEAT AND HAVE THE COMPUTER DO THIS FOR US AS LONG AS WE ENTER OUR VALUES IN SEQUENCE.), OR ONE VALUE SPLIT INTO TWO WHEN "PEEK"ING. TOTALLY CONFUSED YET??? WELL, WE ARE NOT GOING TO GO MUCH FARTHER ON THIS ONE FOR NOW, BUT WE'LL GIVE YOU A FEW EXPERIMENTS TO TRY.

THE "TEXT AREA" (WHERE OUR BASIC PROGRAM IS STORED) ADDRESS ARE NUMBERED FROM -24576 TO -22777, (LIMIT), WITH LOCATION -24576 BEING YOUR VERY FIRST LINE NUMBER.

```
>15 PRINT
>20 PRINT
```

NOW, PRINT %(-24576). YOU SHOULD GET 15 AS YOUR ANSWER. NOW KEY IN: %(-24576)=10. THEN LIST YOUR PROGRAM. LINE #15 HAS NOW BEEN CHANGED TO LINE #10, BECAUSE YOU "POKE"ED IN THE NEW VALUE DIRECTLY. WHAT WILL HAPPEN IF YOU TRY CHANGING IT TO 30? TRY IT. THIS KIND OF THING CAN REALLY CONFUSE YOUR COMPUTER AT TIMES IF YOU TRY TO RUN THE PROGRAM WITH OUT-OF-SEQUENCE LINE NUMBERS, BUT IT DOES ILLUSTRATE WHAT WE ARE TALKING ABOUT. NOW TRY CHANGING THE VALUE AT %(-24574). THIS IS THE ADDRESS OF THE FIRST CHARACTER IN YOUR FIRST LINE. BUT AGAIN, REMEMBER THAT WE CHANGE TWO BYTES WITH A POKE, SO THE FIRST TWO CHARACTERS ON THE LINE WILL BE

AFFECTED. RUN THIS PROGRAM AND WATCH LINE #10 CHANGE ON YOU. IF IT "CRASHES", JUST RE-ENTER IT. IT'S SHORT AND WON'T TAKE YOU VERY LONG.

```
>10 THIS IS A REM STATEMENT
>20 CLEAR
>30 %(-24574+RND(22))=RND(8)
>40 LIST 10,1
>50 FOR A=1 TO 500:NEXT A
>60 GOTO 30
```

EVERYTHING THAT CAN BE CHANGED IN YOUR ARCADE (MEMORY) IS RAM MEMORY. OUR VARIABLES EACH HAVE AN ADDRESS IN ADDITION TO THEIR "LABELS". FOR EXAMPLE, THE VARIABLE "A" IS LOCATED AT %(20002). TRY THIS:

```
>10 A=50
>20 PRINT A
>30 %(20002)=100
>40 PRINT A
```

DON GLADDEN
59400 NINE MILE ROAD
SOUTH LYON, MICHIGAN
48178

SO, YOU SEE, WE CAN CHANGE ANY LOCATION IN RAM USING THE "POKE" FUNCTION. ANOTHER AREA YOU CAN EXPERIMENT WITH IS THE VISIBLE SCREEN AREA, %(16384) TO %(19002)). POKE SOME RANDOM VALUES IN HERE AND WATCH THE SCREEN CHANGE. HERE IS A LIST OF WHAT THE ADDRESSES CONTAIN IN OUR ARCADES. (BOTH ROM & RAM).

LOCATION: (DECIMAL)	CONTAINS:
0-8191	ON-BOARD ROM. (RESIDENT GAMES, (GUNFIGHT, ETC.), AND OPERATING SYSTEM.
8192-16383	CARTRIDGE AREA.
16384-19983	SCREEN. (CONTAINS BOTH GRAPHICS AND PROGRAM, "MIXED" TOGETHER).
20000	END OF PROGRAM MARKER. (PRINT IT TO FIND OUT THE LAST ADDRESS YOUR BASIC PROGRAM USES). "SZ" IS CALCULATED USING THIS LOCATION.
20002-20089	ONE AND TWO-LETTER VARIABLES. (TWO BYTES EACH).
20090-20153	ODDS AND ENDS THAT BASIC USES.
20154-20257	LINE INPUT BUFFER
20258-20458	STACK AREA.

SOME OF THESE ADDRESSES ARE DIFFERENT IN THE OLD BALLY BASIC CARTRIDGE, SO THESE PROGRAMS MAY NOT WORK IF YOU DO NOT HAVE THE NEW ASTRO-BASIC.

NEXT ISSUE WE'LL COVER A FEW MISC. FUNCTIONS THAT WE HAVE NOT USED YET.

ABC HOBBYCRAFT has the HOT games for astrocade!

Here she is -- the newest star in the world of ASTROCADE video games! *Ms. Candy Man* is L & M Software's first CARTRIDGE game for the ASTROCADE, and she's a sure winner!

Ms. Candy Man moves over the game grid gobbling lifesavers and avoiding the restless jokers. Finish a screen and a caged monster is released on the grid to make things tougher next time. Survive long enough, and you'll get a blue screen bonus -- letting you chase the jokers for a change! At higher levels of skill, the monsters fade in and out of visibility. Then, you must use your radar screen to find them! But if *Ms. Candy Man* is knocked off the grid, along comes the animated ambulance to carry her away!

Even if you've seen L & M's *Candy Man* game on tape, you haven't seen anything yet! Only on cartridge could such color and graphic speed be offered. Lots of surprises await players as well!

Best of all is the price -- only \$29.95 for this great cartridge game. *Ms. Candy Man* features 1 or 2 player capability. This is one of the best independent cartridge games we've seen. Order now!

What's fast, tricky, and much more dangerous than a centipede? It's the *Sneaky Snake*, the new cartridge game from New Image Software! This debut cartridge from New Image has color, graphics, sound and action as only ASTROCADE can provide them, in a slightly different version of an arcade classic.

The *Sneaky Snake* slithers toward you quickly -- shoot him to pieces (concentrate on the head) or he'll get you for sure! And watch out for the spider, who'll drop down to help the snake get your shooter. Bonus shooters are provided every 10,000 points -- and you'll need them!

This hot new game is likely to be in short supply, so order NOW! Only \$32.95 from ABC HOBBYCRAFT!

Ms. Candy Man
\$29.95

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Send check or money order for amount of order plus \$1.50 shipping (\$2.50 in Canada) to ABC HOBBYCRAFT, 2155 E. Morgan Av., Evansville, IN 47711. VISA and MasterCard also accepted (provide your card number and expiration date).

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ABC HOBBYCRAFT'S

astrocade/UNDERGROUND

newsletter

There's one sure way to keep up with the exciting world of ASTROCADE video games -- read *ABC Hobbycraft's ASTROCADE UNDERGROUND*, the newsletter especially for the ASTROCADE video game owner! Inside you'll find the very latest word on what's new and exciting for ASTROCADE -- the most versatile home video game/computer system ever developed! Best of all, the newsletter's free!

Why "underground"? *Joystick* magazine recently coined the term "Astrocade underground" to describe the loyal legion of fans and users who know ASTROCADE is not just another video game! ASTROCADE users have banded together to spread the word about the features and expandability found only with the ASTROCADE system. ASTROCADE isn't sold everywhere you look, like some systems, and a lot of people have perhaps not heard about it. But to those who own an ASTROCADE, nothing else quite measures up! Thus, ASTROCADE users are sort of an "underground movement" -- smaller in numbers but active and interested in the latest word on what their system can do!

Of course, **ABC Hobbycraft** has been with ASTROCADE's Underground from the start -- back when it was marketed as the *Bally ARCADE*. We are the most experienced ASTROCADE dealers around, and our hundreds of customers nationwide know ABC is **the** Bally/ASTROCADE headquarters! Part of our personal service package is *ABC Hobbycraft's ASTROCADE UNDERGROUND* newsletter.

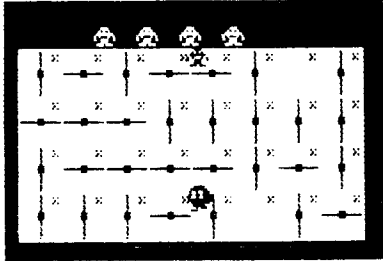
The newsletter goes free to all current ASTROCADE customers of ABC Hobbycraft. (If you haven't ordered for awhile, send a self-addressed stamped envelope and we'll mail you the latest copy!) Only ABC Hobbycraft supports the ASTROCADE user with a **free** newsletter to keep YOU informed! (If you need even more recent information call ASTROCADE specialists Guy McLimore or Scott Collins at (812) 477-9661.)

We're proud to be leaders in the ASTROCADE Underground! Come join us! The movement is growing by the day!

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**FREE to all our
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EXTENDED MEMORY
PRODUCTS REVIEW
by Dave Carson



THE GATE ESCAPE

This column will include actual screen dump illustrations of the games being reviewed. I haven't quite perfected my dump routine as yet. The four possible colors of E.B. are creating a problem, so please bear with me.

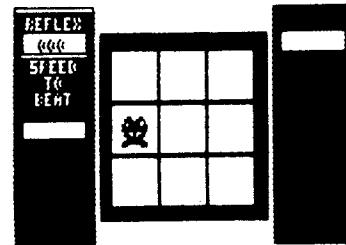
For my first installment I am taking a close look at THE GATE ESCAPE from WAVEMAKERS, by Mike Peace. WAVEMAKERS has had the reputation, for some time, of being one of the leading producers of software for our system.

The first thing you will notice, if you purchase this tape, is the attractive packaging. WAVEMAKERS has devoted considerable time and effort to the illustrations that accompany their products. The picture, visible through the top of the box, is similar to the one seen in the ads for this game and is actually the top of the instruction sheet. The documentation with the tape was clear and easy to understand. Loading procedure was outlined and game play was fully explained. The cassette itself appeared to be of very high quality and should hold up well. The load executed quickly and clearly. You will first be asked to set up the control handle format. Choose either to pass handle number one from player to player or use separate controllers. This is done for the convenience of those with only two handles. Now choose the number of players from one to four with knob one. Pull the trigger and the game begins!

The scenario is quite simple. You gather the small x's from the screen. There are thirty two (4 rows of 8) in each level. You move your player up, down, left, right, and diagonal with the joystick. Move over an x to pick it up. Sounds easy, right? Wrong! There are eight characters whose only purpose in life is to do away with your five players! You will see a different one for each screen you complete. I have faced only seven so I'm not sure what happens after the eighth. Each character is different. They are colorful and each is animated with moving arms, legs, tentacles etc. They are not only constantly chasing you, but periodically place a pod on the screen which allows them to "warp" to a different location. Along with the player's character (near the top center), the first nemesis (bottom center), and the x's, there are the gates. The gates are turnstiles which pivot vertically and horizontally when you push them. The bad guys can't move the gates so you can use them to block or box in the opponent while you grab the x's. The screens get more difficult by placing less gates on the field. The monsters get more aggressive as you progress to higher levels.

Each x gathered yields ten points and a very large bonus is paid for grabbing one of the pods. When a screen is completed, you get a couple of seconds to relax and enjoy the cartoon intermission. A very nice music routine plays while your character chases the current nastie across the game board. When you finally reach THE END, the total compliment of foes is displayed at the bottom for your inspection.

The tape that I used contained two versions of THE GATE ESCAPE. One which runs in a 4k machine and one requiring a larger system. The latter was used as a basis for doing this review. In extensively testing both versions, I noticed only minor differences. Slight variations in sound and the display of remaining player characters were noted. The 4k program had a couple fewer monsters, and they were not animated. The game play seemed identical. All average scores were the same no matter which game was used. The strategies worked equally well on both. THE GATE ESCAPE, in either format, is as full of color, sound, and fast smooth action as you would expect in an E.B. game. It is a game of quick decisions and careful strategy. I heard nothing but praise from those who watched as well as those who played. The general consensus being amazement that the game is in BASIC and on tape rather than in the cartridge slot. It is that well done!



WACK-A-MOLE

On the reverse side of THE GATE ESCAPE is a real treat. WACK-A-MOLE. This game is an outstanding conversion of a mechanical arcade machine to a video game. In the game havens known for their delicious pizza across the country, resides a little machine that is always busy. It attracts gamers ranging from the very small to the very most experienced of all ages. The game features a rather large, stuffed, leather hammer on a chain. There is a flat surface with a series of holes. After inserting a token, moles (yes, those little enemies of lawns and gardens everywhere) begin to randomly pop up from the holes in a taunting fashion. The player, using the padded hammer, must attempt to bash as many of the critters as possible in the time allotted.

Loading WACK-A-MOLE into your E.B. system takes you right back to the famous mouse's theater with an unlimited number of tokens. WAVEMAKERS' conversion is so well done it's almost the real thing! The major difference being that instead of a time limit you play until you miss a certain number of moles.

On the game board, the box titled "reflex" displays the current level of speed in which the moles appear. Wacking one results in incrementing this number. The window below "reflex", titled "speed to beat" displays a number having to do with your reaction time. Each mole, when hit, displays this number above his head. If it is greater than the one in the box, then the one in the box is adjusted. The window at the upper right is labeled "score". This is where my screen dump routine is imperfect as you see. Points are awarded for each successful wack and are totaled in the box. Below the "score" box is another window (not visible in the illus.) labeled "average". This one keeps a running average of the reaction time number.

The board is a 3x3 grid with each square being a "hole". Moles appear randomly and briefly from these holes. The joystick is your "hammer". The grid represents every possible joystick position including neutral. When a mole pops out, position the "hammer" accordingly and wack (pull the trigger). When hit, the mole chirps, frowns, and disappears back down the hole to taunt again later. The game starts out rather slowly and increases in speed as you progress. I noticed the remark "good guess" at the bottom of the screen when I finally connected after missing a few. I knew moles were pesky but these become abusive!

This is a fun game for everyone. There is an abundance

BLUE RAM BASIC CORNER...
A FEW WELL
AIMED POKES
BY CLYDE PERKINS

THERE HAS BEEN SOME CONFUSION AMONG OWNERS OF 16K- AND 32K-BLUE RAMS CONCERNING THE USE OF PROGRAMMING AREAS IN THE EXPANDED MEMORY. THE ORIGINAL UNITS (1980-81) CONTAINED 4K OF NEW MEMORY AND, OF COURSE, THE IO PORTS. THE EXTENDED BASIC CARTRIDGE PROVIDED 2000 BAUD TAPING, AND ALSO RESERVED 996 BYTES OF RAM FOR STACK, VARIABLES AND A FEW REGISTERS. WHEN THE BLUE RAM WAS REDESIGNED WITH 16K OR 32K OF MEMORY, THE DEDICATED AREA (!6C1D TO !6FFF) WAS MAINTAINED FOR THE SAKE OF COMPATIBILITY WITH B.R. PROGRAMS, AND IT REQUIRES A FEW TRICKS TO "DUCK" AROUND THE AREA WHEN WRITING PROGRAMS LARGER THAN 3100 BYTES (!6000 TO !6C1C). THE EASIEST WAY TO DO THAT IS TO START YOUR PROGRAM AT !7000 OR !8000. NOTE: THE "!" MEANS HEXADECIMAL NOTATION (BASE 16).

INSTRUCTIONS SUPPLIED WITH THE NEW RAMS INCLUDED THE POKES NECESSARY FOR STARTING AT !7000, BUT MOST OF US CAREFULLY POKED THEM IN AND WERE HAPPY IF THEY WORKED. HOWEVER, IF YOUR PROGRAM CONTAINS A LARGE FOR-NEXT LOOP YOU MAY RUN INTO TROUBLE AS IT APPROACHES !8000. AS WITH ALL COMPUTERS, YOUR ARCADE HAS A VERY STUBBORN STREAK. IT REQUIRES PRECISE PROTOCOL AND ALSO TRIES TO IMPOSE LIMITATIONS SUCH AS MAXIMUM ADDRESS OF !7FFF OR 32767 DECIMAL. !8000 IS CONSIDERED A NEGATIVE NUMBER BY THE ARCADE (-32768), !8001=-32767, !8002=-32766, ETC. THE BALLY AND ASTRO-BASIC CARTRIDGES AVOIDED THIS TROUBLE BY IMPOSING THE SAME LIMIT. (+32767). BLUE RAM EXTENDED BASIC APPLIES NO LIMIT ON ADDRESSES, BUT THE ARCADE, IF COUNTING THRU A LOOP, REFUSES TO CROSS THE "SNAKE-PIT" AT !8000, AND REVERSE DIRECTION IN MID-STREAM. THE OBVIOUS SOLUTION IS TO START YOUR PROGRAM AT !8000, LEAVING THE FIRST 7196 BYTES FOR SNAPS OR POKED STRINGS.

HERE, WE MIGHT POKE IN THE MODIFIED DATA AS WE DID WITH !7000, BUT IF WE UNDERSTAND WHAT WE ARE DOING WE CAN START AT ANY ADDRESS AND EVEN INCLUDE A ROUTINE WITHIN THE PROGRAM FOR JUMPING TO ANY UNUSED AREA UTILIZING EVERY LAST BYTE! THE PROCEDURE USES THREE LINES, AS FOLLOWS:

```
>1 :INPUT %(!6FFC):;INPUT %(!8000):  
:INPUT %(!6C20):;INPUT %(!6CAA):;RUN
```

```
THEN: %(!6FFC)=!8000;%(!6FFE)=!A07E;  
%(!6C82)=!8002;%(!8000)=-256
```

LINE 25000 IS FOR DUMPING TO TAPE:

```
>25000 :PRINT %(!6000),20:;PRINT %(!6FFC),2;  
:PRINT %(!8000), (8322-SZ)c2:;PRINT  
%(!6C20),65:;PRINT %(!6CAA),47
```

LINE #1 LOADS THE PROGRAM AND DATA FROM TAPE THE DATA AS WHATEVER WAS RECORDED BY LINE #25000. THE SECOND LINE, SINCE IT HAS NO LINE NUMBER, IS NOT PART OF THE PROGRAM, BUT STUFFS VALUES INTO THE PROPER BYTES.
"%(!6FFC)=!8000" PUTS OUR STARTING ADDRESS

IN A REGISTER THAT IS ALWAYS REFERENCED BY THE SYSTEM.

!6FFE POINTS TO OUR "END OF PROGRAM" AREA, USUALLY THE HIGHEST ADDRESS AVAILABLE (!A07E OR !E07E).

!6C82 POINTS TO AN ADDRESS 2 BYTES BEYOND THE LAST BYTE IN THE CURRENT PROGRAM. AT THIS POINT IT IS !8002 BECAUSE WE HAVEN'T YET WRITTEN ANY PROGRAM. THIS VALUE INCREASES AS WE WRITE.

FINALLY, AT !8000, WE PUT AN ILLEGAL LINE NUMBER (-256). THIS "FLAG" WILL MOVE UP FROM !8000 AS WE WRITE AND WILL ALWAYS BE THE LAST BYTE IN OUR REGULAR PROGRAM, SIGNALING THE SYSTEM TO STOP.

LINE #25000, (OR ANY LINE NUMBER HIGH ENOUGH TO NOT INTERFERE WITH THE MAIN PROGRAM) DUMPS EVERYTHING TO TAPE IN SEGMENTS:

```
":PRINT %(!6000),20" DUMPS 20 WORDS (40  
BYTES), STARTING AT !6000, WHICH SAVES LINE  
#1.
```

```
":PRINT %(!6FFC),2" SAVES ONLY THE POINTERS.  
!8000 IS, OF COURSE, THE START OF YOUR PRO-  
GRAM, AND "(8322-SZ)c2" IS IT'S SIZE IN  
WORDS.
```

```
"%(!6C20),65" AND "%(!6CAA),47" SAVE 228  
BYTES OF STACK AND VARIABLES.
```

DON'T BE AFRAID TO PLAY WITH THESE VALUES, ESPECIALLY AFTER THE POKES ARE ON TAPE. IF YOU DUMP ONLY THE POKES ON TAPE, PUT A STOP AT 24990 TO PREVENT A LOAD FROM TRYING TO EXECUTE LINE #25000.

of sound and color. You don't have to do well to enjoy it. One caution: If you have friends that handle joysticks roughly, don't show them WACK-A-MOLE. Also when you or your children play, stress and enforce care with the controllers. It only takes a touch in any direction to be effective. Controller abuse could make this game a joystick "killer"! We have played for hours and hours with no ill effect but heed the caution.

This tape containing two great games is a fantastic software buy at \$19.95 and I recommend it highly. Both games are extremely well programmed and utilize the features of E.B. Many hours of enjoyment are waiting for you if you order THE GATE ESCAPE in E.B.

ATTENTION If you have any products for sale which require extended memory, and would like to see a review done in this column. Send, along with complete documentation the exact product the customer would receive. I will not write about items that I cannot recommend. Our goal is to promote and advance the BALLY-ASTROCADE system, not to destroy it or anyone connected. If I feel there is a problem, I will contact the supplier personally to try to correct the situation and make a review possible.

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MS. CANDYMAN

CARTRIDGE



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PROGRAM ANALYSIS

BY KEN LILL

IN THIS COLUMN I INTEND TO "TEAR-DOWN", EXAMINE AND POSSIBLY RE-CONSTRUCT ALREADY PUBLISHED PROGRAMS - EXPLAINING EACH DETAIL.

LET'S TAKE A LOOK AT OUR ASTROBASIC PROGRAM "GHOST FLEET" AS WE HAVE MODIFIED IT SO FAR:

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>1 Z=-1:NT=Z:MO=69:Q=0
>4 CLEAR:F=-48:G=50:H=H+2:I=-G:J=45:K=0
>5 FOR A=129TO 145STEP 4:BOX 0,0,A,H,3:H=H+2
  :NEXT A:GOSUB 6:GOSUB 9:GOTO 90
>6 FC=7:BOX 0,0,132,58,5:FOR A=0TO 70:BOX
  RND (128)-64,RND (58)-29,1,1,1:NEXT A:
  RETURN
>7 BOX 0,0,24,5,1:RETURN
>8 ;MO=69:RETURN
>9 CX=-39:CY=36:PRINT "_GUNS BOMBSa":
  CX=-39:CY=-37:PRINT "_SHIELDS FUELa"
>10 C=58:D=36:GOSUB 7:C=-C:GOSUB 7:D=37:
  GOSUB 7:C=-C:GOSUB 7:RETURN
>20 BOX F,36,2,3,2:F=F-4:IF FC<-70CX=-67:
  CY=-36:PRINT "DEAD".

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NOW WE WILL LOOK AT MORE OF THE PROGRAM. LINES 30 & 40 LOOK LIKE THIS:

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>30 C=22:FC=89:N=5:U=-4:FOR D=0TO 1:FOR B=56
  TO 125STEP -C:&(19)=D:&(23)=Z:&(21)=U:
  BOX -B,0,C,Bc11,3:BOX B,0,C,Bc11,3
>40 N=N+5:U=U-2:NEXT B:NEXT D:GOSUB 8:RETURN

```

THE FC=89 COMMAND MAKES THE RED COLOR OF THE GUNS FIRING. C IS USED TO EQUATE THE "X" OF THE BOXES USED IN THE GUNSHOTS, AND WHERE THEY ARE PLACED. N AND U ARE FOR SOUND OF THE SHOTS. THE D LOOP IS USED TO FIRST DRAW THE BOXES, THEN ERASE THEM, BY USING #3 BOXES. THE B LOOP DOES THE EQUATING FOR THE "X" POSITION OF THE BOXES. THE NEXT THREE COMMANDS ARE USED TO MAKE THE SOUND OF THE SHOTS. THIS SHOULD BE CHANGED IF YOU ARE GOING TO USE THE 2-LETTER NOTES. THEY SHOULD LOOK LIKE THIS:

```
TC=N;NV=Z;NM=3;VC=U
```

IN ORDER FOR THIS TO WORK PROPERLY, WE WILL HAVE TO CHANGE THE VALUE WE HAVE SET "U" TO THE NEW VALUE SHOULD BE 11 INSTEAD OF -4 FOR AN EXPLANATION WHY, REFER TO GEORGE MOSES' TUTORIAL IN VOLUME 5, NUMBER 4, FEB. 18, 1983 OF THE ARCADIAN (PAGES 58 & 59). THE 2 BOX COMMANDS ARE SELF EXPLANATORY. IN LINE 40 THE N & U VARIABLES ARE VARIED FOR THE CHANGES IN THE SOUND. THEN THE LOOPS ARE COMPLETED. THE SOUND IS TURNED OFF AND THE MASTER OSCILLATOR IS RESET TO 69. THIS IS DONE BECAUSE THE MO IS RESET TO 71 WHEN A DOWN ARROW IS USED. NOW COMES THE "RETURN" COMMAND. THIS PUTS US BACK TO THE POINT IN THE PROGRAM THAT IS THE NEXT COMMAND AFTER "GOSUB 20". LINE 50 NEED NOT BE CHANGED. FOR THE IDEA OF HOW IT WORKS, SEE THE EXPLANATION OF LINE 20. LINE 60 DOES FOR THE BOMBS WHAT LINE 30 DOES FOR THE GUNS. 117 IS A GOLDEN COLOR. THE SOUNDS SHOULD NOW BE:

```
TC=D;MV=Z;VC=15;NM=3
```

LINE 70 MAKES THE "EXPLOSION" SIGHTS AND SOUNDS. THE ONLY CHANGE NEED BE TO THE &(19) COMMAND, MAKING IT TO 154 IS A LIGHT GREEN COLOR. LINE 90 STARTS THE ACTUAL "PLAYING" PART OF THE PROGRAM. IN THIS LINE, L IS SET TO EITHER 0 OR 1. NEXT, IS A CHECK TO SEE IF YOUR SCORE IS GREATER THAN 999 AND IF YOU STILL HAVE ANY FUEL LEFT. IF YOUR SCORE IS UNDER 1000 OR YOU HAVE FUEL LEFT, THE PROGRAM GOES TO THE NEXT LINE WHEN BOTH CONDITIONS ARE TRUE. THE FLASHING, ENLARGING BOX COMES UP IN THE CENTER. THEN IT GOES TO SUBROUTINES 210 AND 230. THESE PRINT OUT THE SCORE AND TELL YOU TO TRY AGAIN. THEN THE PROGRAM STARTS AGAIN, LEAVING YOUR SCORE THE SAME. NOTICE THAT THERE AREN'T ANY SEMICOLONS BETWEEN THE "IF" STATEMENTS. EACH TIME THE ARCADE "SEES" A SEMICOLON IT THINKS THAT YOU WANT YOUR COMMAND TO END. THIS MAY CAUSE PROBLEMS BECAUSE YOU MAY GET A "WHAT?" MESSAGE, MEANING THAT THE COMMAND CANNOT BE EXECUTED AS IT IS WRITTEN.

LINE 100 SENSES TO SEE IF YOUR SCORE IS NEGATIVE OR IF YOU HAVE BEEN HIT WITHOUT ANY SHEILDS. IF EITHER OF THESE ARE TRUE, THEN GO TO THE "GAME OVER" LINE. 240. LINE 110 SETS UP THE "Y" POSITION THAT THE LINE WILL START FROM. HERE IS WHERE THE COMMAND E=(RND(9) >5) SHOULD BE. INSTEAD OF INSIDE OF THE "A" LOOP BECAUSE YOU NEED ONLY SET E ONCE PER ENEMY SHIP. NEXT IS THE LOOP TO MAKE THE #3 LINE SHOW UP AND THEN DISAPPEAR. THE STATEMENT IF L X=-X WILL MAKE THE LINE START ON THE LEFT SIDE IF L IS ANY NUMBER OTHER THAN 0. LINE 120 DRAWS THE LINE, TAKES AWAY ONE FUEL UNIT, AND STARTS THE ENEMY SHIP LOOP. AGAIN WE HAVE SOME MORE SOUNDS TO CONVERT TO THE 2 LETTER TYPES:

```
&(17) IS TA AND &(22) IS VA AND VB.
```

LINE 130 SETS UP RANDOM ENEMY SHOTS AT YOU. -6 IS THE LIGHT BLUE COLOR OF HIS SHOTS. BY SETTING M TO EITHER 0 OR 1, THE SOUNDS USED IN THE ENEMY'S SHOTS CAN BE TURNED ON AND OFF BY THE STATEMENT IN LINE 135. IF M GOSUB 8, THE T LOOP IS USED FOR THE SIZE OF HIS SHOTS, THE SOUNDS ARE:

```
&(19)(TC) &(23)(NV) &(21) IS NM=3;VC=15
```

LINE 135 MAKES HIS SHOTS, CHANGES THE SHOT'S SOUND, AND IF M=1 IT TURNS OFF THE SOUNDS. LINE 140 SENSES THE TRIGGER TO SEE IF YOU WANT A SHOT FROM YOUR GUNS, PROVIDING THEY AREN'T DEAD. LINE 150 DOES THE SAME FOR YOUR TORPEDO BOMBS, SENSING LEFT AND RIGHT MOVEMENT OF YOUR JOYSTICK. LINE 160 IS THE LOOP END FOR THE ENEMY'S SHOT, THE REDUCTION OF POINTS AND THE LOSS OF ONE SHEILD UNIT, IF THERE ARE ANY LEFT, ETC. IS ALL IN THE LINES 290-310. TO MAKE IT IMPOSSIBLE TO STOP HIS SHOTS, AND TO MAKE HIS SHOTS FASTER, CHANGE LINE 160 TO BE 137. LINE 170 FINISHES THE PLAYING PART OF THE PROGRAM AND IF YOU GET PAST THE LOOP'S END, IT "HITS" YOUR SHEILDS OR SHIP. THEN IT MAKES A NEW SCREEN. LINE 180 GIVES YOU SOME TIME AND CHECKS ALONG WITH LINE 190 TO SEE IF YOU WANT TO REPLENISH YOUR GUNS OR SHEILDS, PROVIDING THERE ARE SOME LEFT. 200 FINISHES OUT THE LOOP AND

THEN GOES TO SUBROUTINE 8, WHICH SHUTS OFF THE SOUNDS, AND THEN IT STARTS THE 'PLAYING' PART OF THE GAME AGAIN. LINE 210 SIMPLY PUTS UP THE TEXT "SCORE:" FOLLOWED BY YOUR SCORE VALUE. THE #0 AFTER THE 'PRINT' COMMAND, MEANS TO PRINT ALL 'VARIABLE' QUANTITIES IMMEDIATELY FOLLOWING THE TEXT IF YOU ARE IN THE SAME PRINT STATEMENT! FOR A BETTER UNDERSTANDING OF 'PRINT', SEE DON GLADEN'S TUTORIAL IN VOL.5 NO.2 DEC.3,1982 PAGES 30 AND 31 TITLED 'PRINTING OF NUMBERS AND VARIABLES'. LINE 220 IS A LOOP THAT IS USED TO MAKE YOUR FUEL UNITS LOWER BY 3 EACH TIME YOU CHOSE TO REPLENISH EITHER YOUR GUNS OR YOUR SHEILDS. LINE 230 IS THE LINE USED TO PRINT OUT 'TRY AGAIN!', GIVE A LITTLE TIME, AND THEN RESTART THE GAME WHILE LEAVING YOUR SCORE THE SAME. LINE 240 IS USED FOR THE 'GAME OVER' ROUTINE. LINE 242 AND 245 ARE THE BLACK OUT LOOP AND THE TRIGGER SENSING. AFTER THE LOOP HAS COMPLETED IT'S FIRST ROUND, THE FC BECOMES 0 AND THE ENTIRE SCREEN WILL BLACK OUT. TO GET THE GAME TO RE-START, JUST SQUEEZE TR(1)! LINE 250 IS THE LINE THAT ADDS ONE TO THE AMOUNT OF FUEL UNITS USED, MAKES THE FUEL GAUGE 1 UNIT SMALLER, AND CHECKS TO SEE IF YOU ARE OUT OF FUEL, GUNS AND SHEILDS. IF SO, IT SENDS THE PROGRAM TO THE 'GAME OVER' LINE. LINES 255 AND 280 ARE IDENTICAL. THEY BOTH SEND YOU TO LINE 310. LINES 260, 270 AND 280 ARE USED TO CALCULATE THE RIGHT SCORE, IF YOU HIT THE ENEMY IN RANGE. LINE 300 SHOULD BE MOVED TO LINE 330. BECAUSE THIS PROGRAM USES UP SO MUCH MEMORY, YOU DON'T HAVE ENOUGH SPACE TO USE THE 'EDITOR'! YOU WILL HAVE TO DELETE 300, AND THEN TYPE IN LINE 330 WITH THESE CHANGES:

```
>330 FC=7:BOX I,-37,6,3,2:I=I-8;K=K-50;
      IC-70CX=-67:CY=-37;PRINT #0,"GONE".
```

NOW YOU MUST CHANGE THE NUMBER 300 IN LINE 160 TO THE NUMBER 320. NEXT IS TO DELETE LINE 400, AS THIS LINE IS NOW IN 330! LINE 310 SHUTS OFF SOME OF THE SOUND VARIABLES. LINE 320 IS THE COLOR CHANGES AND SOUNDS FOR THE TIMES THAT YOUR SHEILDS ARE HIT! THE NEW LINE, 330, MAKES THE SHEILD GAUGE GO DOWN BY 1 AND THEN TAKES AWAY 50 POINTS. THEN IT CHECKS TO SEE IF YOUR SHEILDS ARE GONE AND IF THEY ARE IT LETS YOU KNOW! NOW FOR OUR LAST LINE, 340. THIS SHOULD SIMPLY SAY

```
>340 RETURN
```

THIS IS TO GET BACK INTO THE PROGRAM AND NOT CREATE A 'END OF PROGRAM' OR 'STOP' AT THIS POINT!

IF YOU HAVE ANY QUESTIONS ABOUT THIS PROGRAM, OR YOU HAVE ANY OTHER PROGRAMS THAT YOU MIGHT WANT 'TORN-APART', PLEASE BE SURE TO WRITE. DON'T BE AFRAID, THE 'STUPID' QUESTION(S) THAT YOU MAY ASK HAVE BEEN ASKED BY ALL OF US PROGRAMERS AT ONE TIME OR ANOTHER!

 ONE OF YOUR HELPING HANDS IN THE
 ART OF PROGRAMMING - KEN LILL
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