

# "YOUR LIFE WILL NEVER BE THE SAME COMPUTER CLUB"

Vol. 1. No. 4

Well, this is the issue you have been waiting for. As you can see, the format of this newsletter is much different from previous issues. We have changed it in order to cut production time. You might also notice that this issue contains much more than the previous ones. This is because we have received so many responses to the past newsletters, and with many of the responses came a lot of questions! For instance, many of you asked about graphics. Well, the answers are in this issue. What about the routines for square root, you ask? Never fear; they too are in this issue.

Hope all you clubmembers enjoy this issue of the newsletter, and by the way, don't be too surprised if one of the submitted programs happens to be one of your own!

Till next time.

Editor

## SPOTLIGHT ON SOFTWARE

### BILLBOARD - MA475

APF is proud to introduce the new Billboard program. This unique program enables you to incorporate graphics, musical sounds and letters into a working program. You don't have to know how to program in Basic since Billboard gives you a much simpler language.

Put your name in lights! Have it flash off and on. Set it to a musical tune! With the Billboard program you can be sure your programs will be far from ordinary!

MAILING LIST - BP-40 - Requires single-disk system, printer.

Keep losing that address? Let APF assist you in making all your mailing easier and complete with APF's Mailing List.

Keep all addresses up to date, organized, and neatly printed on labels. You can store mailing list information on more than 1000 clients, change the list when necessary, and easily select which ones are to be printed on labels.

APF even includes the listing of the Mailing List program so that you can adjust the program to your own needs.

## SPOTLIGHT ON HARDWARE

### PI100

This is a parallel interface for printers. It is designed to allow the Imagination Machine to output to printers which have a 34-pin "Centronics" type of port. It comes with its address the same as the SI232 so the built-in printer commands are useable, or it can be changed to a different address.

Note: Standard PI-100 cannot be used simultaneously with an SI-232. The instruction manual contains full schematics. Its price is \$149.95.

**APF™  
IMAGINATION  
MACHINE**

**APF electronics inc.**  
1501 Broadway, New York, N.Y. 10036

WW100

We have had a number of requests from people who want to build their own interfaces or modules. The WW100 is a blank universal wire-wrap board (wire-wrap sockets not included). It comes in our standard peripheral interface cabinet. It has a 34 pin edge connector and a 50 pin edge to plug into the expansion box. The price is \$34.95.

#### YOU ASKED FOR IT

We have been asked for routines to do square root and  $X \uparrow A$  functions. (Algorithms for trig functions are in the Technical Reference Manual.) Well, here it is!

$X \uparrow A$  - (LN $X$  is also used in this routine.)

Remember, these are just approximations.

```
5 REM ROUTINE TO DO  $X \uparrow Y$ 
6 REM USES EXP AND LN ROUTINES
10 INPUT "X  $\uparrow$  A", X,A
12 IF X=0 THEN IF A=0 THEN STOP
15 IF X- INT(X)=0 THEN IF A- INT(A)=0 THEN 500
19 REM OBTAIN NATURAL LOG OF X.
   MULTIPLY RESULT BY A
20 N=0: M=X
25 IF M > 2 THEN 100
30 IF M <= 1 THEN 110
40 GOTO 120
100 M=M/2: N=N+1: GOTO 25
110 M=M+2: N=N-1: GOTO 25
120 Z=(M-1)/(M+1): LNM=((Z  $\uparrow$  2)/3)+1: LNM=LNM*Z*2
130 Y=LNM+(N*.6931): REM Y IS
   NATURAL LOG OF X
131 PRINT "LN";Y
140 T=Y*A
200 REM CALCULATE EXPONENTIAL OF T
210 N=0
220 IF T < .1 THEN 240
230 N=N+1: T=T/2: GOTO 220
240 Y=((T+1)  $\uparrow$  2)+1: Y=Y/2
250 IF N=0 THEN ANS=Y THEN 520
260 FOR T=1 TO N: Y=Y*Y: NEXT
270 ANS=Y: GOTO 520
500 REM IF BOTH X AND A ARE INTEGERS
   USE BUILT IN  $X \uparrow A$ 
```

```
510 ANS=X  $\uparrow$  A
520 PRINT "ANS"; ANS
530 GOTO 10
```

#### SQUARE ROOT

Mr. Frank Hughes of Adamstown Hts, Australia (yes, we do have worldwide distribution) has submitted a program to do the square root of a number. We modified the square root to prevent overflows. Here it is.

```
10 INPUT A: REM A WILL BE A NUMBER
   TO GET A SQUARE ROOT OF
15 IF A < .001 THEN S1=0: GOTO 80
20 MULT=1: REM INITIALIZE MULTIPLIES
30 IF A > 63245 THEN A=A/100: MULT=
   MULT*10:GOTO 30: REM ADJUST
   NUMBER TO PREVENT OVERFLOW IN
   LINE 60
40 S2=A/2: GOTO 60: REM S2 IS FIRST
   GUESS
50 S2=S1
60 S1=S2-(S2*S2-A)/(2*S2)
70 IF (S1-S2) < > 0 THEN 50
80 S1=S1*MULT: PRINT S1
90 GOTO 10
```

Again, this is an approximation.

#### MEMORY

Many of our clubmembers have inquired as to how they can determine the amount of memory space that is still available to them while writing a program. You asked for it; here's the answer:

```
9990 L=PEEK(41984)*256+PEEK(41985)
9991 E=PEEK(41446)*256+PEEK(41447)
9992 M=E-L
9993 PRINT M
```

L=LAST ADDRESS OF PROGRAM  
E=END OF MEMORY  
M=AMOUNT OF MEMORY AVAILABLE  
IN BYTES

When you are writing a long program, key in the above 4 lines. Any time you want to see how much memory is left, give a GOTO 9990, and the number of bytes left are printed.

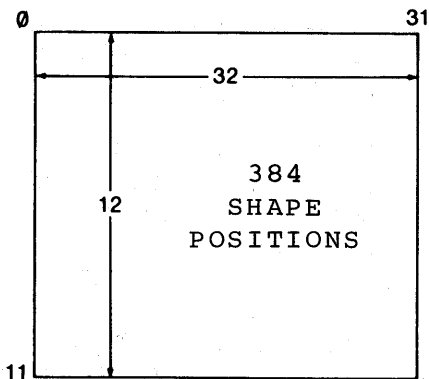
HIGH RESOLUTION GRAPHICS

No need to fret anymore. Starting with this issue we will go through the basics of high resolution graphics. We hope that this and subsequent issues will answer all of your questions, but if not, you know where you can reach us. Please note that Chapter 8 of the Technical Reference Manual does go into high resolution graphics, and you should go through that first. If you do not have a TRM, write us for one. They are free. Since the TRM deals mostly with machine language programming of high resolution, we will stick mostly with Basic programming in this newsletter article.

The first area we will cover in high resolution graphics is the 256 x 192 two-color graphics mode. This is the mode that is used in such APF programs as Space Destroyers, Blackjack, and Rocket Patrol.

All Hi-Res Graphics modes of the Imagination Machine utilize a shape defined method of display. We define the shapes (there can be up to 32 shapes, each with a number 0-31) and can have that shape displayed on the TV screen in any one of 384 possible places. The 384 possible places arise from dividing the screen into 12 horizontal rows, each with 32 positions (12 x 32 = 384).

SCREEN MAP



The TV screen is divided into 384 object boxes (12 rows by 32 columns).

DEFINING THE SHAPES

In the 256 x 192 mode, each shape is 8 dots across x 16 lines high. Each dot can be selected to be on or off and in 1 of 2 color sets.

We define the shape graphically and take the binary equivalent of the dot pattern of each of the 16 lines, then convert the binary number to a decimal number (if we will program in Basic) or a hexadecimal number (if we will program in machine language).

Below is an example of a shape, its binary pattern and decimal/hexadecimal codes.

Bit #	Hex	Dec
7 6 5 4 3 2 1 0		
0	0	0
1	0	0
2	0	0
3	0	0
4	40	64
5	60	96
6	90	144
7	90	144
8	9	9
9	9	9
10	A	10
11	A	10
12	6	6
13	4	4
14	0	0
15	0	0

You should define all the shapes you want using chart or graph paper. Compute for each of the 16 lines the binary equivalent of each of the 8 dots across. If a dot is to be on, it is a Binary 1, and off, it is a Binary 0. Convert the 8 binary bits to 2 hexadecimal digits and then obtain the decimal number.

WRITING A PROGRAM TO CREATE A HIGH RESOLUTION GRAPHICS DISPLAY

Once we have defined the shapes and where we want them to appear on the screen, we now have to write and enter a program to make it happen. There are some standard routines that can be used:

- A. When the Imagination Machine is powered up or reset, its display is in the alphanumeric mode. We

have to do two POKE commands to make it go into the high resolution graphics display mode. These are:

```
POKE 8193,56: POKE 8194,222
```

B. PUTTING THE CODES FOR THE SHAPE INTO MEMORY STORAGE

1. Each shape requires 16 words (bytes) of memory for its definition. There can be up to 32 different shapes defined in memory at any one time. Therefore, we require 16 x 32 (512) words of memory for our shape definitions. This block of memory is located at memory address 512-1023. The first 16 locations (512-527) are for the first shape (Shape #0), then 16 locations (528-543) for the second shape (Shape #1), etc.

2. A general method is to use DATA-READ Statements to move the codes for the shapes to memory. To move the shape we defined above, plus a 2nd shape of all zero words, a program would be:

```
10 FOR X=512 TO 543
20 READ A
30 POKE X,A
40 NEXT
50 DATA 0,0,0,0,64,96,144,
144,9,9,10,10,6,4,0,0:
REM SHAPE #1
60 DATA 0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0: REM SHAPE
#2
```

C. Since there are 384 shape positions, we need another section of memory that says which shapes go where on the display. Memory locations 0-383 are used for this purpose. In each location we POKE the # of the shape we want displayed in the corresponding position on the display screen.

D. Let's add to the above program, but instead of writing a DATA Statement with 384 items (one

corresponding to the shape we want in each display box), we will write the DATA Statements as a "shape number," and then the "number of consecutive boxes" that get that shape. This will be simple; right now we have only 2 shapes (#0 and #1) to concern ourselves with.

```
70 DATA 0,128,1,128,0,128,99,0
80 X=0
90 READ A,B: IF A=99 THEN STOP
100 FOR J=1 TO B
110 POKE X,A: X=X+1
120 NEXT J
```

Line 70 is the data that we want to move to the screen map area. It says we want "0" put to the first 128 locations, then a "1" put to the next 128, then a "0" to the last 128. The 99 is a code that will indicate to a routine that we are finished.

Line 80 sets X=0. This will be the first location we want to POKE (or store) a shape # to.

Line 90 reads 2 items from the DATA Statement. A gets the shape number and B gets the number of consecutive bytes we will write to. If A=99, we stop.

Lines 100-120 do the actual POKING of the shape # to a group of consecutive display boxes.

E. Now to put it all together. Instead of using the DATA Statements of Part B, we will use the method of Part D. Here's what the program looks like:

```
5 REM SET GRAPHIC MODE
10 POKE 8193,56: POKE 8194,222
15 REM MOVE OBJECT CODES
20 X=512: GOSUB 500
25 REM MOVE SHAPE NUMBERS
30 X=0: GOSUB 500
35 REM WAIT FOR KEY PRESSED
36 REM THEN RETURN TO REGULAR
MODE
40 IF KEY$ (0)=" " THEN 40
50 POKE 8194,60: STOP
499 REM ROUTINE TO READ DATA AND
MOVE TO MEMORY
```

```

500 READ A,B: IF A=999 THEN
    RETURN
510 FOR J=1 TO B
520 POKE X,A
530 X=X+1
540 NEXT J
550 GOTO 500
599 REM DATA FOR TWO SHAPES
600 DATA 0,4,64,1,96,1,144,2,9,
    2,10,2,6,1,4,1,0,2,0,16,
    999,999
609 REM DATA FOR SCREEN MAP
610 DATA 0,128,1,128,0,128,999,
    0

```

#### WHAT'S NEWLY AVAILABLE IN SOFTWARE

ACCOUNTS RECEIVABLE - Requires:  
IM-1, BB-2, 2 disks, SI-232,  
printer

APF's Accounts Receivable system uses standard accounting procedures for maintaining a file of customer information and transactions, preparing monthly statements, updating accounts monthly, and producing an aged report using 30-60-90-day standards.

Any business that maintains customer records will find this system easy to use and a valuable tool for minimizing paperwork. Customer information and transaction activity is easily recorded on disks and also on a daily report printout (optional). All additional functions can be performed by the computer upon request.

ASSEMBLER/EDITOR - Requires: IM-1,  
BB-2, 1-D-100

APF's Assembler/Editor program is here at last! One important feature is the full screen editor. This enables the user to insert or delete a character or a line, page forward or page backward. It will also print out or display symbols, syntax errors, and address locations as it assembles your machine language programs.

#### BACKUP

APF's Backup program enables you to make complete copies of all programs from any single-sided diskette onto a formatted (clean) disk using either a single disk drive or a dual drive.

Just imagine not having to rekey an entire program because the original disk is destroyed. All you will have to do is insert your backup diskette in Drive 0. (Remember, though, to copy your original backup diskette so that you always have one on hand.)

One other feature of the Backup program is that it verifies each file it copies, which insures program accuracy.

#### DISASSEMBLE

APF wants to give clubmember Roy Holmes a round of applause and thank him for providing us with a Disassembler program.

This program will give a disassembly of memory contents in MC6800 mnemonics. APF considers this Disassembler program to be a very good package for assembly language programmers.

This complete package is now being distributed through APF with Mr. Holmes' permission at the cost of \$7.95 per cassette. Call the Imagination Machine hotline for further information and ordering.

#### LETTERS TO THE EDITOR

This is one of our favorite sections of the newsletter. We receive an overwhelming amount of letters similar to the ones shown below:

Sirs:

I just received and read VOL I No's 2 and 3 of your newsletter. I am looking forward to reading the newsletters in the future. I have had the IM for approximately a month, and I enjoy programming the IM even with my limited experience with "Basic" language.

R. H. Downing  
Marietta, Georgia

P.S. to APF - Your Basic Tutor is fantastic. The whole family is having a great time with it - even my 6-year old. Keep up the good work.

Bob Johnson  
Spokane, Washington

Nice huh! APF wants to extend a thank you to all our clubmembers. You make it all worthwhile.

NOTE: Letters are edited for reasons of available space and clarity.

#### SUBMITTED CLUBMEMBER PROGRAMS

The following program was sent in by Rob Rabun of North Augusta, South Carolina. It will put lists of words or names in alphabetical order. It also illustrates a feature of APF Basic that many people overlook--numerical comparison of string variables.

```
5 PRINT "LIST ALPHABETIZER"
10 DIM A$(100,10), B$(10)
20 INPUT "NUMBER OF WORDS=", N
30 N=N-1
40 PRINT "WORDS TO BE ALPHABETIZED"
50 FOR J=0 TO N
60 INPUT A$(J,0)
70 NEXT J
80 FOR J=0 TO N-1
90 FOR K=J+1 TO N
100 IF A$(J,0) > A$(K,0) THEN
    B$=A$(J,0): A$(J,0)=A$(K,0):
    A$(K,0)=B$
110 NEXT K
120 NEXT J
130 FOR J=0 TO N
140 PRINT A$(J,0)
150 NEXT J
160 END
```

Mr. Brett Neustater of Morganville, New Jersey, sent the following program to us. See Brett, we didn't forget!

The program enables you to draw shapes and designs on the screen with the use of the left joystick. To change the color you are plotting, press the "Fire" button until the color you wish to plot is displayed. To clear the screen press the 'CL' button.

```
10 REM ***DOODLE***
20 CALL 17046: INPUT "ENTER COLOR,
    SHAPE", C,S: COLOR=C: SHAPE=S
30 CALL 17046
40 DIM A$(1)
50 A$=KEY$(2)
60 IF A$="?" THEN CALL 17046
```

```
70 IF A$="!" THEN C=C+1
80 IF A$="" THEN 50
90 IF Y <= 1 THEN Y=1
100 IF X >= 30 THEN X=30
110 IF X <= 1 THEN X=1
120 IF Y >= 14 THEN Y=14
130 COLOR=C: PLOT X,Y
140 A$=KEY$(2): IF A$="N" THEN Y=Y-1
150 IF A$="S" THEN Y=Y+1
160 IF A$="E" THEN X=X+1
170 IF A$="W" THEN X=X-1
180 GOTO 10
190 END
```

Due to the extra material included in this issue, there was only enough space to print two programs.

Not to worry, though. Faced with these circumstances, the editor has decided to focus the next newsletter primarily on our clubmember programs! So, if you don't see your program in this issue, cheer up and be sure to check the following issue.

NOTE: All programs sent in are checked by our programmers. If we encounter any errors, an attempt is made to correct the program. If it is a serious error, we will return the program with a letter explaining the problems we encountered.

#### WHAT! MORE BUGS!

We asked for our readers to notify us of any bugs they discover and let it be known that they have! We wish to use this opportunity to thank those of you who bring these bugs to our attention. Thanks! Not only do you help us, but many of our clubmembers benefit and undoubtedly send their thanks as well.

Now for those bugs and other problems . . . People have asked how we create the pictures that appear when loading an APF program from cassette. We use the APF Artist and Easel program (MA-325). Thanks are in order to Mr. Larry Parsons of Bethel, Ohio, for finding a bug for us. There is a bug in the Artist and Easel program that we have been distributing. You can fix the bug and make a new copy of the Artist and Easel program with the following steps:

1. Load in the Artist and Easel program using the CLOAD command.
2. Type in the following 4 lines after the program is loaded.
 

```
9890 J=512: K=0: L=SP-512+I*512:
      M=L+511: A=1: GOSUB 200
9891 CALL 17046
9892 POKE 41452,255
9893 STOP
```
3. Now do a CSAVE and save the new program. This is what you will use to create front screens for other program tapes.
4. To use the new Artist and Easel program, type lCLOAD and GOTO 100 as before.
5. Select the picture from the index that you wish to place on the front of another program tape, or draw one of your own.
6. Once the picture is on the screen, press the Break key.
7. Next type GOTO 9890 and press the Return key again.
8. When the cursor reappears on the screen, load in your tape program that you wish to add the front screen to.
9. When it is loaded, type CSAVE using your same program cassette, and the front screen will be saved onto the cassette with your program.

NEXT BUG:

Thank you Mr. Richard Carman. As many of you might have noticed, Mr. Carman has been a very active member of our club. This time he has alerted us to the fact that both the APF Language Reference Manual and the Technical Reference Manual fail to mention an important point in reference to doubled dimensioned strings. If you dimension a set of strings, the second number gives the number of characters directly; you don't add one. In other words, A\$(4,6), for example, will give 5 strings with 6 char-

acters each, not 7 as we implied in the Language Reference Manual on Page 8.

AND FINALLY:

Clubmember Stephen Lupin has certainly been on his toes. While reading the third newsletter, Stephen noticed that we made some errors in our Checkbook program. The corrections should be as follows:

```
70 IF C > 0 THEN GOTO 50
250 IF F < 0 THEN PRINT "CHECKBOOK UNDER BY $";-F
```

Thank you Stephen Lupin.

That's all the bugs for now. Keep up the good work, clubmembers!

**\*\*NEW\*\***

HARDWARE

PI100 - Parallel Interface-149.95  
WW100 - Wire Wrap Board 34.95

SOFTWARE

BP-30 - Accounts Receivable -199.95  
SY-20 - Assembler Editor 59.95  
SY-30 - Backup 9.95  
SY-40 - Disassembler 7.95

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WHAT'S AVAILABLE IN SOFTWARE

GAME CARTRIDGES

MG 1001 Catena 19.95  
MG 1003 Hangman/Tic Tac Toe/Doodle -19.95  
MG 1004 Bowling/Micro Match-19.95  
MG 1005 Brickdown/Shooting Gallery -19.95  
MG 1006 Baseball 19.95  
MG 1007 Blackjack 19.95  
MG 1008 Backgammon 19.95  
MG 1009 Casino I  
Roulette/Keno/Slots-19.95  
MG 1010 UFO/Sea Monsters/  
Break It Down/Rebuild/  
Shoot -19.95  
MG 1011 Pinball/Dungeon Hunt/  
Blockout -19.95  
MG 1012 Boxing 19.95  
MG 1013 Space Destroyers 39.95

CASSETTE TAPES

EDUCATION/ENTERTAINMENT

MA-125 Music Composer/Player Piano -19.95  
MA-150 Typing Tutor 29.95  
MA-200 Math Tutor 29.95  
MA-225 Perception I 19.95  
MA-325 Artist and Easel 19.95  
MA-375 The Word Factory 19.95  
MA-400 Spelling Duel 19.95  
MA-475 Billboard/Message Center -19.95  
MA-500 Basic Tutor 49.95  
MA-550 Jumbled Up Things 29.95  
MA-575 Space Destroyers 19.95

BUSINESS/PERSONAL & HOME MANAGEMENT

MA-175 Checkbook/Budget Manager -29.95  
MA-250 Space, Size and Surface Guide 29.95  
MA-275 Personal Business Machine -29.95  
MA-300 Budget Manager II 19.95  
MA-350 Bar Charts 19.95  
MA-425 Electronic Files 29.95  
MA-475 Billboard/Message Center -19.95

WHAT'S AVAILABLE IN HARDWARE

BB-1 Expansion Box with RS232 Cartridge -199.95  
BB-2 Expansion Box with Floppy Disk Interface Cartridge -199.95  
R8-K 8K RAM Memory Cartridge-99.95  
SI-232 Serial Cartridge 149.95  
FI-100 Floppy-Disk Interface Cartridge 149.95  
D-100-0 Mini-Floppy Disk Drive -399.95  
D100-1 2nd Mini-Floppy Disk Drive -399.95  
D100-A Dual Mini-Floppy Disk Drives -799.00

WHAT'S AVAILABLE IN DOCUMENTATION

TRM Technical Reference Manual-N/C  
LBL-1 Listings, I/O Routines-14.95  
LBL-2 Listings, Basic Interpreter -19.95  
LBL-A LBL-1 & LBL-2 together-29.95