

NATIONAL IMAGINATION COMPUTER CLUB

* 515 Shady Lane - Barrington - Illinois - 60010

JUNE 1982

If you have a program for sale be sure to include all the pertinent information. At a minimum a description of the program, the price, (including shipping and handling), and your name and address.

Remember, that only 1 program per member will be published in each newsletter.

We have also received programs without documentation. Please be sure to include a description of what the program is supposed to do and how to make it do it! We run each program before we publish it and if we can't get it to run we don't publish it. Also, if at all possible submit your programs on tape with your name & address labeled on the tape, as well as the name and tape locations of the programs. Submitting a tape will eliminate keying errors on our part. If your tape is properly labeled it will be sent back to you with our thanks.

ANSWERS/TIPS FROM CLUB MEMBERS

FROM Ernest E. Smith of Texas

Ernest gives us the following tip....

"I have encountered a mistake in the exponential function of my IM-1's Basic. When raising some numbers to a power of 3 or greater, wrong answers occur (apparently a location or register is not being properly cleared). For example, $1.0003 \neq 100200001.0030$ -- 1.00104 results in an overflow.

Avoid using the exponential function and by simply multiplying the number (or it's inverse for negative exponents) by itself "n" times overcomes this failing. The special case of $N=0$ can be accounted for by an IF statement."

In the programs section of the letter you will see how another member applied this tip.

FROM Jerry's T.V. of Minnesota

Jerry offers his technical expertise by providing answers to questions that have come up in previous newsletters.

It is possible, with internal modification to hook up a monitor. Although the IM-1 is limited to 16K, it is possible to convert the IM-1 to 16K internally.

Considering Gregory Carroll problem where the T.V. goes fuzzy and resets itself, Jerry recommends checking the timing/multiplexor ckt.

Jerry has a tape as well as a disk to check the whole machine. Also a cartridge which checks RAM only. He also has several items for sale. (see ITEMS FOR SALE SECTION).

SPECIAL FEATURE-HOW TO UPGRADE TO 16K INTERNALLY !!

FROM John F. Jarrett of Arizona

John substantiates Jerry's answer on the internal expansion, by explaining exactly how to do it.

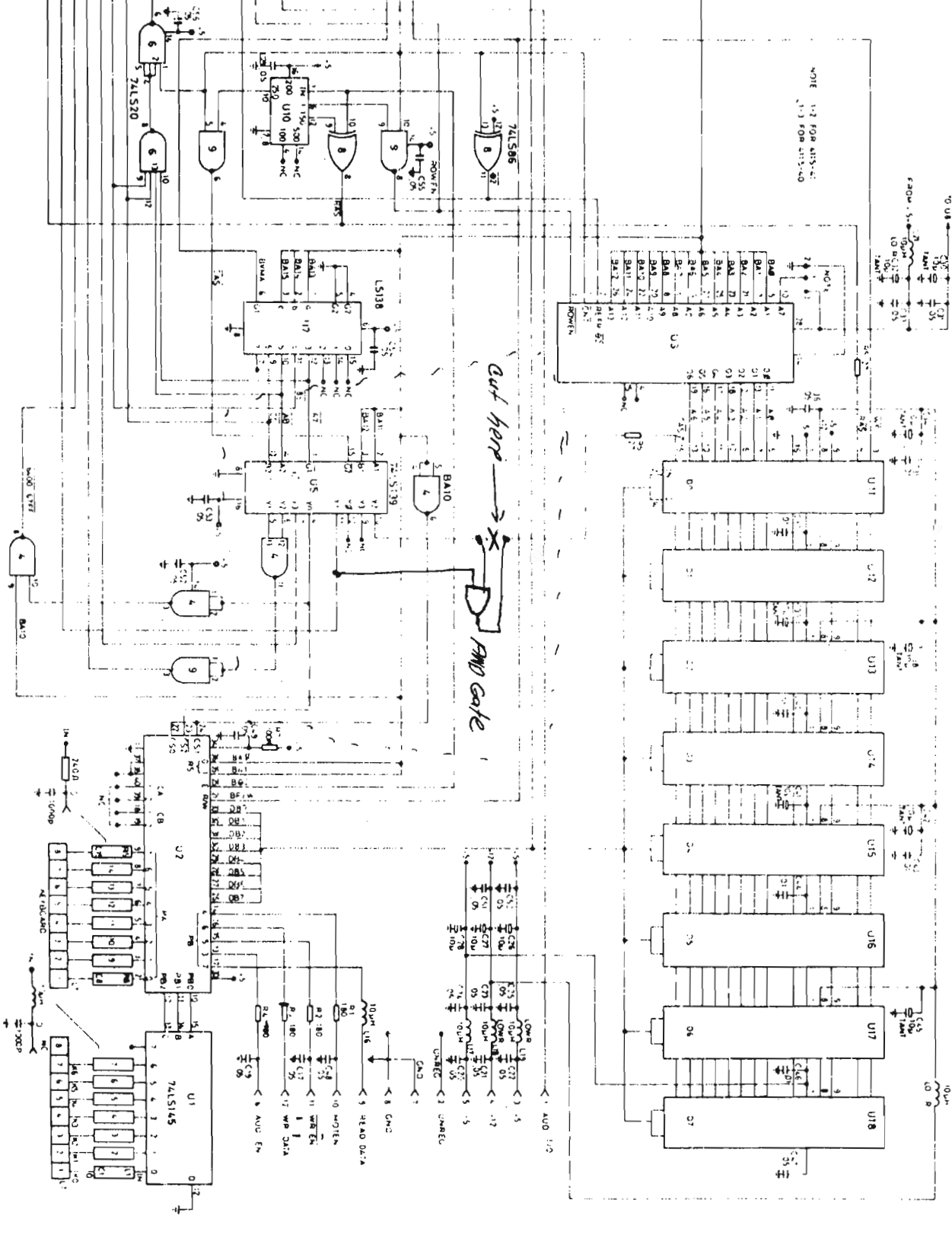
John states "I further have an idea I would like to express to you and other members, which can save them money on additional RAM.

In the APF IM-10 are eight 4115 RAM IC's which are 8K by 1 bit. These IC's are the dynamic type of RAM. There is a direct replacement, (almost), for the 4115 and that is the 4116. This IC is a 16K by 1 bit IC which can easily be interfaced into the IM-10, by removing the 4115's and simply replacing them with the 4116's. However, more must be done in order to access the full 16K of available memory inside the 4116.

The CAS controls the output state of the 4115 and 4116, and also is the control for the additional 8K RAM expansion. The CAS in the IM-10 is 150 ns pulse width. The minimum required for the fastest 4116, which is 150 ns access time. Therefore, an MCM4116-BP-15 will suit the bill or any other 4116 with a 150 ns access time. Usually, eight 4116's can be obtained through a reliable supplier for under \$20.00.

The next step is to add an AND gate with the inputs of this gate going to U5 on the schematic, pins 10 and 11. The foil on the P.C. board must be cut between R6 and pin 10 of U5. The output of the AND gate must be placed on the R6 side of the cut. Pin 10 of U3 should go to the high side."
(See schematic next page)

| 50 PIN | 30 PIN | 10 PIN | |
|--------|--------|--------|------|
| 1 | 1 | 1 | BA1 |
| 2 | 2 | 2 | BA2 |
| 3 | 3 | 3 | BA3 |
| 4 | 4 | 4 | BA4 |
| 5 | 5 | 5 | BA5 |
| 6 | 6 | 6 | BA6 |
| 7 | 7 | 7 | BA7 |
| 8 | 8 | 8 | BA8 |
| 9 | 9 | 9 | BA9 |
| 10 | 10 | 10 | BA10 |
| 11 | 11 | 11 | BA11 |
| 12 | 12 | 12 | BA12 |
| 13 | 13 | 13 | BA13 |
| 14 | 14 | 14 | BA14 |
| 15 | 15 | 15 | BA15 |
| 16 | 16 | 16 | BA16 |
| 17 | 17 | 17 | BA17 |
| 18 | 18 | 18 | BA18 |
| 19 | 19 | 19 | BA19 |
| 20 | 20 | 20 | BA20 |
| 21 | 21 | 21 | BA21 |
| 22 | 22 | 22 | BA22 |
| 23 | 23 | 23 | BA23 |
| 24 | 24 | 24 | BA24 |
| 25 | 25 | 25 | BA25 |
| 26 | 26 | 26 | BA26 |
| 27 | 27 | 27 | BA27 |
| 28 | 28 | 28 | BA28 |
| 29 | 29 | 29 | BA29 |
| 30 | 30 | 30 | BA30 |
| 31 | 31 | 31 | BA31 |
| 32 | 32 | 32 | BA32 |
| 33 | 33 | 33 | BA33 |
| 34 | 34 | 34 | BA34 |
| 35 | 35 | 35 | BA35 |
| 36 | 36 | 36 | BA36 |
| 37 | 37 | 37 | BA37 |
| 38 | 38 | 38 | BA38 |
| 39 | 39 | 39 | BA39 |
| 40 | 40 | 40 | BA40 |
| 41 | 41 | 41 | BA41 |
| 42 | 42 | 42 | BA42 |
| 43 | 43 | 43 | BA43 |
| 44 | 44 | 44 | BA44 |
| 45 | 45 | 45 | BA45 |
| 46 | 46 | 46 | BA46 |
| 47 | 47 | 47 | BA47 |
| 48 | 48 | 48 | BA48 |
| 49 | 49 | 49 | BA49 |
| 50 | 50 | 50 | BA50 |



Out here → AND Gate

4116-150-03

Figure D-3
MPA-10 Main Board Schematic
PAGE 3

To answer a question sent in by Robert E. Jones of Virginia.

We had stated in an earlier newsletter that we had 2 drives and a printer hooked up with 2 available slots left. True. The BASIC cartridge does not take up a slot in the Building Block. We did not have the 8K expansion plugged in, so since the SI-232 took up one slot and the mini-floppy interface took up the other there were 2 of the four in the building block remaining.

To answer a question for Vincent A. McKeever of Washington

The commands for directing output to the printer are:
PRINT=1 To direct to printer
PRINT=0 To direct to screen

Also, Mr. McKeever would like to know if anyone has any information regarding sources for 6800 based programs.

From Maxil Manning

He would like to know how to keep characters from moving off the screen or moving off one side of the screen and onto the other. He has made use of pokes rather than plots to speed up character movement. Can anyone help???

SPECIAL FEATURE-A LIST OF SUBROUTINE ADDRESSES

Our special thanks to Norman Smith of Tennessee who compiled the list on the following two pages. Mr. Smith states these were obtained from the Technical Manual and the Basic Tutor documentation.

Mr. Smith would like to know if anyone has any further subroutines that are not contained in the technical manual. If you do, please send it in to the club and we will publish it.

MEMORY MAP

ADDRESS

HEX DECIMAL

0000 00000

03FF 01023

!-----!
 ! SCREEN DISPLAY MEMORY
 ! * 01F2 00498
 ! INPUT VALUE FROM RIGHT OR LEFT KEYPAD CONTROLLER!
 ! * 0200-03FF 00512-01023
 !

0400 01024

1FFF 08191

! PIA MC6821 IN MP-1000
 ! * 2000 8192
 ! DATA REGISTER A
 ! * 2001
 ! CONTROL REGISTER A
 ! * 2002
 ! DATA REGISTER B
 ! * 2003
 ! CONTROL REGISTER B
 !

2004 08194

3FFF 16383

! ALSO USED FOR PIA
 !

4000 16384

5FFF 24575

! MP-1000 ROM (SCREEN, KEYPADS, KEYBOARD)
 ! * 418E 16850
 ! GET INPUT FROM LEFT KEYPAD CONTROLLER
 ! * 41D9 16857
 ! GET INPUT FROM RIGHT KEYPAD CONTROLLER
 ! * 426E 17006
 ! "DEEP" NOISE
 ! * 4282 17026
 ! "DEEP" AND "WHISTLE" NOISE
 ! * 4296 17046
 ! CLEAR SCREEN
 ! * 4298 17048
 ! SET SCREEN VALUE TO ALL ONE VALUE
 ! * 477C 18300
 ! STORE SAME VALUES IN CONSECUTIVE GROUP OF
 ! MEMORY ADDRESSES
 !

8000 24576

0003 24579

! MP-10 PIA (CASSETTE TAPE)
 ! * 6002 24578
 ! TURN OFF AUDIO WHEN POKED WITH '54'
 !

0004 24580

63FF 25599

! ALSO USED FOR PIA
 !

6400 25600

67FF 26623

! EXTERNAL I/O DEVICES
 !

6800 26624

77FF 30719

! BASIC ROM CARTRIDGE (4K)
 ! * 7000 28672
 ! IM-1 MONITOR PROGRAM
 ! * 7700 30464
 ! MOVE BLOCK OF MEMORY
 ! * 771B 30491
 ! ADD TO INDEX REGISTER
 ! * 80CF 32975
 !

```

: INPUT FROM KEYBOARD, RETURN TO REG A
: * 8473 33907
: OUTPUT CHARACTER TO SCREEN
: * 84F8 34040
: ENABLE TAPE MOTOR AND AUDIO
: * 850D 34061
: TAPE MOTOR AND AUDIO OFF
: * 854B 34228
: READ TAPE INTO MEMORY AT "HIGH" AND "LOW" ADDR
: * 955D 34128
: WRITE MEMORY CONTENTS TO TAPE FROM "HIGH" AND
: "LOW" ADDRESSES
: * 855A 34138
: WRITE HEADER, 512 BYTES BASED ON MODE FLAG,
: ALL MEMORY TO TAPE
: * 8561 34225
: READ TAPE, FIRST 512 BYTES TO SCREEN, REST TO
: MEMORY
:
: FOR ROM EXPANSION
:
: BASIC ROM CARTRIDGE (8K)
:
: USER RAM
: * A000-A2FF 40960-41727
: SYSTEM VARIABLES, LABEL TABLE, STACK VARIABLES
: * A000-A001 40960-40961
: POINTER TO CURSOR LOCATION
: * A007-A008 40969-40970
: "LOW" ADDRESS POINTER
: * A009-A00A 40971-40972
: "HIGH" ADDRESS POINTER
: * A031-A032 41009-4100A
: POINTERS TO DIMENSIONED VARIABLES
: * A0C3-A1AD 41155-41389
: LABEL TABLE, 26 ENTRIES OF 9 BYTES
: * A1E6-A1E7 41446-41447
: POINTER TO END OF MEMORY
: * A1EC 41452
: MODE FLAG FOR TAPE OPERATION
: 0=SAVE ADDRESSES 0-512
: 1=SAVE ADDRESSES 513-1023
: * A300-A3FF 41728-41983
: I/O BUFFER
: * A400-BFFF 41984-49151
: PROGRAM TEXT, COMPLEX VARIABLE STORAGE, STACKS
: * A400-A401 41984-41985
: POINTER TO NEXT AVAILABLE BASIC STATEMENT
:
: USER RAM EXPANSION
:
: NOT USED (LOOKS LIKE COPY OF MONITOR)
:
: RESET INTERRUPT VECTOR - ROM

```

```

7800 30720
7FFF 32767

8000 32876
9FFF 40959

A000 40960
BFFF 49151

```

```

C000 49152
DFFF 57343

E000 57344
FFFF 65519

FF70 65520
FFFF 65535

```

=====

????????? QUESTIONS FROM CLUB MEMBERS ???????????

=====

FROM Ronald Speth of Idaho

Is there a way of clearing one or two places on the screen without clearing the whole thing? I was developing a graphics program and didn't know how to clear a space on the screen.

FROM Thomas E. Fairbairn

What other systems have been marketed using the 4800 microcomputer as a basis?

P.S. Thomas, sounds like you've developed some interesting software. The Club would be glad to accept in your format, preferably on tape.

FROM Vincent A. McKeever

Can anyone explain a rapid way to do square roots?

ITEMS FOR SALE

~~_____~~

~~_____~~

COMPUTER STOOLS 6 \$ 95 4 legs
like a short
bar stool with
butcher block seat
plus \$ 2⁰⁰ FOR FREIGHT was \$ 14⁹⁵

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PROGRAMS FROM CLUB MEMBERS

TRIG FUNCTIONS

..... from RIMAS SIMONAITIS of Connecticut

```
10  REM  -TRIG FUNCTIONS:FROM TAYLOR SERIES
100  INPUT "DEGREES(1) <> RADIANS(2)",M
110  IF M=2 THEN GOTO 140
120  INPUT "  DEGREES:",DEGR
130  X=DEGR/57.2958
135  GOTO 200
140  INPUT "  RADIANS:",X
150  DEGR=X*57.2958
200  SIN=X-(X*X*X)/6
210  SIN=SIN+(X*X*X*X*X)/120
220  SIN=SIN-(X*X*X*X*X*X*X)/5040
300  COS=1-X*X/2
310  COS=COS+(X*X*X*X)/24
320  COS=COS-(X*X*X*X*X*X)/720
400  TAN=SIN/COS
500  CALL 17046
510  PRINT "  RADIANS=";X
520  PRINT "  DEGREES=";DEGR
530  PRINT : PRINT
540  PRINT "  SIN=";SIN
550  PRINT "  COS=";COS
560  PRINT "  TAN=";TAN
570  END
```

SPELLING TUTORfrom James M. Pollens of California

The program is pretty straight forward. The only thing that might need adjustment is the timing loop in line # 240. I find that if I use a dictation tape (one without any leader) and start taping the words with the digital counter reset to 000, say word #1 when it reaches 001, press the space bar when it reaches 002, say word #2 when it reaches 003, etc.etc., then this timing loop works well.

AMORTIZATION SCHEDULE

.....from HAROLD BLOOM OF CALIFORNIA

Word of advice, when inputting your interest rate, type as follows - .125 = 12.5%, .140 = 14%, etc.

```
10 INPUT "ANNUAL INTEREST RATE IE .125 =12.5%",A
20 INPUT "TOTAL NO. OF PMTS?",N
30 INPUT "LOAN AMOUNT",L
40 P=1
50 B=A/12
60 C=B+1
70 FOR I=1 TO N
80 P=P*C
90 NEXT
100 P=1/P
110 P=1-P
120 P=P/B
130 M=L/P
140 M= INT (M*100+.5)/100
150 PRINT USING 160,M
160 :MONTHLY PAYMENT =####.##
170 INPUT "NO. OF STARTING MONTH IE, JAN =1, FEB=2 ETC.",D
190 INPUT "FIRST YEAR",Y
195 PRINT "YEAR INTEREST BALANCE"
200 E=13-D
202 LB=L
205 S=0
210 FOR J=1 TO E
215 N=N-1
220 R=LB*B
230 R= INT (R*100+.5)/100
240 LB=LB+R-M
245 S=S+R
250 IF LB<M THEN P=LB:LB=0 GOTO 280
260 NEXT
280 PRINT USING 290,Y,S,LB
290 :#### ##,###.## ###,###.##
291 Y=Y+1
292 IF LB<M THEN GOTO 325
295 IF N<12 THEN GOTO 320
305 E=12: GOTO 205
320 E=N: GOTO 205
325 P=P+P*B: IF E<12 THEN Y=Y-1
330 PRINT USING 340,E,Y,P
340 :FINAL PMT OCCURS IN MONTH ## OF YEAR#### AND IS ####.##
350 END
```

SOMEWHERE MY LOVE

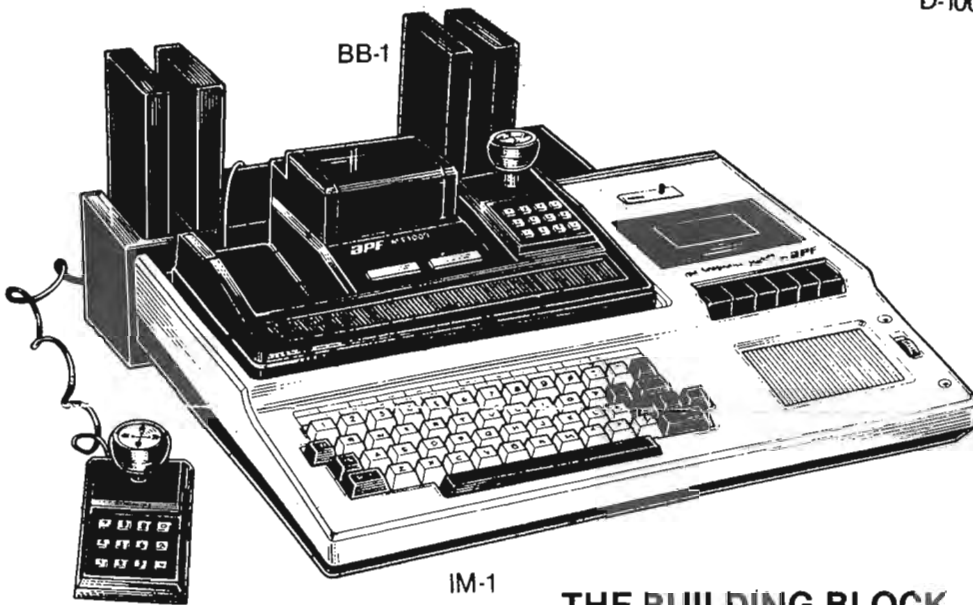
.....also from HAROLD BLOOM OF CALIFORNIA

Another word of advice, when keying in this program, count all of the zeros first, it is very hard to type them otherwise. Yes, this does play "SOMEWHERE MY LOVE" through you T.V.

```

10 FOR I=1 TO 2
20 MUSIC "/70000000200000+6070000000000000 +40006000500020000 +1010000000000000"
30 MUSIC " "
40 MUSIC "10000000020000030+400000000000000 30002000+10002000*1070000000000000"
50 MUSIC " "
60 MUSIC "/70000000020000+6070000000000000 +400060005000200000+1010000000000000"
70 MUSIC " "
80 MUSIC "1000000020000030+400000000000000 30002000+10002000*1070000000000000"
90 MUSIC " "
100 MUSIC "3000000050000000000000 60005000+400050000000030000000020000000000000"
110 MUSIC " "
120 MUSIC "2000000040000000000 +40005000+40005000600000000+60000000*10000000000000000"
130 MUSIC " "
140 MUSIC "/700000000200000+6070000000000000 +400060005000200000+10100000000000000"
150 MUSIC " "
160 MUSIC "1000000020000030+400000000000000 30002000+10002000*1070000000000000"
170 MUSIC " "
180 MUSIC "/700000000200000+6070000000000000 +400060005000200000+10100000000000000"
190 MUSIC " "
200 MUSIC "1000000020000030+400000000000000"
210 MUSIC " "
220 IF I=2 GOTO 300
230 MUSIC "30002000+10001000000+4050000000000000"
240 MUSIC " "
250 NEXT I
300 MUSIC "30002000+100010000000000000 6000000050000000000000000000000000"
800 RUN "MENU"
999 END

```

APF**APF APF**

IM-1

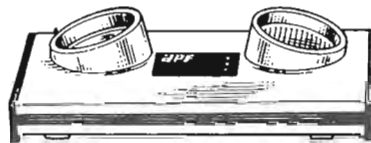
THE IMAGINATION MACHINE (IM-1)

Exciting, personal, home computer for home management, entertainment and education. User-programmable in BASIC or uses APF software cassette programs. Features 9K RAM, 14K ROM, 53-key keyboard, 32 characters x 16 line screen format, alpha numerics in up to 8 colors. Built-in sound synthesizer, built-in tape deck, 2 game-style hand held controllers.

TELEPHONE MODEM (TM-150)

The APF modem (modulator/demodulator) allows you to hook up the computer to a remote terminal over telephone lines and access time-sharing services or trade programs with a compatible computer.

TM-150

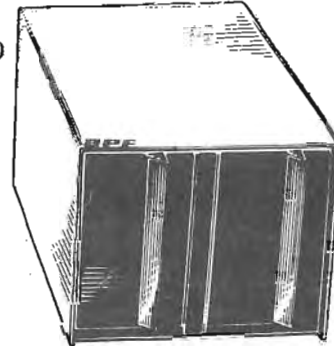


THE BUILDING BLOCK (BB-1)

This expansion device lets you use your APF Imagination Machine to its fullest degree. Easily plugged into the machine and requiring no additional power supply, it contains four universally adaptable ports for peripheral drive cartridges.

For example, a cartridge, enabling hookup to any standard printer or telephone modem. Ports can also hold cartridges for 8K RAM memory and mini-floppy disk drive.

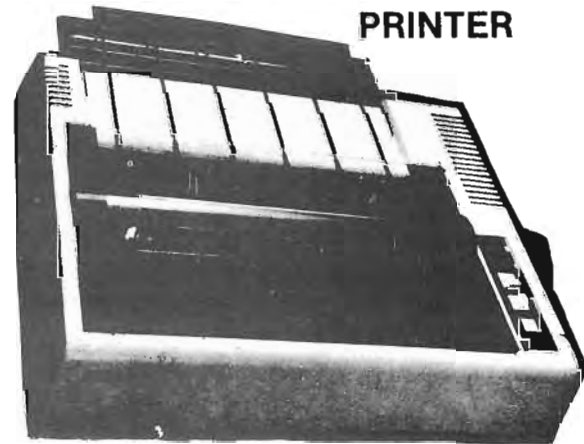
D-100



MINI-FLOPPY DISK DRIVE (D-100)

Each APF mini-floppy disk drive gives you 72,000 bytes of additional storage capacity plus loading and accessing of data within seconds. Industry standard mini-floppy connections.

PRINTER



The EPSON MX

The MX-80, shown above, is an 80-column bidirectional printer featuring the full 96-character ASCII set with descenders for easier reading, and offers a user-defined choice of 40, 66, 80 or 132 columns.

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MAIL TO: CLUB PRESIDENT
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BARRINGTON, IL 60010
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JUNE CLUB LETTER

GREAT NEWS FROM PROTECTO

June 1, 1982

WE ARE BACK IN STOCK!

- A. 23K APK IM-1 Computers In Stock!
- B. Building Block Interfaces In Stock!
- C. 8K RAM Expanders! In Stock!
- D. S1-232 Serial Interfaces! In Stock!
- E. FI-100 Disk Interfaces! In Stock!
- F. D-100 Mini Floppy Disk Drives In Stock!
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- D. S1-232 Serial Interfaces! In Stock!
- E. FI-100 Disk Interfaces! In Stock!
- F. D-100 Mini Floppy Disk Drives In Stock!
- G. All Tape and Cartridge Programs In Stock!

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**JUNE
JANUARY 1, 1982**

**SPECIAL CLUB
LIST *FACTORY
PRICE PRICE**

COMPUTER PRODUCTS

| | | | |
|--|----------|-------------------|----------|
| 23K APF IM-1 COMPUTER. Includes 14,000 Bytes ROM with BASIC built in, 9000 Bytes User RAM, Color, Sound. Professional 53 keyboard, Two controllers, Two 10 key numeric pads, High speed cassette, A. C. adapter, R. F. Modulator, T.V. switch box. Accepts TAPE-DISK-PLUG in cartridges. It is plug in expandable. 90 days parts and labor warranty, Owners guide, BASIC language manual, Beautiful Black & White Console Case. | X | 599.00 | \$239.00 |
| 23K APF IM-1 COMPUTER FACTORY PACK. Everything you get for \$239.00 plus "BASIC TUTOR program" on two tape cassettes with manual to teach you how to cut programming time, "PROGRAMMING AND TECHNICAL ASSISTANCE MANUAL" for Graphics, Machine Language-Memory maps, Schematics and Parts List. Also you get the popular "SPACE DESTROYERS Program." | X | 498.00 | 289.00 |
| BB-1 BUILDING BLOCK INTERFACE. This plug in interface allows you to use the 23K IM-1 computer to its fullest degree. It contains 4 universal ports to add: RAM memory, Printers, Telephone Modem, and Floppy Disk drives. (5.00 shipping) | S | 74.50 | 79.50 |
| 8K-RAM EXPANSION. Plug into interface port to increase your RAM memory 8192 Bytes. (3.00 shipping) | | 74.50 | 79.50 |
| SI-232 SERIAL INTERFACE. Plug in to interface port to connect printers and telephone modems. (3.00 shipping) | | 74.50 | 79.50 |
| MX-80 EPSON LINE PRINTER. Deluxe quality: Impact dot matrix-bi-directional, 40-80-66 132 columns-uses regular paper. Includes serial port. (20.00 shipping) | | 479.00 | 499.00 |
| TM-150 TELEPHONE MODEM. Best quality: Transmit receive full duplex, switches! Originate-off-answer. (4.00 shipping) | | 119.00 | 129.00 |
| FI-100 DISK INTERFACE. Plug into interface port - allows you to connect the floppy disk drive. (\$3.00 shipping) | | 74.50 | 79.50 |
| D-100 MINI FLOPPY DISK DRIVE. Plugs into interface - has its own power supply and controller - uses no RAM memory, give you 72,000 Bytes of additional data storage, plus instant loading and accessing of data. (7.50 shipping) | | 379.00 | 399.00 |

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| | | | |
|--|----------|------------------|-------|
| BASIC TUTOR. This program includes two cassette tape programs with a 243 page manual - Teaches you how to use the simplified Level II BASIC cuts programming time - a must for beginners and professionals. | S | 26.95 | 29.95 |
| PROGRAMMING AND TECHNICAL ASSISTANCE MANUAL. 100 pages, graphics, memory maps, machine language, schematics, and parts list. | | 13.45 | 14.95 |
| 6800 MACHINE LANGUAGE EDITOR AND ASSEMBLER. This disk program is used to create source code file - this file is then used as the assembler - simplifies entry or editing, adding, deleting, change in lines, etc. | | 26.95 | 29.95 |
| 6800 MACHINE LANGUAGE DISASSEMBLER. This disk enhances creation, debugging and recording of machine language. | | 13.45 | 14.95 |
| DISK COPIER PROGRAM. Allows you to make duplicate copies of all disk programs written for the APF-IM-1. | | 8.95 | 9.95 |

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JUNE 1, 1982

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