

## GAD! ANOTHER NEWSLETTER! (Editorial)

Welcome to our new (and overdue!) MMSFORTH NEWSLETTER. We offer it as the vehicle for the licensed MMSFORTH user community's questions and suggestions, constructive criticism, and for sharing interesting routines and short programs. MMS is sending the first two issues free of charge. A subscription arrangement will be announced and will become effective with the third issue.

### Some ground-rules for the MMSFORTH Newsletter:

1. As MMSFORTH and this Newsletter evolve, early descriptions may require updating. (The current version of MMSFORTH is V 1.8.)
2. Number values mentioned in this Newsletter are in single-precision decimal unless noted otherwise.
3. MMS and authors of articles are not liable for damage and frustration attributable to any imperfections herein.
4. We solicit your contributions for this Newsletter in writing or in MMSFORTH, Electric Pencil or SCRIPSIT on tape or disk.

On the first page of our first Newsletter, MMS acknowledges its gratitude to Charles Moore and Elizabeth Rather of Forth Inc. for developing Forth during the past decade, and for encouraging our development of MMSFORTH as a competent version on the Radio Shack TRS-80. The cooperative spirit shown by the staff of this important Forth company is one reason Forth is a better tool.

One of the best sources of non-TRS-80 FORTH information is the Forth Interest Group, P.O. Box 1105, San Carlos, CA 94070. It costs only \$5.00 to get aboard, including a list of available documents and the first six issues of FORTH DIMENSIONS, the FIG Newsletter. We're FIG members and think you will enjoy it, too.

Are you appreciating MMSFORTH? At MMS, we hear cries of delight from experienced users and many newcomers, an occasional roar of frustration from someone accustomed to weaker but more strictly developed (read: limited) systems, requests for additional routines and for better documentation. We also get your inputs to correct errors and reduce ambiguities. We're grateful for all. It is clear that Forth looks as good to most of you as it does to us, that the books aren't yet a tenth as good as the best on BASIC, and that MMS is hard-pressed to deal individually with everybody until the better books arrive. For the serious professional user, we offer consulting expertise. For the future, we have our own manual - maybe two - in the works. For now, we begin this Newsletter to increase our own correspondence with you and to open up your feedback to each other. This MMSFORTH Newsletter is important to us. We hope you'll value it, too.

-- Dick Miller, Editor 4th Class

## FUN & GAMES

### BOTTLES AND MUGS:

Here's a quickie, demonstrating a simple use of TRS-80 graphics.

```
: MUGS 0 5 SPACES DO 191 79 32 ECHO ECHO ECHO LOOP CR ;
: BOTTLES 0 2 SPACES DO 189 168 32 ECHO ECHO ECHO LOOP CR ;
10 MUGS Enter          15 BOTTLES Enter
```

### DIGI-PONG:

Jim Gerow of the Eastern Mass. MUG turned in our first user contribution, his own real-time graphics game in two tightly packed blocks of MMSFORTH. Jim used the MMSFORTH tape system to create this fine demonstration of the space and speed capabilities of Forth. It's real electronic fly-paper! We expect it will spawn various combinations and permutations from other users. Pong, anyone?

### BLOCK : 67

```
0 ( DIGI-PONG J. GEROW 12/79 ) : TASK ; 3 CONSTANT SKILL
1 33 LOAD ( LOAD GRAPHICS ROUTINES ) : PAUSE SKILL 99 * 0 DO LOOP ;
2 20 VARIABLE R 20 VARIABLE C 1 VARIABLE RI 1 VARIABLE CI
3 4 VARIABLE P1 16 VARIABLE P2 12 VARIABLE WIDTH
4 0 VARIABLE SCORE 1 VARIABLE ROUND
5 : TCHK R @ RI @ + 9 < IF RI @ MINUS RI ! THEN ;
6 : LCHK C @ CI @ + 4 < IF CI @ MINUS CI ! THEN ;
7 : RCHK C @ CI @ + 123 > IF CI @ MINUS CI ! THEN ;
8 : SINIT CLS 9 7 DO 128 0 DO J I ESET LOOP LOOP 48 9 DO 4 0 DO
9 J I ESET LOOP LOOP 48 9 DO 128 124 DO J I ESET LOOP LOOP
10 48 46 DO 128 0 DO J I ESET LOOP LOOP 0 22 PTC " D I G I - P O "
11 " N G " 1 8 PTC " PRESS ENTER KEY TO SERVE " 1 47 PTC " ROUND "
12 1 37 PTC " SCORE 0 ROUND 1 "
13 15 5 PTC " 1 " 15 11 PTC " 2 " 15 17 PTC " 3 "
14 15 23 PTC " 4 " 15 29 PTC " 5 " 15 35 PTC " 6 " 15 41 PTC " 7 "
15 15 47 PTC " 8 " 15 53 PTC " 9 " 15 59 PTC " 0 " ; 68 LOAD
```

## LIFE:

The Game of Life is a population dynamics simulation invented by John Conway, an Englishman, and first reported in the October 1970 Scientific American. The December 1978 issue of Byte Magazine is a rich source of Life articles and references. (We liked "Some Facts of Life" on page 54 the best.)

Single cells, represented on the screen as graphics characters, reproduce, live or die governed by a simple set of rules based on how many direct neighbors abut each cell. More than three neighbors and the cell dies of overcrowding, fewer than two and it dies of loneliness, otherwise it survives in the next generation. A cell will be born in any empty space which has exactly three neighbors.

On Block 53 of your MMSFORTH System, MMS has provided a one-block Life module in Forth. It uses the three-block Doodle screen-graphics module which resides immediately beneath, and this in turn uses the standard graphics module and the basic MMSFORTH vocabulary. The whole operation is loaded automatically from the system diskette menu, by calling LIFE.

When Life has loaded and its menu screen is on the video, press L for the Load mode. You will be prompted for a block number at the bottom right of the video screen. At this point enter 62, 63 or 64 to load the desired block.

Some beginning patterns of cells are very long-lived, continuing to grow for many generations. Two of these patterns are supplied on the MMSFORTH System Diskette or Cassette as Blocks 62 and 63.

The MMSFORTH version of Life also allows the user to enter his/her own starting patterns via the Doodle module. Block 64 contains a Doodle picture which is short-lived if run with Life.

You now can run Life by pressing G for Go, or you can reverse the white and black areas of the screen with R for Reverse. Note that patterns with a lot of white cells will die out relatively fast. If you have started running Life and wish to stop it to do something different hold down the I (Interrupt) key until the blinking cursor returns in the upper right area of the screen. The Life program only scans the keyboard (to see if you are pressing the I key) when the full screen has been updated and before starting the next screen.

To enter your own pattern note the location of the small block in the center of the screen (the drawing cursor) and the "compass rose", the small group of numbers in the upper right of the screen. The rose indicates direction: you press the number which represents the relative direction you wish to move the drawing cursor. The letter in the center of the rose indicates the mode of action: M for Move, D for Draw, or E for Erase. ROW and COLUMN indicate the current position of the drawing cursor. The rose numbers correspond to the numbers on the TRS-80 numeric keypad. Children (of all ages!) enjoy drawing pictures with this Doodle program.

If you wish to erase the screen use C to make it Clear and W to make it White. Reverse can be performed repeatedly.

To save a particularly nice pattern or picture, press S for Save and you will be prompted (as with the Load option) for a block number. This block number is where you will write the contents of the video screen so be sure it is not one which has some important data on it. As delivered, the MMSFORTH disk has 21 free blocks from 66 to 86.

### BLOCK : 68

```
0 : PDRAW P2 @ P1 @ DO 42 I ESET LOOP ; ( DIGI-PONG, 2 OF 2 )
1 : PCLR P2 @ P1 @ DO 42 I ECLR LOOP ;
2 : PGET ?KEY DUP DUP IF 48 - DUP 0 = IF DROP 10 THEN
3 DUP 0 > = OVER 10 < = AND IF 12 * 8 - DUP P1 @ < >
4 IF PCLR DUP P1 ! WIDTH @ + P2 ! PDRAW ELSE DROP THEN
5 ELSE DROP THEN ELSE DROP THEN ;
6 : ASCORE 1 ROUND + 1 ! 52 PTC ROUND ?
7 10 R ! 0 BEGIN 1 + PGET 13 = END ABS 123 MOD 4 MAX C ! ;
8 : PCHK 1 R @ RI @ + 42 > IF C @ P1 @ > = C @ P2 @ < AND
9 IF DROP 0 RI @ MINUS RI ! ! SCORE + ! 1 42 PTC SCORE ?
10 ELSE R @ C @ ECLR ASCORE 5000 0 DO LOOP THEN THEN ;
11 : PONG BEGIN CLS " SKILL LEVEL (1-10)" #IN 1 MAX 10 MIN
12 ( ' ) SKILL ! 0 SCORE ! 0 ROUND ! SINIT PDRAW ASCORE
13 BEGIN PGET DROP PCHK IF R @ C @ ECLR THEN TCHK RCHK LCHK
14 RI @ R + ! CI @ C + ! R @ C @ ESET PAUSE ROUND @ 21 > END
15 14 63 PTC CR " PLAY AGAIN " Y/N END ; CLS PONG FORGET TASK DIR
```

SETTING FORTH (for beginners)

PAINT (in colors of white, black, striped, and flashing!):

We are going to create a new routine based on the Forth word, FILL. We will do so by using some immediate-execute mode operations. We also will store the program in an edited block for further modification later.

First, try the word FILL to see how it performs. In your MMSFORTH Glossary we find that FILL expects three numbers on stack and will fill the top number of bytes starting at the address 2nd-on-stack, with the character whose ASCII code is 3rd-on-stack. Use it to paint the screen (which starts at RAM location 15360, a good number to remember!) white with ASCII Code 191:

```
191 15360 1024 FILL Enter
```

Fast, what? But we can make it faster by defining a single word to do all except the ASCII code, and then we can use various codes to get different displays. Just before we start, put a special word at the beginning of your new words, like a bookmark:

```
: TASK ;
: PAINT 15360 1024 FILL ;
191 PAINT Enter
```

Get the idea? If you believe that, we'll tell you another:

```
: WHITE 191 PAINT ;
: BLACK 128 PAINT ;
: STRIPE 131 PAINT ;
WHITE Enter BLACK Enter STRIPE Enter
```

Whoopee! We can even make it flash, like so:

```
: FLASHES 0 DO WHITE BLACK LOOP ;
```

```
5 FLASHES (Enter)
```

Whoops, a problem! Forth is so fast that the flashes are ineffective. We can add a pause routine, but first we will forget the latest word so we can redefine it with the new PAUSE word pre-defined for use therein:

```
FORGET FLASHES
: PAUSE 1000 0 DO LOOP ;
: FLASHES 0 DO WHITE PAUSE BLACK PAUSE PAUSE LOOP ;
5 FLASHES
```

Why the double pause after BLACK? Because I liked it better, that's why. Try it yourself. When you've had enough, you can remove these new words from the top of the dictionary and free the RAM for other uses, by saying FORGET TASK. Then use these techniques and your Glossary for other projects.

NOTE: FORGET TASK frees the use of these words, as well as their RAM space. In this example WHITE will supersede WHILE in newer definitions until we FORGET TASK. This is because MMSFORTH only recognizes the first three characters plus the number of characters. (BASIC only saw the first two, remember?) This feature can be used effectively by advanced programmers.

Now to contemplate that which we have created. Using Forth, we quickly and easily added special new words for our own tasks to the existing FORTH vocabulary of the MMSFORTH dictionary. These words are compiled immediately; that is, their machine code definitions are added to the dictionary in RAM and they become as useable as the preceding words. But the source code, the sequence of Forth words we wrote on the screen, is no longer available for modification or to reload tomorrow night. To store it, we need an Editor.

As fate would have it, two fine editors are on the MMSFORTH system tape or disk. One is much as described in the microFORTH PRIMER, and the other is a more powerful full-screen editor built upon the former. Either can be used to create the source code in a Forth block, from which it can be used, modified and stored to tape or disk. I will use the fancy version here.

The MMSFORTH block is the same size as your TRS-80's video display screen: 16 lines (numbered 0 through 15) of 64 characters each, adding up to 1024 characters or bytes or, as we say in the byte business, 1K. Your original MMSFORTH tape or disk has 66 blocks of software aboard; it is duplicated on the reverse side of the tape, and there are 21 additional blank blocks on the disk. For now, we will build the program in a temporary block, in the computer's memory. Two block buffers are provided, and the actual block numbers presently "attached" to their contents are the negatives of two variables, BK1 and BK2. Load the optional full-screen editor from Block 65. Then, taking care to select an available block number, enter the Editor vocabulary, clear that block to blanks, and enter the "edit-screen" mode in the same block:

```
DIR SCREEN (on disk) or 65 LOAD (on tape)
EDITOR 80 CLEAR V
```

Here is a blank slate on which to create our source code record. Start by titling your work of art on Line 0. Press the R key to Replace the blanks, then write:

```
( MY FIRST MASTERPIECE! ) or some other significant
statement. Add : TASK ; near the right end of this line, then
press Enter to return from the Replace submode to the Editor
mode. Press Enter again to move down to the beginning of the
```

next line. Let's skip a line with another Enter, just to keep things readable and to leave some room for possible future changes. On line 2 (remember, we started on Line 0), we again can enter

```
: PAINT 15360 1024 FILL ;
```

Did you remember to press R on the new line? Other submodes are Insert and Delete. In general, return to the Editor mode with an Enter between each of these. Experiment, then complete the earlier program on this block. These submodes are all you'll need, even to correct mistakes and to make changes.

When you like the block and are ready to save it, from the Editor mode press S to substitute this version for the prior one in the block buffer (or press Q to "forget it" and keep the prior one). Now it is the new Block 80, or whatever (you can get the present screen number with SCR?). You can again compile from this source code, by entering 80 LOAD. This time the source code will still be available in Block 80 when you are through. Try it out, by entering 5 FLASHES again. But remember that repeated LOADS will compile more and more copies of your source code into the limited amount of RAM and eventually may crash the system; then you will have to reload Forth, or reenter it with Break Reset SYSTEM Enter /19200. It is safer and easier to FORGET TASK (the first new word) before reLOADing.

As you get into fancier programming, you will create multiple-block programs and Forth's virtual memory will move the earlier blocks out to disk or tape as they are displaced by new text entering the two block buffers. But for now, and for the final two blocks later, if you want to keep this block move it out to tape or disk yourself with the word, FLUSH. If you'd rather forget the present contents of the two block buffers, say ERASE-CORE to ensure that the virtual memory doesn't flush them for you later. To FLUSH on tape, you must provide the correct place on tape, in Record mode. The disk system overwrites that block number automatically. Be sure you aren't write-protected or, on disk, PBLK'd.

Now you have created your own Forth program, saved its source in a Forth block, and saved that block for use tomorrow. Let's call it a day, and an interesting one at that.

BACKUP:

Some beginners wonder why OBACKUP permits exchange of diskettes before execution but BACKUP (from Drive 0 to Drive 1) does not. It does. We gave BACKUP equal billing on the directory menu, but in fact it is already aboard in basic MMSFORTH. (Note that it doesn't appear in Block 10 as a directory command.) So just swap diskettes when you wish, then call BACKUP for immediate action. Remember that your destination diskette must be formatted, un-PBLK'd, and have its write-protect tab removed.

PERIPHERAL TALK

DISK DRIVES:

Here's a Forth routine from MMS, to check your disk drives for alignment and for speed-up capabilities:

```
: OTEST BEGIN 15360 0 RBLK 15360 86 RBLK ?KEY END ;
OTEST Enter (hold any key to exit)
```

If the above test works without hanging up, and without chattering excessively while failing to read the complete first or last block on your 0-drive diskette, your system is working OK at the usual low speed associated with Radio Shack disk drives. Let's try to speed it up, with one-byte stores of different seek and restore constants, as follows:

```
22 20852 C! 2 20824 C!
```

Now repeat the OTEST routine. If it works you'll hear the briefer delay between tracks quite clearly. If it fails put back the more conservative original values, which were 23 and 3 respectively. If it works, press your luck by trying new constants of 21 and 1. In descending order, these constant pairs correspond to time delays of 40 milliseconds, 20 ms and 12 ms per track. MMS sells and uses MPI drive mechanisms, which are capable of 5 ms but which we run at 12 ms on the TRS-80. Even many Radio Shack (Shugart SA400) drives are capable of the 20 ms speed-up, so give it a try!

Want to use the disk drive diagnostic on multiple drives? Here's a version for that:

```
: TEST 87 * 15360 SWAP BEGIN OVER OVER RBLK
OVER OVER 86 + RBLK ?KEY END DROP DROP ;
```

Then 2 TEST Enter for a test of Drive 2, etc. Don't forget to move your diskette into that drive. If you get a "PROTECT - DISK ERROR" rejection slip, just set 3 #DV C! like you should have in the first place, then try again!

TAPES:

Several months ago, MMS delivered some tapes of marginal recording quality. At the time, they loaded easily on the TRS-80's at MMS, but several users reported exceptionally hard



We don't know of other existing MMSFORTH Users Groups, but here are some users interested in starting local ones: Morris Herman (MMSFORTH Dealer), 503 Rosario Drive, Santa Barbara, CA 93110 (805/964-7144) Paul Van der Eyk, 4910 Fran Place #204, Alexandria, VA 22312 (703/354-7443)

We now have many hundreds of registered users, so add your name to this list to get a good thing going in your region.

NOTE: Program trading is one popular facet of these meetings, but NOT commercial programs and WITHOUT MMSFORTH systems aboard! Promote legitimate sharing, discourage pirating, and take care not to jeopardize your own MMSFORTH serial number.

#### AT MILLER MICROCOMPUTER SERVICES

#### WHAT'S COMING:

MMS is very pleased with the early responses regarding our new DATAHANDLER data base management system. It is based on the PIMS introductory text by SCELBI Publications, but is much more flexible and powerful. It selects on any field or portion of a field in about a half-second, and sorts hundreds of records in 5 to 20 seconds. THE DATAHANDLER V 1.1 (with user-specified one-line reports) is being released now, and additional modules to add to its capabilities are spinning off our keyboard at this time. This inexpensive, easy to use and very professional DBMS is available now for your TRS-80. Yes, it comes with MMSFORTH source code for your own modifications.

In response to many user requests, MMS now offers a very thorough single and double precision FLOATING-POINT MATH PACKAGE for use with your MMSFORTH System Diskette. In addition to the Level II BASIC capabilities, it has complex number math, rectangular and polar coordinate conversions, and an optional degrees mode for its trigonometric functions.

A FULL Z80 ASSEMBLER for MMSFORTH is also available. It and the Floating-Point Math package are included on a single diskette for \$29.95 plus the usual shipping/handling and Mass. tax.

MMSFORTH utilities in development include a VIDEO DISPLAY DRIVER ROUTINE for the new Radio Shack lower-case characters modification, an RS-232-C COMMUNICATIONS PACKAGE in MMSFORTH, and a FULL ASCII KEYBOARD. FORTHWRITE, our word-processing program project, was suspended while we awaited Radio Shack's SCRIPSIT but it appears that there is room for competition after all. Comments regarding this?

#### SPECIAL APPLICATIONS:

MMS is very busy developing CUSTOM applications in MMSFORTH. We find it ideal for many client purposes, and know that many advanced users are also applying it to serious professional tasks. A brief item describing your successful project will be most welcome.

THE LAST WORD: "May the FORTH be with you!"  
- from Tom Dowling, with whom it indeed is.

Punsters: submit a cornier last word for the next issue!

#### UPGRADE YOUR MMSFORTH SYSTEM TO V 1.8:

If you like, MMS will rewrite your original MMSFORTH System Tape or Disk for only \$10.00, plus \$1.00 shipping/handling and \$4.00 extra which will be refunded with your order unless a new diskette/cassette is required during our duplication process. If you prefer, for the same \$10.00 plus \$1.00 we will ship you a V 1.8 Upgrade Diskette which you can merge yourself.

Version 1.8 has added quite a bit for some of our early customers: the full-screen editor on Block 65 (including one-key stepping to the adjacent blocks), intelligent ' and " (that means they work both inside and outside of colon-definitions), and many minor improvements.

#### VERSION 1.8 MMSFORTH GLOSSARY:

This February 1980 edition is now available. It costs \$4.00 plus \$1.00 shipping (or just \$1.00 for the two items). In addition to more details, corrections, examples and upgrades, it is a complete glossary instead of the early references to the microFORTH PRIMER, and it is printed in upper and lower case type.

#### #IN CHANGE:

Effective with MMSFORTH Version 1.8, #IN accepts only single-precision integer numbers. Early copies of the CHECK demo program on the system disk/tape and the CHECK print-out routine on THE DATAHANDLER both got into trouble with this one, since their programs expect #IN to absorb a double-precision number. Please note this change in your own programming. All new copies are corrected; if you need the fix and are not getting a Version 1.8 upgrade from MMS at this time, just write us for a print-out of the block you need.

#### MERGING APPLICATIONS WITH YOUR SYSTEM DISKETTE:

THE DATAHANDLER, our new FLOATING-POINT MATH/Z80 ASSEMBLER package and other similar items are delivered on diskette blocks, without a system aboard. This permits you to merge them with your own serialized MMSFORTH System Diskette upon receipt. The merged disk should display your system's version number in its first screen, but instead may incorrectly show the version number MMS used to write the new blocks. To avoid or correct this minor problem, rewrite disk sectors 0 and 1 FROM your MMSFORTH System diskette TO the other disk. If the disk requires further adjustment of either of these two boot sectors, which lie under Block 0, do that also. We intend to incorporate this slightly modified process in future documentation.

To move the two sectors across, boot your MMSFORTH System and enter PAD 0 0 0 2 DRDSECS. Then swap your program disk into Drive 0 and enter PAD 0 0 0 2 DWTSECS



-----  
Bulk Rate  
U. S. POSTAGE  
PAID  
Framingham, MA 01701  
Permit No. 207  
-----