

# GENERAL DESCRIPTION OF **mmsFORTH™**

For Radio Shack TRS-80 Models I and III  
and the IBM Personal Computer

For a decade, the Forth language and system have been the computer environment of choice at many of the world's foremost radio telescope observatories. Now that the investment for a professional version is reduced from many thousands of dollars to the low hundreds, Forth is proving equally revolutionary and practical for microcomputer business programs, games and I/O device controls.

Forth is a structured language somewhat similar to PASCAL except that, in Forth, the programmer defines additional commands as they are needed. The commands can be immediately compiled into the language, and deleted when no longer needed. This makes Forth expandable and contractible so you can tailor it to your own needs. Assembler code can be inserted directly into a Forth program using a function of the language itself. This eliminates the need to pre-load or POKE in Assembler subroutines as one normally does in BASIC.

enables the user to precompile modified versions of MMSFORTH for specific applications or simply to examine it. Your complete professional application systems also can be precompiled with each final user's individual serial-numbered MMSFORTH System. You may choose to deliver to the final user precompiled without your source code; such programs will load rapidly and run efficiently, while effectively preventing user review and modification. MMS encourages professional programmers to modify and extend its system in this manner, provided that the necessary MMSFORTH System and any utilized accessory modules are properly sold to each final user.

Like Hewlett-Packard calculators, Forth uses Reverse Polish Notation. Unlike H-P's, Forth has **multiple stacks** of "infinite" depth limited only by the size of available memory. Forth programs tend to be so **compact** that a 16K disk system becomes practical.

# **mmsFORTH™**

Since early 1979 over 3,000 persons and organizations have licensed MMSFORTH, making it the **most popular** professional Forth system. MMSFORTH offers **significant advantages** over any other Forth currently available for the TRS-80 or IBM Personal Computer, and many features supplied by MMS are not available in other versions of Forth for any microcomputer. The MMSFORTH System Diskette supplies user-callable disk (and TRS-80 tape) I/O, virtual memory with multiple block buffers, double-precision integer math (to +/-21,000,000.00), auto repeat keyboard with complete ASCII set, variable-character blinking cursor, a complete Assembler (8080 for the TRS-80, 8088 for the IBM), sophisticated full-screen editing, Extended-BASIC-like string-handling and arrays, even a function to "screenprint" text and graphics to your compatible line printer.

Because MMSFORTH runs in its **own software environment** without DOS, it can achieve an unusual degree of flexibility. Its disk format frees 1.5 tracks more data space than most DOS diskettes (plus an optional 20Kbytes additional data per "M.3" disk on the IBM), runs faster, adjusts for up to 8 35-track to 255-track drives, and permits MMSFORTH program and data diskettes to be read, changed, and run **interchangeably** between Model I and Model III, or between Model III and IBM Personal Computer hardware. Just put the diskette in the other type of computer, change disk format on any drive, and keep running!

MMSFORTH's inclusion of **79-STANDARD Forth** words enhances compatibility with versions from Forth, Inc. and others. MMS includes **source code** for the upper portion of MMSFORTH which is written in Forth. This unusual feature

Persons accustomed to BASIC interpreters will gasp at the **execution speed** of Forth programs. A demonstration program supplied on the MMSFORTH package sorts 1,000 items in 3 seconds. Routines in MMSFORTH run significantly faster than most other Forths, and approximately 20 times faster than equivalent BASIC programming (faster still when using Forth's Assembler). Forth's **modular, structured code** makes development time exceptionally brief and bug-free. Functions including those using Forth's internal Assembler can be tested interpretively during development of a package. Machine code dump routines are also provided. Thus the MMSFORTH system supports programming in high-level Forth, Assembler, and machine code as well as functioning as **interpreter and compiler!**

The MMSFORTH System Diskette includes additional routines and **demonstration programs**. Among these are a number guessing game, a name sorting program, a remarkable demonstration of five common sorting routines, a graphics package and the Game of Life, a menu-driven checkbook balancing program, the famous BREAKFORTH arcade game with sound, and THE NOTEPAD letter writing program. An optional directory block has been implemented for these demonstrations and is available for user applications.

MMSFORTH is the hottest new software environment for the IBM Personal Computer and the TRS-80 Model I and III, and our MMSFORTH USERS MANUAL of over 200 pages makes learning it easier than ever before. This manual is available separately (without Appendices, but with a fine introduction and even a detailed analysis of our checkbook balancing program), for those who wish to evaluate Forth further or to use it with a version other than MMSFORTH.

MMS continuously adds refinements, additional modules, and application programs to its MMSFORTH system.

The MMSFORTH **UTILITIES** Diskette includes a very full **FLOATING POINT MATH** utility with complex numbers, radian and degree trigonometry, rectangular and polar coordinate conversions, etc. It also includes **XREF**, a powerful cross-referencing utility which quickly lists the anatomy of any Forth program's source code. The TRS-80 version of the **UTILITIES** Disk includes a full **Z80 ASSEMBLER** utilizing most of MMSFORTH's capabilities for conditional control structures, interpretive and compiled operating modes, etc. The IBM version of the **UTILITIES** Disk includes **TGRAPH**, a color graphics wordset including a full Turtle Graphics implementation.

The MMSFORTH **GAMES** Diskette includes a handy copy of the **BREAKFORTH** arcade game from the System Diskette, plus new arcade games (**CRASHFORTH** and **FREEWAY**), board games (**OTHELLO** and **TIC-TAC-FORTH**), and an excellent creation and solution aid for **CRYPTOQUOTE** puzzles. It's top-notch for fun and for learning interactive Forth techniques!

The **FORTHCOM** communications program in MMSFORTH permits a wide variety of **RS-232** and **telephone communication** activities. Run as a terminal on other computers, and spool the input to your printer. Between two **FORTHCOM** systems, transfer ranges of Forth blocks (with space compression and error checking) or even let one computer take over **remote operation** of the other. These capabilities are available to the user from **FORTHCOM**'s on-screen menu at up to **1200 baud**, or to the programmer by modifying its Forth source code to special tasks at up to **9600 baud**!

**THE DATAHANDLER** application program for MMSFORTH is a fast, flexible, and easily used data base management system based on **SCELB**'s **PIMS** Manual but with dramatically increased capabilities, storage capacity, and operating speed. (In accounting, mail-list, inventory or other files of hundreds of records, records are selected conditionally on any field or fragment thereof with delay time less than a half-second; the same files are sorted on multiple fields in 5 to 10 seconds.) Like other MMSFORTH software, **THE DATAHANDLER** comes with demonstration programs, data files, documentation, and full source code for further modification. (See next column.)

**FORTHWRITE** is a fast, full-performance word-processor with easy-to-learn simple operations and surprisingly powerful advanced features. Among its more unusual abilities are ability to imbed additional **printer control characters** individually or in groups, text indents and **outdents**, **relative** margin settings, block and document linkage anywhere in text or only upon print-out (permitting insertion of data into forms, keyboard entry of custom items during print-out, and full-disk print-out!), **print-to-disk** option, a keyboard control for the playback of transcription tapes, and **full-proportional** support of appropriate printers **WITH** tabbing! The release version of **FORTHWRITE** will accept record data from **THE DATAHANDLER**. (Using **FORTHWRITE**, this actual copy was converted from a **SCRIPSIT**/TRSDOS file, then modified and printed on an NEC Spinwriter printer.)

The MMSFORTH **GENERAL LEDGER** provides fast, smooth-operating accounting support including subsidiary ledgers and journals. It has an unusually **large capacity** of 500 accounts with unlimited subsidiary ledgers and over 2,500 line items per session (one group of journal entries). Its many built-in **information safeguards** include error checking, a complete audit trail, 60-character transaction descriptions, and prompting for additional data on unbalanced entries. An **optimized user interface** speeds professional data entry by minimizing switching back and forth from numeric keypad to other keys. Journal detail is always retained, so detailed journal and ledger listings may

be made of any account or group of accounts (determined by any part of account number). Income statements include percentage information for present period and for year-to-date.

**TRADESHOW** is a specialized high-speed intelligent-terminal program for the selective remote monitoring and recording of up to 100 types of **Commodities Exchange transactions** from the COMEX or similar data lines (separately leased services) at up to **1200 baud** without modification. **TRADESHOW** is designed for easy and effective use by sophisticated commodities traders who value its selectivity and 15-minutes or greater leadtime on other data services. (**TRADESHOW** is not supported on the TRS-80 Model I.)

MMS **supports** its powerful MMSFORTH software system with on-board examples, manuals, a user newsletter, workshops, and custom consultation. MMS also encourages the formation of MMSFORTH User Groups; dozens presently exist around the world. Upgrades to each MMSFORTH System are made available to its licensed user at minimal cost.

### THE DATAHANDLER

(Data Base Management System in MMSFORTH)

**THE DATAHANDLER** is a favorite and inexpensive first application for most new users. It is an interactive data base management system in MMSFORTH for the TRS-80 Model I or III or IBM Personal Computer system with at least 32K RAM and one minidisk drive. Its user can specify up to 10 data fields appropriate to each particular job (more with a minor change), of variable length up to 255 characters each! Standard and special report formats can be output to screen and printer. It is an outstanding solution to a wide variety of personal and professional tasks such as management of alphabetic and numeric data files, including accounting and inventory. The **DATAHANDLER** diskette includes mail list, checking account and bibliography applications with custom report commands and sample data files, both as useful products and as informative examples of other practical applications.

**THE DATAHANDLER's** program approach follows the excellent introductory documentation of **SCELB**'s **PIMS** Manual. However, unlike **PIMS** and other TRS-80 data base packages written in **BASIC**, **THE DATAHANDLER** is **extremely fast**: typical multiple-field sorts on a 100-record file take five seconds, while look-ups take less than a half-second! The system and its sequential data files are **remarkably compact** as well. An indexed key structure incorporates sophisticated string and value selection mechanisms including normal compares and values inside or outside a range. **THE DATAHANDLER** is **the best professional solution** for those data files which can reside in RAM: typically at one time, 24K fewer data characters than the computer's RAM capacity. Often, larger files can be divided into a series of subfiles for effective use.

Most computer data files for personal use will fit into **THE DATAHANDLER** easily, as will many professional tasks. The flexibility of its interactive program makes it the logical choice for non-programmers. For the professional programmer, it and MMSFORTH offer far greater execution speed than **BASIC** programs, while its complete source code and Forth's structured and modular language provide the tools for rapid and accurate modification to a wide variety of custom applications.

Several MMSFORTH features make **THE DATAHANDLER** unusually well suited to single disk drive use: the program area of the **DATAHANDLER** diskette is **software write-protected** while the data file area is left open; alternatively, after loading the program its diskette may be replaced by one or more diskettes containing data only. Regularly used system configurations may be precompiled for five-second loading time.



## MMSFORTH & ACCESSORY PRODUCTS

(October 1982, available from MMS or selected dealers)

TRS-80 Model 1 V2.0 MMSFORTH Disk System (32K RAM, 1 single-density drive)	\$129.95
TRS-80 Model 3 V2.0 MMSFORTH Disk System (32K RAM, 1 drive)	\$129.95
IBM Pers. Comp. V2.1 MMSFORTH Disk System (32K RAM, 1 drive, 80-column display)	\$249.95
MMSFORTH USERS MANUAL (free w/MMSFORTH) W/o Appendices, for non-users.	\$17.50
MMSFORTH UTILITIES Diskette Floating Point Math & XREF; also Z80 Assembler for TRS-80 or Turtle Graphics for IBM PC (32K RAM, 1 drive)	\$39.95
MMSFORTH GAMES Diskette BREAKFORTH, CRASHFORTH, CRYPTOQUOTE, FREEWAY (TRS-80), OTHELLO, TICTACFORTH (32K RAM, 1 drive)	\$39.95
FORTHCOM Communications Module (32K RAM, 1 drive)	\$39.95
THE DATAHANDLER in MMSFORTH (32K RAM, 1 drive)	\$59.95
PIMS Manual (separately) Included free with THE DATAHANDLER.	\$11.95
FORTHWRITE Word-processor System (48K RAM, 2 drives)	\$175.00
MMSFORTH GENERAL LEDGER System (48K RAM, 2 drives)	\$350.00*
TRADESHOW smart-terminal program for Commodities Exchange users (M.3 or IBM with 48K RAM, 2 drives)	\$995.00*

\* - Starred items are scheduled for late-1982 delivery; present MMSFORTH users and clients are invited to contact MMS for list-price "beta test-site" copies.

## LICENSE AND GUARANTEE

MMSFORTH programs require an appropriate MMSFORTH System. Each is sold on a nontransferrable **personal** (single-system, single-user) license basis, with second-part instructions sent upon receipt of the properly-completed License Agreement.

Multiple use: an initial MMSFORTH **Corporate Site License Extension** (CSLE) is available for \$1,000 more than the personal license(s), and additional sites or levels of coverage are \$500 each (or ten CSLE's for \$5,000, then \$2,000 per additional ten). The primary level of coverage includes use of the MMSFORTH System, Utilities Disk, DATAHANDLER, FORTHCOM and the GAMES Diskette. FORTHWRITE, GENERAL LEDGER and TRADESHOW each requires a CSLE of its own.

MMS does not issue refunds, warrantee fitness for a given application, or underwrite user losses. MMS does guarantee a machine-readable copy of each program and will attempt to provide reasonable levels of support information.

## MMS ORDERING INFORMATION

Shipping (First Class Mail or UPS) is \$2.00, plus \$3.00 for MMSFORTH System, plus \$1.00 for each additional book.

Massachusetts orders: add 5% tax; Foreign except Canada and Mexico: payable on U.S. bank and add 20% estimated shipping/handling.

Prepayment, COD, VISA, or MasterCard accepted (include card number and expiration date). No unpaid purchase orders.

Type or print carefully, and include phone number. If in doubt, phone MMS for assistance in ordering. Prices, specifications and availability are subject to change.

## SOME OF OUR OTHER FORTH-RELATED LITERATURE

STARTING FORTH (L.Brodie)	softcover: \$15.95
The best companion book to our MMSFORTH USERS MANUAL.	hardcover: \$19.95
THREADED INTERPRETIVE LANGUAGES (R.Loeliger) Advanced; on the creation of a MMSFORTH-like Z80 language.	\$18.95
79-STANDARD MANUAL Official definition of the Forth International Standards Team wordset.	\$13.95
Special FORTH Issue, BYTE Magazine (Aug. 1980) A collector's edition, don't miss it!	\$4.00
INTRODUCTION TO FORTH (K.Knecht)	\$9.95
BASIC-user's introduction to MMSFORTH V1.9.	
PROGRAM DESIGN & CONSTRUCTION (D.Higgins)	\$16.00
Good introduction to structured programming.	
TRS-80 ASSEMBLY LANGUAGE (H.Howe,Jr.)	\$9.95
Good overview of Assembler and firmware.	
MICROSOFT BASIC DECODED & OTHER MYSTERIES FOR THE TRS-80 (J.Farvour)	\$29.95
Excellent for TRS-80 M.1 firmware; much of it good for M.3, also.	
MODEL III ROM COMMENTED (SSM Inc.)	\$22.50
M.3 ROM listing to supplement the above.	
THE 8086-8088 PRIMER (S.Morse)	\$10.95
Assembly-language view of the IBM PC's 8088 chip, by one of its designers.	

## MILLER MICROCOMPUTER SERVICES

61 Lake Shore Rd., Natick, MA 01760 (617/653-6136)

## DEALERS

MMS solicits the participation of reputable TRS-80- and IBM-knowledgeable dealers who are willing to actively support MMSFORTH and its local user community.

The following Miller Microcomputer Services products and documentation are copyrighted and their names are registered trademarks; their use is subject to all protections of the law: MMSFORTH, THE DATAHANDLER, FORTHWRITE, MMSFORTH GENERAL LEDGER, FORTH-COM, TRADESHOW.

TRS-80 is a registered trademark of Tandy Corporation. IBM Personal Computer is a registered trademark of International Business Machines, Inc.

**MMS IS A GROUP OF PROFESSIONAL PROGRAMMERS SUPPORTING THE TRS-80 & IBM P.C.**

**HERE ARE TWO EASY WAYS WE CAN HELP YOU!**

**1. MMS CONSULTING SERVICES:**

Pay by the hour for the specific information or support you need. We can develop a business package, patch an existing program, or advise on hardware or software needs. Our system selection services can save hundreds of dollars and months of delivery time. We are as near as your telephone, and serve beginning hobbyists, small businesses and professional programming staffs.

**2. MMS PRODUCT SALES:**

Buy selected hardware, prepackaged software and literature from a pro. It costs no more to get much of the best standard and special TRS-80 software from MMS. Don't expect to get everything. Do expect a careful selection of good capabilities and values in many areas of interest. Our disk drives, printers and modems are tested here before shipping.

**MMS has:**

- \* Worked (and played) with the TRS-80 and IBM PC since they were released.
- \* Led TRS-80 training seminars for Radio Shack's own staff.
- \* Developed MMSFORTH, the professional-level Forth system for TRS-80 and IBM Personal Computers.
- \* Combined MMSFORTH and NEWDOS+ into the first 10-Megabyte hard-disk system for TRS-80 (in cooperation with Corvus Systems, Inc.).
- \* Supported MMSFORTH with a growing series of major programs for general and specific use.

Please contact MMS concerning your specific interests, preferably by telephone for prompt and accurate response.

