

The Fastest File Manager: DATAHANDLER-PLUS

by A. Richard Miller and Jill A. Miller
Miller Microcomputer Services
61 Lake Shore Road, Natick MA 01760-2099
(617/653-6136)

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Abstract

DATAHANDLER-PLUS V1.2 is implemented in MMSFORTH and provides fast, compact and easy-to-use abilities for a wide variety of file-manager tasks on personal computers. How compact? It and MMSFORTH reside within 64K of RAM; on an IBM PC, XT, AT, PS2 or compatible computer, DATAHANDLER-PLUS accesses up to the rest of 640K in a very fast data buffer. How fast and easy? A demonstration will be provided. DH+ shares an unusual stand-alone files directory and flexible disk formats with FORTHCOM, FORTHWRITE, DATAHANDLER (its predecessor) and other MMSFORTH application software.

Background

Database management and word processing are the standard computer tools of the modern office. Compared with these, even spreadsheets receive far less use and all else lags far behind. Since the late 1970's, Miller Microcomputer Services has used MMSFORTH to develop and market a family of relatively powerful word processing and database tools for small computers, created in MMSFORTH. Our current offerings support the IBM PC family of 8086/8088 computers including the new Personal Series/2, and the ten-year-old family of Radio Shack TRS-80 (Z80) computers from Model 1 through Model 4D.

Our latest database offering, DATAHANDLER-PLUS V1.2 or DH+, for short, shares many design concepts and Forth routines with its predecessor, DATAHANDLER. Among these are extreme speed and ease of use for typical office tasks, and the ability to interface with other MMSFORTH applications including the FORTHWRITE word processor and our FORTHCOM communications module. DH+ also introduces some new ideas which take advantage of advances, both in Forth and in the computers we use. Key new features affecting this design are the beyond-64K RAM and increased disk capacity of the IBM PC family of computers, and MMSFORTH improvements such as long-addressing without segments, QUANs and QUAN arrays, VECTs, temporary headers and temporary definitions, and an excellent new keyboard driver which permits more flexible assignment of key combinations and instant-release keyboard auto-repeat. Another MMSFORTH feature, scrolling windows, has grown into a small word processor under DH+.

Structure

Some of the basic design choices of DH+ remain unchanged from DATAHANDLER. These include the maintenance of numeric and alphanumeric fields as variable-length, counted strings, single-file operation within a single RAM-based file buffer, and incorporation of free-form user notes at the beginning of each file. Although DATAHANDLER can run in computers with less than 64K of RAM and DH+ wants at least 128K and, although DH+ files are more complex than DATAHANDLER files, upward compatibility of the simpler files has been maintained, as have many user concepts, combined-fields technology, etc. Two traditional MMSFORTH ideas, engineering for minimal disk I/O and for optional single-disk formats, optimize ease of use and battery life on the now-popular laptop computers.

New design concepts in DATAHANDLER-PLUS start with the decision to use double-length addressing and a file buffer area above the base 64K of RAM. This makes DH+ incompatible with the earlier TRS-80 family of Z80 computers which have been supported by MMSFORTH and, in prior years, by most MMSFORTH applications. MMSFORTH and DH+ together use less than 64K RAM (currently, about 53K), so this application can realize maximum processing speed on the 8086/8088 microprocessors. The compiled program would take more than 64K of RAM, if not for our extensive use of temporary headers and temporary definitions; words compiled in TEMP-HEADS or TEMP-DEFS modes get their heads or their entire definitions compiled into a second dictionary area which is available during the critical portion of the compilation, and then is relinquished to the main program. There is a small PAD buffer area in the primary 64K, but the general file buffer occupies some or all of the next 576K, and without need for the IBM PC's conventional segmented addressing within the Forth program.

Other new concepts include the elaborated use of dynamically-allocated windows. The 80-column by 25-line display is generally managed as three windows: an upper screen window of 22 lines, a lower command window of two lines, and a bottom line error window which doubles as the credit line when not reporting errors. These are standard MMSFORTH windows which remember their respective attributes, etc. In addition, a dynamic "active-field" window with inverted colors highlights the active field in the selected record, receives the input for all prompts, etc. This active-field window in fact is a talented text editor at the word processor level, and permits the user to create, change or delete all data without leaving the displayed information. When necessary to display up to 255 characters of text in small windows, the cursor enjoys bidirectional scrolling in various axes and up to four dimensions. Further depth of information is provided by an optional Table View mode, which looks like a spreadsheet and still permits scanning the active window across or down the two-dimensional array of fields and records, plus text editing inside the window for the third dimension of data manipulation. These three dimensions are controlled by three families of control-key operations: [PageUp/Down] to move across records, [Home/End] to move across fields, and the four [Direction-Arrow] keys to move inside the active window. Maintaining the generally consistent MMSFORTH keyboard usage, these keys may be modified by [Control] or [Alternate] keys for respectively stronger results; i.e., [Alternate-PageDown] moves forward to the final active record, while the less-strong [Control-PageUp] moves back n records, where n is a user-defined quan called REC-JUMP. All other stand-

ard DH+ operations use [Control] and [Alternate] similarly, but in combination with letter keys which have been chosen for strong mnemonic value. Such strong mnemonic value, in fact, that new functions tend to be obvious to the DH+ user. For example, press [Control-f] for a **Forward Find** of the next occurrence of a partial string in the active field. You are then prompted to define that find-string, and upon pressing [Enter] the active window lands in the next such record. Now that the find-string is defined, you can press [Alternate-f] to go **Forward** to the next occurrence, without any prompt for a new find-string.

Over fifty such commands provide the major operations in an intuitively obvious and surprisingly fast manner. In addition, many named presets may be defined and saved with the file. These include Form View and Table View presets, multiple-field Find (or selection) presets and multiple-field Order (or sorting) presets, standard and custom Print-outs, etc.

Twenty **local macro** keys may be trained while performing actual operations and then saved with the file. Following Forth philosophy, these can call other macros. This permits powerful factoring, and even lets macro keys call other, reprogrammable macro keys. Nineteen other **global macro** keys may be saved with the DH+ **program** rather than with a file, for use with **all** files!

In addition to economizing RAM with variable-length records, DH+ economizes on the number of fields which must be maintained by permitting several unusual operations on optional "combined fields". For example, we often keep LASTNAME\FIRST as a single field, separating the last name from the following first name by a single backslash character. You can append a title in the single field, too, such as Spock, M.D.\Benjamin or Spock, Vulcan\Mr. .

Performance

Jill Miller will provide a live demonstration of a typical DH+ task, while I explain. Because no DOS is required, DH+ boots directly onto the screen. Low on the screen, the command lines prompt for various options; one, the Load option, initially hosts the Active Window in order to Load one of the file-names from the top. In the proposed task, Jill will load a typical, 95 name and address file. Typical for DH+, that is; LASTNAME\FIRST with an optional TITLE all fits into the first field, and CITY STATE also is a combined, single field. Although we have other options, we will view 20 one-line records at a time, in a table view. Jill will select and print mailing labels for those records which have a company name and are not in Massachusetts; of course, these 13 labels are automatically flipped for FIRSTNAME LAST, TITLE and they will be sorted into ZIP order. In DH+, the typical elapsed time for this manual task is about 30 seconds.

Special Versions

If the prior task is a standard one for your company, a few additional presets and function-key macros can be easily defined to provide further speed and automation. For example, try [F1] *\dick* or *vic* [F9]. And although Forth source code is not a part of the standard software, Forth is available from within DH+ and additional Forth routines are patched on top by many users.

Most DH+ applications substantially outperform prior programs at many user companies. Yet, the majority of them use simple data files, easily created and maintained, and modified only with simple presets and function-key macros. A few have additional Forth code, added by the user or inserted by MMS. I think the initial design goals of DH+ are more than borne out by this success rate in real applications.

Some successful applications are:

Follow-up files for sales representatives (John Gray and others).

n-up labels for commercial mailing houses (Boston Mailing Co., Boston, MA, and others).

Inventory control for large warehouses (R.B. Eriksen, Inc., Woburn, MA).

Pharmaceutical applications (several hospital pharmacies).

The Bibliography of Forth References (Thea Martin, The Institute for Forth Research, Rochester, NY).

The original Gilbert & Sullivan Concordance of operettas, by Warren Colson (Feather's Press, 35 West Central Street, Natick MA 01760-4503, 1986).

Sharing of DH+ technology into independent products, such as Ashton-Tate's new RapidFile file manager (created by Intelligent Designs, Inc.).

Credits & References

DATAHANDLER-PLUS V1.0 was created by Thomas Dowling. A portion of its development was financed by a joint project with Intelligent Designs Inc., and that technology has also been incorporated into Ashton-Tate's new RapidFile file manager.

DH+ V1.2 was programmed by Jill A. Miller and A. Richard Miller.

Many new features of MMSFORTH V2.4 were created by John Rible, and its keyboard driver was programmed by Bent Schmidt-Neilsen.

The file structure of THE DATAHANDLER is described in A File System in Forth, by John Rible and Tom Dowling (a paper at FORML, the Forth Modifications Laboratory, Monterey, CA, 1981).

Some design ideas are attributable to the book, PIMS (Personal Information Management System), by Madan Gupta (SCELEBI Publishing, 1978).