

22 March 1983

This is the first Sage User Bulletin. It will serve to help keep you abreast of new product lines and product changes. We plan to send you one twice per month.

Last week we were happy to announce the availability of CP/M-68K. Here is the additional information that we said would follow:

CP/M-68K has been developed for Sage hardware by Digital Research. The package available from Sage retails at 1399.00. The part number is 9F8038. The documentation in the package includes: CP/M-68K User's, Programmer's and Systems guides, the C Programming Guide for CP/M-68K, and Sage Computer Technology's release notes that are necessary to document the system on Sage microcomputers. All files are contained on three 5 1/4" double density Sage format 80 track disks.

Those familiar with the CP/M operating system will be pleased to hear that CP/M-68K extends it to the Motorola MC68000 family of microprocessors. CP/M-68K is easy to learn and use. When used with Sage hardware this provides a system for business users that is both quick, and familiar. In addition CP/M-68K has a flexible application program interface and powerful system utilities combined with a C compiler to provide a complete software development environment.

Even though CP/M-68K is compact, it can manage up to 16 Mb of RAM. Furthermore, it can support up to 16 logical drives, each containing 512 megabytes. That's a maximum of 8 Gigabytes of on-line storage. A single file can be up to 32 Megabytes in length. This makes it a good match for today's MC68000-based microcomputer systems.

CP/M-68K has a file system that is both fast and reliable. Due to it's modular design it is easily customized to run in a particular hardware environment. Input/Output device handlers, that are system dependent, are located in the BIOS

Basic Input/Output System module. The BIOS interfaces to the logical, hardware independent portion of the operating system, and is the only module which differs from machine to machine.

CP/M-68K's resident portion is small at 24K bytes of memory. The size of the customized BIOS depends on the number of peripheral devices.

CP/M and MP/M file structures are compatible with CP/M-68K. Thus, facilitating the transferring of data from CP/M and MP/M-86 to the Sage microprocessor with CP/M-68K, it is hard to find any difference between CP/M-68K and previous versions of CP/M except for vastly improved response and power.

Additionally many C programs developed under the UNIX operating system can be recompiled to run under CP/M-68K with no trouble. The Sage CP/M-68K package includes a C compiler and run time library which are subset compatible with the UNIX Version 7.

CP/M-68K package includes the following set of software tools:

- C compiler and C run-time library compatible with UNIX software.
- An assembler which supports standard Motorola MC68000 assembly language.
- A linker which produces both relocatable and absolute load modules.
- An object module librarian.
- A utility to convert CP/M-68K load modules to Motorola S-Record form.
- A relocation utility to convert relocatable load modules to absolute form.
- A utility to list the symbol table contained in a load module file.
- A utility which prints the memory size required by the load module.

These tools listed above can run on any CP/M-68K system with at least 128k of memory.

Digital Research's CRYM-68K running on Sage equipment continues to support these standard CRYM subroutines:

#### PR

The Peripheral Interchange Program provides file transfer between devices and disk files. Various reformatting and concatenation operations may also be performed with PR. These include: parity bit removal, case conversion, subfile extraction, tab expansion, line number generation, and pagination.

#### ED

The CRYM-68K text editor allows creation and modification of ASCII files using extensive commands: string substitution, string search, insert, delete and block move. ED allows text to be located by context, line number, or relative position. A macro command allows making repetitive text changes with a single command line.

#### DDT

The CRYM-68K Dynamic Debugging Tool allows the user to test and debug programs interactively in a CRYM-68K environment. The command set allows users to trace program execution with a full register and status display.

#### STAT

The STAT utility offers and displays I/O device and file status including free space computations, status of online disks and physical-to-logical device assignments.

#### SUBMIT

The SUBMIT command lets the user execute a command sequence stored in a disk file.

#### DUMP

The DUMP utility displays any file with side-by-side hexadecimal and ASCII representations. Output may be reflected to a file or the listing device if desired.

The CRYM-68K has a load function that allows an application program to load other programs into memory. The memory space on the machine is the only limit to the number of programs that can be loaded. Program overlays can also be used.

CRYM-68K gives the applications program complete access to the advanced features of the MC68000 microprocessor.

SAGE COMPUTER TECHNOLOGY will provide first line support of CRYM-68K on Sage hardware.

For more information contact Sage Computer Technology in Reno at 4905 Energy Way, Reno, NV 89602, (702) 332-6868 or in Boston at 12 New England Exec. Park #120 Burlington, MA 01803, (617) 229-6868

Enjoy your Sage Computer!

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