P&T CP/M® 2.2m IS HERE

This edition of C:What's.New is dedicated to Pickles & Trout's new CP/M 2.2m (and 2.2mH for the Radio Shack Hard Disk). We don't wish to sound too much like proud parents. But we do feel a good deal of pride: our "baby" is now 3 1/2 years of age, she is being used by several thousand satisfied customers, and she has gained the reputation of being one of the finest CP/M operating systems on the market today. P&T CP/M 2.2m is even better.

How is finest to be defined? No doubt, everyone of you has his or her own definition - because each of you has somewhat different needs. We know this very well, because we have been listening to your suggestions for over three years. And, because we read the same magazines that you do, we also know that you have growing expectations of what your operating system should do for you.

P&T CP/M 2.2m is very much the child of your suggestions and expectations. Not only have we tried to satisfy your present needs and desires - with, for instance, a very fast copy utility (which copies the system tracks), a full-screen editor, and a brand new manual - but we have also designed the system so that we can respond to your future suggestions quickly and efficiently. Thus, we expect that everyone of you will find at least one feature in the following description that you have always wanted - a feature that will lead you to exclaim, "Gee, isn't that neat!" or "Well, its about time!"

M STANDS FOR MENU

Pickles & Trout has striven to make CP/M 2.2m the most user-friendly operating system available. The new MENU program is one of the best examples of this. Simply by typing "MENU", a user may perform most system functions both quickly and easily. All that is required is a two-letter code and answers to a few system questions (like which logical drive to use). You can, for instance, format, test, and create a new system disk with just 12 key strokes (including the <enter>'s).

This is but one example. MENU makes it easy for even the most inexperienced user to perform such tasks as maintaining program diskettes, testing their computer's memory banks, setting up the system's I/O parameters, and setting the system's time and date. Can it be made any easier?

The simple answer is that it can be, because Pickles & Trout has added a command line mode to 2.2m's utilities that allows you to set up your own "automatic" procedures.

M STANDS FOR A NEW MODE

Several changes have been made to the P&T CP/M 2 utilities. Of these, the most significant enhancement is the addition of a command line mode to many of the P&T utilities. Not only does this feature allow you to type in often-used commands very rapidly, but it also allows you to execute these utilities from a command file. This capability was developed specifically for use in integrated applications. By using SUBMIT, some sort of menu program, or a chaining facility, a consultant or supervisor can organize a system so that an end-user need not learn the intricacies of the operating system.

The command line mode allows you to send the console output from a utility program to the console, the printer, and/or an error file. This ability to create error-reporting files can be especially useful. You might, for instance, embed the DISKCHK utility in an integrated system of programs so that heavily-used diskettes would be checked on a regular basis. You can store the results of these checks in a file so that another program can scan it to check for errors. (Examples of how you can set up this and other useful operations are provided in the new manual.)

M STANDS FOR MODULAR

P&T CP/M 2.2m is a modular system. This sounds nice. But what does it mean? In essence, any CP/M operating system designed for a Radio Shack Model II, 12, or 16 must include a variety of "drivers", to control the floppy (and/or hard disk) drives, screen, keyboard, communications ports, and so on. Like most other operating systems, P&T CP/M 2.2e included all of these drivers in one unit. It was difficult to make significant changes in any one part without also having to alter other parts. By contrast, the new P&T modular system has been designed so that the different drivers are in distinct modules. This makes it is much easier for us to add new features (i.e. modules) and for you to tailor the operating system to your exact requirements.

The MODSEL (or module selection) utility makes it easy to select those features you need. Since there may be several modules of any one type to choose from, all modules of each type, in turn, are displayed on the screen. With just a few key strokes, you can examine a description of each module and choose the one(s) you wish. MODSEL will show you everything you need to know and allow you to select all of the modules that you need or desire. But it won't allow you to make mistakes. It is so easy that even a new computer user will find it a snap to configure just the system that he or she needs.

The benefits of this new system can be most clearly illustrated by briefly describing some of the exciting modules that are presently available.

1. The KEYXLATE module allows you "translate" your keyboard to match virtually any keyboard.

Each of up to 16 keys can be translated to an-
other character. As a result, touch-typists can
now work up to their full potential and all of us
can overcome the keyboard idiosyncracies of our
favorite "canned" programs.

2. Users of the Model II, 12, and 16 now can all
have five fully programmable keys (ctrl-1 through
ctrl-5), if they select the AUTOKEY module. Each
of the keys can be programmed to generate a
string of up to 79 characters (with a maximum of
128 characters for all 5 keys). These programmed
keys do **NOT** replace any control keys. Any of
these keys can be re-programmed at anytime from
the keyboard, even during the execution of a pro-
gram. If you wish, you can even write small pro-
grams to change them "automatically". Conse-
quently, commonly used commands, lines of text,
mathematical formulae, etc. can all be "typed" by
pressing on just two keys. Once you start using
AUTOKEY you will be hooked!

3. If you select the SCRNDUMP module, you can
print out the contents of a screen with a single
keystroke. Hard copies of short memos or letters,
of data, of error messages, of menus, and so on
are available instantly. If you are within a pro-
gram, you won't even have to interrupt the pro-
gram's execution to get printed copies of those
screens that you need.

4. The ADM3A module allows the screen driver to
emulate the popular ADM 3A terminal, which is
found on the installation menu of most programs
on the market today. It may be used in those
situations when the standard P&T screen driver is
not on the installation menu and you can't seem
to custom install it successfully.

5. Users of the Radio Shack hard disk version of
P&T CP/M 2.2m will have several preconfigured
disk parameter modules to choose from (for both
the 8.7 and 12 Mbyte disks). Our experience sug-
gests that one of these modules will satisfy the
requirements of most users. One key stroke is all
that is needed to select the module of your
choice. Of course, if one of them does not fit
your needs perfectly - because, for instance, you
wish to 'chain' 2-4 hard disks together - there is
also a utility called HDCONFIG that gives you
complete control over the hard disk configuration.
Can anyone need more ease and flexibility?

NEW SYSTEM UTILITIES

P&T CP/M 2.2m comes with several new utilities
that help you get the most out of your microcompu-
ter. They are described below in alphabetical order.

ASSIGN This utility allows you to change your I/O
device assignment easily and quickly. This
ability is still part of the SETUP utility;
however, ASSIGN is more convenient to use.

CLEAN This is a special utility designed to work
with head-cleaning diskettes. With it, you
can clean a read/write head in a matter of
seconds.

CLONE One of the more exciting of the new util-
ities, CLONE allows you to make a verified
image copy of a diskette. It gives you the
option of copying just the system tracks, just
the data tracks, all of the tracks, or all of
the tracks up to the first empty track. An
added benefit is CLONE's speed: you can
copy a full single-sided, double-density disk-
ette in just under a minute (i.e., better than

4 times faster than FASTCOPY), and verify
the copy in less than 30 seconds more.
Finally, unlike other CP/M copy utilities,
CLONE allows you to copy Random Access
files.

DATIME This utility sends the current system time
and date to the console, a printer, and/or a
file. Dating reports and backups is now a
snap.

ERROR This utility explains the error messages that
are generated by the P&T CP/M 2 operating
system. Not only do these messages tell you
what happened, but they try, when feasible,
to suggest why it happened and what re-
medial action you might take. And they do
this in relatively jargon-free English.

KXEDIT When you are using the KEYXLATE module,
this utility allows you to interactively define
or re-define the characters assigned to keys.

PATCH This utility was designed so that we can cor-
rect or enhance P&T utilities by sending you
easy-to-copy character strings (rather than
difficult-to-understand assembly language
patches).

VERIFY This utility allows you to verify that any
P&T supplied utility is a perfect copy of the
program you originally received.

Several P&T utilities have also been enhanced in very
significant ways:

- The check, test, and format utilities (DISKCHK,
DISKTEST, and FORMAT) now work with either
single- or double-sided and either single- or
double-density diskettes.

- CLONE, DISKCHK, DISKTEST, FASTCOPY, and
FORMAT now allow you to repeat an operation
with a simple "R" command, making them ex-
tremely easy to use in production situations.
DISKTEST also has both a long and a short test.

- FORMAT, FASTCOPY, and CLONE now option-
ally verify the accuracy of their operations.

- TRS2CPM will now copy text files generated by
RSCOBOL.

FULL SCREEN EDITOR

VEDIT is widely regarded as one of the finest full-
screen editors on the market today (see the review in
INFOWORLD, May 16, 1983). We are therefore espe-
cially pleased that we have been able to add a
special (somewhat scaled-down) version of this pro-
gram to P&T CP/M 2.2m without increasing the cost
of the operating system. We know that you will be
pleased too when you begin to use VEDIT. Among
its very useful features are:

- A screen-oriented mode of operation that is so
simple even a novice computer user can start
using it productively almost immediately.

- A fully configurable keyboard layout that you can
easily adjust to your needs.

- Line and column number displays, automatic in-
denting, adjustable tab positions, and text move
and copy commands.

- The ability to change disks while editing and
save text when faced with the dreaded "full disk"
message.

- Powerful command macros that allow you to perform many difficult editing tasks quickly and easily.

  Special features for use when editing programs in PASCAL, PL/I, COBOL, C, assembly languages, and others.

- A scratchpad buffer for cut-and-paste operations.

Although the P&T version of VEDIT does not have the word-processing capabilities and some of the more powerful macros that are available on the full version of the editor, it is still a very powerful program. One that amateur and professional alike will use - and value.

VEDIT comes fully configured and ready to use with CP/M 2.2m. It also comes with a well written and comprehensive manual.

M STANDS FOR A NEW MANUAL

P&T CP/M 2.2m also comes with a Pickles & Trout User's Manual that has been entirely reorganized and rewritten. Two goals were uppermost in our minds when writing this manual: we wanted it to be friendly enough that our new users could easily learn what they had to know to run the system and comprehensive enough to satisfy our more experienced users' desire for (often quite technical) details.

We have done three things to try to make the manual easy to read and understand. First, the chapters and sections are organized so that the information that everyone needs to know comes first. Second, we have taken pains to make these sections as non-technical and jargon-free as possible. And, third, we have tried wherever possible to provide screen images that go along with the text. Thus, the user is both shown and told what to do.

The sections that describe the P&T CP/M utilities use this screen image technique extensively. In most instances, literally every line on the example screens is explained and, where appropriate, the possible alternatives are discussed in some detail and illustrated (with further screen images) in most cases. In addition, the command line options are discussed and several examples are given.

Other sections of the manual are equally comprehensive. Every part of the operating system is carefully explained and, where appropriate, BASIC, PASCAL, and/or assembly language routines are provided to show you exactly how their features are best utilized. We have tried to answer all of the questions you have been asking our technical support staff for the last 3 1/2 years. The result: even the most experienced of users is going to learn something new from this manual.

RAMD

Model 16 Ram Disk Utility

The execution speed of a program is usually closely related to how often it accesses a disk. RAMD can dramatically improve the performance of programs that perform a lot of reading or writing because it uses the 68000 memory found on Mod 16s (or upgraded Mod II/12s) as the equivalent of a disk drive. "Disk" read/write operations can thus occur in the blink of an eye (rather than in the groan of an overworked disk).

How much time can RAMD save you? There is no precise answer since it depends on the nature of your programs, the size of your files, and the size of your 68000 memory. To give you an idea of RAMD's potential benefits, we used a standard Mod 16 (with 256 Kbytes of 68000 memory, thin-line drives, and a Tandy hard disk) to perform the following operations:

1. Index a 2300 record, 490 Kbyte dBASE II file (on a 20-character field):

Data and index files on floppy drive:	1 hr, 8 mins, 21 secs
Data and index files on hard disk:	24 mins, 46 secs
Data file on floppy and index file on RAM drive:	6 mins, 32 secs

2. Move from the top to the bottom of an 84 Kbyte WordStar file (using Ctrl-QC):

Program and data files on floppy:	36.38 secs
Program and data files on RAM drive:	10.22 secs

In some circumstances, you can save literally hours of processing time per week.

The RAMD package includes a diskette and full documentation. Price: $45.

PASCAL/MT+

The Pascal/MT+ language is a superset of the ISO standard Pascal, and provides many additional facilities for developing extensive applications and system level programs. The system includes a native code compiler, linker, and a wide range of run-time routines, and the compiler generates relocatable object code for use with its linker. The Pascal/MT+ run-time library supports transcendental operations, data transfer, input/output, string manipulation, and includes a host of other useful procedures and functions.

Pascal/MT+ supports extended features such as modular compilation, variable length strings, linkage to assembly language, and random access file I/O. Pascal/MT+ also provides advanced debugging capabilities designed to aid the development of complex programs. Since Pascal/MT+ is available under CP/M-68K, CP/M-86, and CP/M-80, program portability across a wide base of hardware environment is ensured.

CBASIC (CP-68K)

CBASIC-68K is a commercial dialect of the popular BASIC language implemented as a native code compiler. Among its many features are:

o Expanded file processing
o Extended precision decimal arithmetic
o Comprehensive string processing
o Efficient use of memory
o Reduced software development time
o Compatibility with CP/M-86 and CP/M-80
o Assembly code interface

Due to its efficient use of RAM and compatibility with a wide variety of hardware and software, more software packages have been written in CBASIC for commercial business applications than in any other microcomputer language.

FORTRAN-77

FORTRAN-77 remains the most widely accepted language for scientific and engineering applications. SVS FORTRAN-77 now provides to the microcomputer user the same capabilities and power once found only on mainframes and the larger minis. The SVS FORTRAN-77 system provides a language compiler, code generator, and module linker to produce extremely fast and efficient 68000 code.

Now!
CP/M-68K for your
Macintosh

The SVS FORTRAN-77 language provides a fast and powerful mechanism for the development of application software. Supported data types include LOGICAL, INTEGER, REAL, DOUBLE PRECISION, COMPLEX, and CHARACTER. The use of IF-THEN-ELSE blocks permit the development of 'structured' programs. A full run-time library provides transcendental, logical, and character manipulation functions. Programs written in SVS FORTRAN-77, SVS PASCAL, and 68000 assembly language may be combined for an optimum programming environment.

BASIC-68K

The BASIC-68K language is ideal for the programmer who needs a quick and powerful dialect of the popular BASIC language implemented as a compiler/interpreter. The source code file, created by a text editor or word processor, is compiled by BASIC-68K into an intermediate pseudo-code (P-code) file which takes very little disk space. During program execution the run-time interprets each P-code directive and performs the operation.

BASIC-68K provides many enhancements to the standard BASIC language. Powerful file handling capabilities include sequential, random and ISAM (indexed sequential) support. An XCALL statement allows the use of subroutines written in the C language (compatible with the C compiler provided with every CP/M-68K system). Screen handling functions are provided for most hardware systems. And BASIC-68K will run on a minimal 128 kbyte system!

PASCAL-68K

PASCAL-68K is an enhanced version of the popular USCD PASCAL language. The PASCAL language provides an excellent means for the software developer to generate structured, efficient, and easily maintainable procedures and programs.

The SVS PASCAL-68K system includes a program compiler, 68000 code generator, module linker, and full run-time library. Detailed compile-time and run-time error message aid the user in rapid debug and development. Procedures written in SVS PASCAL-68K may be combined with SVS FORTRAN-77 routines for a truly flexible programming environment.
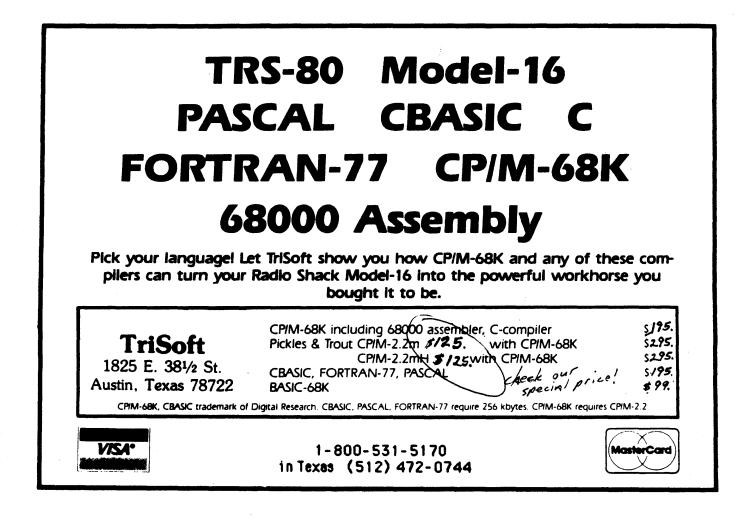
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Introducing . . .

TriSoft introduces the CP/M-68K operating system for the Radio Shack Model-16 and Model-II Enhanced computers. This addition to the CP/M family adds the speed and power of the 16/32-bit MC68000 under CP/M-68K while maintaining compatibility with the vast library of CP/M 2.2 software.

The Tri-Soft CP/M-68K operating system runs in conjunction with CP/M 2.2. Easy context switching allows the user to quickly go from CP/M-68K to CP/M 2.2 and vice versa. While under CP/M-68K, the Z80 processor acts as an I/O slave freeing the 68000 from mundane tasks.

Support utility programs and a 68000 assembler are provided with the CP/M-68K operating system. An industry standard C compiler is also available under CP/M-68K.

Syntax and Definitions

ufn unambiguous file name
afn ambiguous file name

[ ] optional command field
( ) denotes single file or value

Multiple Command Format

Multiple commands may be entered on the same command line up to a limit of 128 characters. Commands are separated by the backslash character "\".

Example: dir\dirs\type ufn\user 12\dir

CP/M-68K Commands

Command		Description
AR68	ufn	invokes the Archive Utility that stores object files in the C run-time library
AS68	[−F d:] [−P] [−S d:] [−U] [−L] [−N] [−O(object ufn)] (source ufn) [)(listing ufn)]	invokes the Assembler
C	ufn	invokes the C language compiler
CP68	[−I d:] ufn.C ufn.I	invokes the C language preprocessor for processing macros
DIR	[afn]	displays the directory of files from a specified disk
DIRS	[afn]	displays the directory of system files
DDT	[ufn]	invokes DDT, the CP/M-68K debugger
DUMP	ufn	invokes the Dump Utility that prints the contents of a file in hexadecimal or ASCII notation
ED	ufn	invokes the CP/M-68K text editor
ERA	[afn]	erases one or more specified files
LO68	[−F d:] [−R] [−S d:] [−S] [−I] [−O (ufn)] [−X] [−Z (address)] [−D (address)] [−B (address)] (object ufn) . . . (object ufn) [)message ufn]	invokes the Linker
M68		TriSoft Model-16 command to transfer control to CP/M-68K
n:		changes to disk drive "n"; n ranges from "A" to "P"
NM68	ufn	invokes the NM68 Utility that prints the symbol table

CP/M-68K Commands (Continued)

Command		Description
PIP	[afn=afn]	copies, combines, and transfers specified files between peripheral devices
RELOC	[−B(address)] (relocatable ufn) (absolute ufn)	invokes the Relocate Utility that relocates a command file containing relocation information to an absolute address
REN	[ufn=ufn]	renames an existing file to the new name specified in the command line
SENDC68	ufn	invokes the SENDC68 Utility that converts a command file to the Motorola S-record format
SIZE68	ufn	invokes the SIZE68 Utility that prints the size of a command file
STAT	[afn]	provides general statistical information about file storage and device assignment
SUBMIT	ufn	executes a file of CP/M commands
TYPE	ufn	displays the contents of an ASCII file on the default output device, a console.
USER	[n]	displays and changes the current user number; n ranges from 0 to 15
Z80		TriSoft Model-16 command to transfer control to CP/M 2.2

CP/M-68K Line Editing and Output Control

ctl−C	CP/M system reboot when typed at the start of command line
ctl−E	physical end of line: carriage is returned, but line is not sent until carriage return key is depressed
ctl−H	backspace one character position
ctl−J	terminate current input (line feed)
ctl−M	terminate current input (carriage return)
ctl−Q	restart console I/O after ctl−S halts it
ctl−P	starts and stops output to the currently assigned list device
ctl−R	retype current command line: types a "clean line" following character deletion with rubouts
ctl−S	stop the console output and wait for ctl−Q to restart it
ctl−U	delete the current line
ctl−X	backspace to beginning of current line
ctl−Z	end input from the console (used in PIP and ED)
rub/del	delete the last character typed at the console

CP/M-68K BDOS Functions

F #	Result	F #	Result
0	System Reset	22	Make File
1	Console Input	23	Rename File
2	Console Output	24	Return Login Vector
3	Auxiliary Input	25	Return Current Disk
4	Auxiliary Output	26	Set DMA Address
5	List Output	28	Write Protect Disk
6	Direct Console I/O	29	Get Read-Only Vector
7	Get I/O Byte	30	Set File Attributes
8	Set I/O Byte	31	Get Disk Parameters
9	Print String	32	Set/Get User Code
10	Read Console Buffer	33	Read Random
11	Get Console Status	34	Write Random
12	Return Version Number	35	Compute File Size
13	Reset Disk System	36	Set Random Record
14	Select Disk	37	Reset Drive
15	Open File	40	Write Random Zero Fill
16	Close File	46	Get Disk Free Space
17	Search for First	47	Chain to Program
18	Search for Next	48	Flush Buffers
19	Delete File	59	Program Load
20	Read Sequential	61	Set Exception Vector
21	Write Sequential	62	Set Supervisor State

CP/M-68K BIOS Functions

F #	Function Name	Description
0	Init	call for cold boot
1	Warm Boot	call for warm boot
2	Const	check for console character ready
3	Conin	read console character in
4	Conout	write console character out
5	List	write listing character out
6	Auxiliary Output	write character to auxiliary output device
7	Auxiliary Input	read character from auxiliary input device
8	Home	move to track 00
9	Seldsk	select disk drive
10	Settrk	set track number
11	Setsec	set sector number
12	Setdma	set DMA offset address
13	Read	read selected sector
14	Write	write selected sector
15	Listst	return list status
16	Sectran	sector translate
18	Get Memory Region Table Addr	address of memory region table
19	Get I/O Byte	get I/O mapping byte
20	Set I/O Byte	set I/O mapping byte
21	Flush Buffers	writes modified buffers
22	Set Exception Vector	sets exception vector

68K-BASIC

That's RIGHT! At last TriSoft is able to announce the availability of 68K-BASIC for immediate shipment. This, the first of the long awaited BASIC languages, is finally ready for all users of CP/M-68K.

68K-BASIC is a P-Code type compiler and run-time library with many powerful features and extensions. Among its many features are:

o Access to the full 68000 memory.
  No more program size problems.

o Screen support for P&T, ATON,
  and Lifeboat CP/M-2.

o Screen support adaptable to all
  CP/M-68K systems for maximum
  transportability.

o Powerful file access features
  including Indexed Sequential
  Access Method (ISAM).

o Ability to call routines written
  in Assembly and 'C' languages.

o Compact '.RUN' compiled files
  save precious disk space.

o Compatible with ALPHA - MICRO
  BASIC.

o Approximately 50% to 100%
  faster than TRSDOS BASIC

o Eleven digit floating point
  accuracy.

o DEBUG and TRACE capability.

For users interested in MC68000 program development in BASIC the 68K-BASIC is a very powerful tool. Its large memory capacity (up to 1 Megabyte on a Model-16B) and enhanced floating point accuracy allow for advanced business and scientific applications. And the ISAM file capability gives micro users file and record handling features usually found only on mainframes.

68K-BASIC is available from TriSoft for $ 99., including 68K-BASIC manual, installation document, and shipping (UPS ground). Users interested in conversion of existing TRSDOS or MicroSoft BASIC programs may wish to first purchase the 68K-BASIC manual for only $25., refundable with later purchase of 68K-BASIC.

To order, or for additional information, please contact TriSoft at 1-800-531-5170
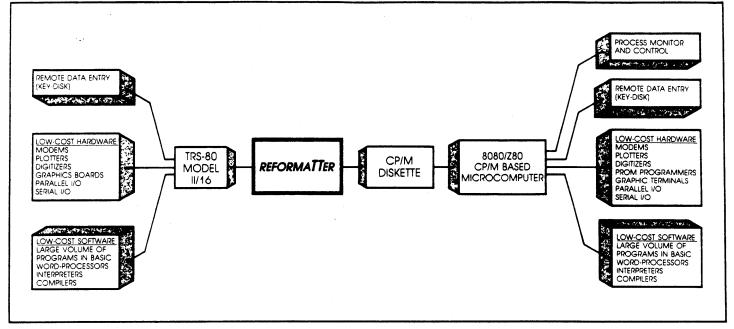
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[Coming end of '83. CBASIC-68K from Digital Research!]

REFORMATTER®

REFORMATTER® is a diskette utility program which gives the TRSDOS user complete access to CP/M formatted diskettes. With REFORMATTER, you now have the ability to transfer files back and forth between TRS-80 Model II/16 microcomputers and CP/M based computers which have 8" floppy disks.

REFORMATTER sets up a chain of events permitting new applications for microcomputers.

REFORMATTER applications extend beyond file transfer to a series of conversions going from diskettes through magnetic tape to most other mini or mainframe systems.

REFORMATTER enables you to:
* Access CP/M program source files written in BASIC, COBOL, FORTRAN or assembly language.
* Move data files from application programs between TRSDOS and CP/M operating systems.
* Exchange source programs and data with other microcomputers using the standard CP/M diskette format.

This gives you access to a much larger base of developed software and the ability to use the best operating system for your application, while still maintaining integrated operation.

REFORMATTER has the following features:
* Transfers files bidirectionally between TRSDOS and CP/M
* Operates under TRSDOS (CP/M operating system is not required)
* Gives complete file statistics for CP/M directory listings
* Provides TRSDOS directory listing
* Deletes or renames CP/M files
* Changes user number on CP/M files
* Supports all TRSDOS file types (variable or fixed)
* Operates on a single drive system. Allows multiple files to be transferred with wildcards.
* Displays CP/M diskette usage
* Dumps (hexadecimal display) or displays (ASCII display) CP/M files

* Converts TRSDOS diskettes to single density CP/M format
* Completely menu driven, and virtually "crash-proof"

REFORMATTER supports CP/M single density format (128 bytes per sector), 8" single-sided diskettes. Single density diskettes written under MP/M, CP/M86 or CP/M lookalikes such as Turbodos or SDOS are also acceptable.

REFORMATTER will run on a single drive system, although multiple drives are recommended.

REFORMATTER runs on the Model 16 in Model II mode. 64K memory required.

REFORMATTER is supplied on a TRSDOS diskette. Also supplied is a comprehensive User's Manual which contains operating and installation instructions, a section on the theory of operation and appendices with numerous examples.
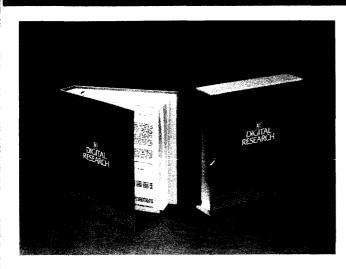
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CP/M-68K™

CP/M-68K™ OVERVIEW

CP/M-68K extends the popular CP/M® operating system to the Motorola MC68000™ family of microprocessors. It is a high performance single-user, single-tasking operating system. CP/M-68K is ideal for the business user — it is easy to learn and use. CP/M-68K also features a flexible application program interface and powerful system utilities combined with a C compiler to provide a complete software development environment.

CP/M-68K includes a fast, reliable file system. It has a time tested, modular design which allows it to be easily customized to run in a particular hardware environment. System dependent input/output device handlers are located in a module called the Basic Input/Output System (BIOS). The BIOS interfaces to the logical, hardware independent portion of the operating system, and is the only module which differs from machine to machine.

The RAM resident portion of CP/M-68K is small, requiring about 24K bytes of memory. Its size is dependent on the size of the BIOS. The actual size of the customized BIOS is dependent on the number of peripheral devices in the system. Although it is compact, CP/M-68K can manage up to 16 Mb of RAM, and up to 16 disk drives, making it a good match for today's MC68000-based microcomputer systems.

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CP/M-68K FEATURES

- CP/M and CP/M-86 Compatible
- Supports from 64 Kilobytes to 16 Megabytes of RAM
- Support for 1 to 16 Disk Drives of up to 512 Megabytes each
- C Language
- Sophisticated Software Development Tools
- Standard CP/M Utilities
- Multiple Programs can Coexist in RAM
- Resident System Extensions
- Allows Full Access to MC68000 Hardware Features
- Cross Development Tools

CP/M AND CP/M-86™ COMPATIBILITY

CP/M-68K supports an enhanced version of the file system used by CP/M Version 2 and CP/M-86™ Version 1. The CP/M-68K file system is compatible with all other CP/M and MP/M™ file systems. This simplifies conversions of CP/M and CP/M-86 software to run on CP/M-68K.

The end-user will notice no significant difference between CP/M-68K and previous versions of CP/M. Commands such as DIR, TYPE, PIP, STAT, and ED respond the same way in both systems. The program interface is also unchanged — CP/M-68K calls for system services have the same function numbers as CP/M and CP/M-86. Upgrading existing CP/M and CP/M-86 application software to run under CP/M-68K is straightforward, because CP/M-68K is so similar to its predecessors. Although assembly language programs will require recoding, high-level language programs will recompile with little or no modification.

MEMORY SUPPORT

CP/M-68K is capable of using as little as 64K or as much as 16 Mb of RAM. The memory used by CP/M-68K can reside anywhere within the address space of the machine. However, user program memory must be contiguous.

DISK DRIVE SUPPORT

CP/M-68K can support up to 16 logical drives, each containing up to 512 Megabytes, for a maximum of 8 Gigabytes of on-line storage. A file can be up to 32 Megabytes long, with space dynamically allocated and released. Each disk has a directory which maps each file's physical locations on the disk. Disk definition tables in the BIOS translate this logical information to the physical characteristics of the disk.

C LANGUAGE

The CP/M-68K package includes a C compiler and run-time library which are subset compatible with UNIX® Version 7. This provides a bridge from UNIX to CP/M-68K — C programs developed under the UNIX operating system can easily be transported to run under CP/M-68K.

SOPHISTICATED SOFTWARE DEVELOPMENT TOOLS

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

■ A 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 can run on any CP/M-68K system with at least 128K of memory.

STANDARD CP/M UTILITIES

PIP

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

ED

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

STAT

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

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 redirected to a file or the listing device if desired.

MULTIPLE PROGRAMS CAN COEXIST IN RAM

The CP/M-68K program load function allows an application program to load other programs into memory. The number of programs which can be loaded is limited only by memory space on the machine. This feature can be used to implement program overlays. Overlays can be called using the standard CP/M-68K loading sequence. Relocatable overlays can be loaded anywhere in user program memory, eliminating the need to relink all overlay segments with every program change.

RESIDENT SYSTEM EXTENSIONS

The CP/M-68K RSX facility allows customization of the operating system on a selective basis. RSX modules are attached to the base of the operating system where they intercept operating system functions and either perform the function or forward the function to the operating system. RSX modules can remain permanently in memory or be removed when a user program terminates.

FULL ACCESS TO MC68000 HARDWARE

CP/M-68K gives the applications program complete access to the advanced features of the MC68000 microprocessor. Support is provided for intercepting 68000 exceptions, using the CPU supervisor state, and accessing I/O devices within the user program.

CP/M-68K places no restrictions on the use of coprocessor chips by the application program. All support for such devices must be supplied by the application, however.

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