

Multi-Format Programs

A software solution to a common problem

by T.F. Chiang

Perhaps you work with two different brands of CP/M computers—one at work and the other at home. Or maybe you own two Kaypros—one CP/M and the other MS-DOS. Or perhaps you're working on a project with someone who owns a different computer. In any case, you'll undoubtedly want some way of transferring the work you've done on one machine to the other. The problem is that the machines can't read each other's disks.

There are two reasons for this very common problem. One, of course, is that CP/M and MS-DOS machines use different operating systems—they speak different languages. The other is that every CP/M computer manufacturer, wanting buyers to use only software made for that particular computer, ensured that the machine couldn't read disks from any other CP/M machine. To transfer information from one brand of machine to another, it was necessary to get them talking to each other through a serial cable—a very complicated procedure.

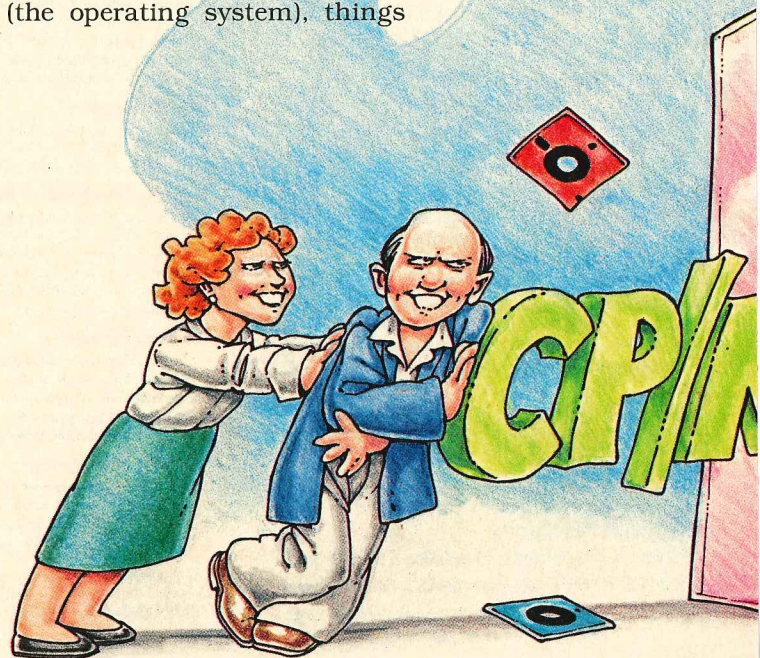
A better solution, of course, is multi-format programs. These programs will let your computer read from and write to disks in another computer's format. They're very handy and quite popular (Kaypro Corporation even wrote one, MFDISK, for use on Kaypros.) Unfortunately, they are not a perfect solution. To see what they can and cannot do, let's look at the incompatibility problem.

The many faces of compatibility

All 5-1/4-inch disks look alike, and a disk for one IBM-PC compatible machine can be used in another. But you can't take a disk from one CP/M computer and use it in a CP/M computer manufactured by someone else, or in an MS-DOS machine. Why not? The answer to that question gets complex and can be difficult to understand. Without getting too technical we'll examine some of the reasons for disk incompatibility.

The inability to swap disks between different brands of CP/M machines can stem from differences in either hardware or software. In the hardware area you have disk drives with different mechanical capabilities. A single-sided drive can only use one side of the disk and will get hopelessly confused if you insert a double-sided disk (which has information recorded on both sides). Putting a quad-density disk in a standard double-density drive results in a similar impasse. Since quad-density drives record information at 96 tpi (tracks per inch) and double-density drives only work at 48 tpi, you are asking the drive to do something that is physically impossible.

Once you get away from the physical limitations of the drive and into the variations controlled by software (the operating system), things



start getting more complex. All disks are organized into sectors and tracks by a formatting program. However, nobody agrees on the details of a standard 5-1/4-inch disk format for CP/M machines. You get variations in the number of sectors per track, the size of the sectors, how far apart sectors are on a track, format of directory entries, and even how the boot tracks are configured. Each manufacturer has its own ideas of what these should be and doesn't want to use anyone else's. No two CP/M 5-1/4-inch disk formats are the same, and swapping disks between different CP/M computers just doesn't work.

CP/M-MS-DOS incompatibility is a different story. As we've already said, the two machines use different operating systems. This means that programs written for one machine will not run on the other. Any executable programs (.COM or .EXE) for MS-DOS use instructions specific to the 8088 CPU (central processing unit). CP/M responds only to instructions for the 8080 or Z80 CPUs.

But while programs can't be carried over from one system to another, data or text files *are* transferable between CP/M and MS-DOS with no problems.

This is because data and text files contain just numbers and letters represented in ASCII (American Standard Code for Information Interchange), a code both types of computers understand.

If a data file is in some special format, as are dBASE II's data files, you will need the DOS version of the program before

you can utilize the data. BASIC source code is a special case. Normally when you save a file in BASIC, the file is "tokenized;" that is, key words are represented by hexadecimal digits to save disk space. A tokenized BASIC file saved under MBASIC will be unintelligible to the GW-BASIC interpreter, and vice versa. However, if you save the file in ASCII format (i.e., SAVE "FILE-NAME.BAS",A), either interpreter can read the file correctly. There are still some minor syntax differences between the two BASICs that you'll have to edit before the program will run. But that is certainly easier than retyping the entire program.

For all these reasons, disk swapping doesn't work unless you use special software called multi-format programs that know about the variations other manufacturers use. Nothing can change the physical limitations of disk drives, but this software *can* let a CP/M Kaypro read disks from an Osborne or even an IBM PC or Kaypro MS-DOS machine.

With a multi-format program you can read, write, and transfer files to or from disks that your computer couldn't normally read. You can transfer any file, regardless of whether it's a data file, a program, a text file, or an overlay file—although, as we've explained, whether your computer can do anything with that file is another question. If you transfer programs from another CP/M computer, they should run *unless* they use video commands specific to the other computer or directly manipulate the BIOS.

So that leaves us with *data compatibility* between any two computers that we can get the multi-format software for. This means that ASCII, BASIC, and data files for the same program (WordStar, dBASE II, Multiplan, and others) should all transfer with a multi-format program. Now let's examine three of the most popular multi-format programs—two for both CP/M and DOS, and one that is strictly CP/M.

UniForm (CP/M ver. 3.03; MS-DOS ver. 1.08)

The original version of this program was bundled with the first Kaypro IIs ('83 series); it had three foreign formats and came as two programs, SETDISK and INITDISK. UniForm for CP/M now handles 87 formats, and it's a single program with a 78K overlay file. The typeset manual includes error messages, instructions for customizing UniForm to your terminal or drive configurations, and advice on using it.

The program starts out by presenting you with a menu of three choices: assigning a foreign CP/M format, transferring files to or from an MS-DOS disk, and the same operations on a TRS-DOS (Radio Shack) disk. The first choice leads you to four screens of the available CP/M formats, arranged alphabetically, with the density and tracks per inch given for each format. You choose one and drive B (on floppy systems) is assigned to that format after you exit the program. Configuring a drive in this manner allows you great freedom in accessing disks of another format. A BIOS filter, which

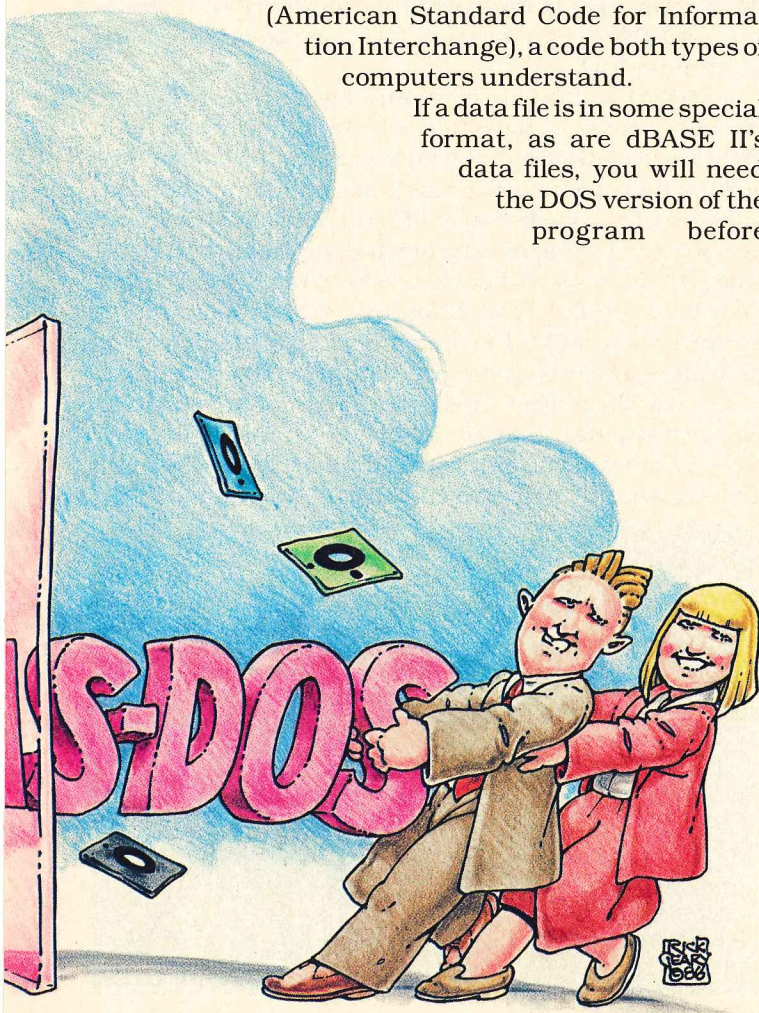


ILLUSTRATION BY RICK GEARY

changes the disk format parameters for a selected drive, resides in memory, largely transparent to CP/M. This lets you read the directory, use PIP or NSWP to move files back and forth, or even access the drive directly through an application program. A status message reminds you of the foreign format each time you warm boot.

Initializing (formatting) a blank disk in another format must be done from within UniForm. Once you've chosen a format from the list, you can initialize a disk in that format by hitting the **TAB** key. If you hit the key accidentally, don't worry, because initialization doesn't begin immediately. (However, exiting any menu option is done by hitting **RETURN**, which is very easy to hit accidentally; this can try one's patience, since re-entering a menu option takes a rather long period of disk accessing.) Configuring a drive or initializing a disk can also be done from the command line.

The second and third options exist for MS-DOS and TRS-DOS file transfers; these operations require a different I/O procedure, so they cannot be incorporated into a BIOS filter. This means that all operations on MS-DOS or TRS-DOS disks take place from within UniForm, not from the **AO>** prompt. You can display a numbered directory of either your CP/M or DOS disk, and copying is done by specifying file numbers. (None of the programs reviewed here can copy files found in MS-DOS sub-directories.)

One thing I noticed about UniForm in particular was drive noise. When writing to another format, the disk drive made some distinctly unpleasant noises. This is to be expected considering some of the acrobatics the drive must perform, but prolonged use in another format isn't the healthiest thing for your drives.

While the MS-DOS version of UniForm is similar to the CP/M version, it is much faster and more flexible. You choose which drive will always be assigned to a foreign format (if you have two floppy drives) during installation. Then, when you run UniForm and choose one of the 79 formats, that format is assigned to a virtual (imaginary) drive, which is the next unused drive in your system. Example: If you have a Kaypro PC with two floppy drives (A and B) and a hard disk (C), the next unused drive designation is D. Assume that you installed UniForm to act on drive B and that you have chosen Osborne as your foreign format. When you access drive B, it is a normal DOS drive. When you access drive D, UniForm still diverts the signal to drive B, but expects to find an Osborne CP/M disk in it. Also, the MS-DOS version of UniForm doesn't have the annoying delay when loading new formats that is present in the CP/M version.

Compat (CP/M ver. 3.2A)

Compat is from Mycroft Labs, the same people who brought you the Mite communications program. Compat is actually divided into three programs: COMPAT (20K), for selecting a format; FORMAT (24K), for initial-

izing disks; and MS (12K), for MS-DOS file operations. Another program, MYCOPY, is included as a general PIP replacement. Besides describing all of the programs, the manual has an informative section on the technical aspects of compatibility, lists the formats supported, and has a good index.

Compat's programs let you pick a format, initialize disks, and have MS-DOS file operations.

COMPAT gives you six screens showing 105 formats, listed by density and then alphabetically, with the disk capacity given. As with UniForm, you configure a drive to the selected format. You have a choice of either drive or both, and when you exit the program it gives the new TPA (transient program area) size with the filter in place (a 6K reduction is typical). When you use FORMAT, you choose from the same menus and initialize a disk in drive B; any foreign format that drive B has previously been configured for is ignored while FORMAT runs and is returned afterwards. Both COMPAT and FORMAT can be run from parameters on the command line.

COMPAT's ability to configure both drives to foreign formats seems to have limited usefulness. Once both drives are configured, the only programs you can load will be those for another machine, which may not run; file transfers then become difficult. Nor can you return to your normal formats by any means other than a cold boot. Media Master (below) is better when exchanging files between two foreign formats directly; you do file operations from within Media Master, without having to load your file transfer program from a foreign disk.

To use MS, a drive must have been configured to an MS-DOS format (though the drive is unusable outside MS). When you run MS, you find yourself in an interactive command environment, with an **"A >"** prompt. All

TIME TRIALS

Following are the approximate times taken by these programs to perform some exercises in disk manipulation. The CP/M programs were timed for initializing (format and verify) a diskette in MS-DOS DSDD format. Then they copied 162K of files from a CP/M disk to the MS-DOS disk. The MS-DOS programs initialized a diskette in Kaypro DSDD format, and copied the 162K of files back onto that disk. (All times given in min:sec.)

CP/M	Initializing	Copying
Media Master	1:15	4:18
Compat	:57	2:17
UniForm	1:05	2:18
MS-DOS		
Media Master	1:45	1:55
UniForm	1:20	1:06

system commands associated with CP/M are available; they act on the MS-DOS drive when you enter them normally, and on the CP/M drive when preceded by a "/". Moving files back and forth is done with PUT and GET commands (to and from the MS-DOS drive). A help command lists all the commands, though it doesn't mention a command to exit; ^C seems to be the only way out.

I found MS to be a little erratic in reading MS-DOS disks. The program is supposed to automatically recognize any MS-DOS format, whether version 1.xx or 2.xx, single- or double-sided. However, it was inconsistent in what it would recognize, and I could discern no pattern to its behavior. (Disks initialized in MS-DOS format by Compat's FORMAT program posed no noticeable problems.)

The MYCOPY utility replaces or improves on most of the functions of PIP. Its functions can be run directly from the command line, in an interactive mode, or off a batch file in automated fashion. When copying files, you can specify user number, and you can use ambiguous file name expressions that exclude certain files. MYCOPY's parameters include most of PIP's, plus such options as query for each file, compare the contents of two files, or transfer files in alphabetical order. You can even execute CP/M system commands via MYCOPY. Some of the additional commands can display space left on disk, reset drives to R/W, and set file attributes.

Media Master (CP/M ver. 2.02k4; MM Plus MS-DOS ver. 1.15)

This program's CP/M version has 70 formats and is broken into two programs, MMSMALL (40K) and MMFMT (30K). Unlike the previous two programs, Media Master does not leave a drive configured in a foreign format. You can only access the foreign disk from within Media Master, not through other programs. It does, however, allow you to access either or both drives in a foreign format. The manual is typeset and includes error messages.

MMSMALL begins with a menu of eight options, more than the other two programs, since you have all the necessary file manipulation capabilities within the program itself. MS-DOS operations are treated just like those for any other format. The option to log onto a new disk lists all the formats, and MMFMT repeats those listings when you want to initialize a disk. Other options allow you to display or print a directory and delete or copy files with optional wildcards; you can also change the user number or verify flag. Some of Media Master's safety features are rejection of illegal file specs, request for confirmation before deleting a file, and, when doing mass file copying, prompting you for a new disk when the destination disk is full. Another is that if you press ESCape anywhere in the program, you are returned to the previous screen.

The MS-DOS version is a single .EXE file, 57K in size. It has 72 formats, but is otherwise similar to the CP/M

version. The main differences are menu options for initializing a disk (you don't need a separate program), for viewing a file, and for operating on sub-directories (on a hard disk). Also, the MS-DOS version of Media Master has an annoying problem with Kaypro-formatted disks, which is acknowledged in the manual. A disk initialized on a Kaypro machine may not work with Media Master. You must initialize a disk in the Kaypro format using Media Master's own formatting procedure. The resulting disk can be read by Kaypros as well as Media Master. Also, a disk formatted by Uniform cannot be read by Media Master, and vice versa.

The Plus version for MS-DOS machines includes something called ZPEM, a program that allows an MS-DOS computer to run *some* CP/M programs. When the IBM PC was still new, several co-processor cards were available for running CP/M on your IBM. For a long time the MS-DOS world didn't care about CP/M compatibility, but now there is renewed interest. NEC's new V-series of chips make it simple for an MS-DOS machine

Media Master's safety features include the rejection of illegal file specs . . .

to run CP/M programs (8080 only, no Z80 programs) very nicely, and now many chip/software packages are available. Plain ZPEM does not include the NEC chip; everything is handled through software emulation. (*Editor's note: Intersecting Concepts also offers its ACCELER-8/16 package at \$99.95, which is ZPEM with support for an included NEC V-20 chip to speed things up considerably.*)

There are different versions of ZPEM to emulate the (non-graphic) video control codes of a Kaypro, Osborne, or a Heath/Zenith. Once you've executed the program, you're in a simulated CP/M environment, the only difference being an EXIT command to return to MS-DOS. ZPEM cannot read Kaypro CP/M disks, so all of your CP/M programs need to be transferred to a DOS diskette. Additionally, CP/M programs, but not data files or overlays, must be renamed to have the filetype .CPM instead of .COM. ZPEM can't run programs that make direct BIOS or BDOS calls, nor can it run programs written specifically for a Z80 CPU.

As for speed, the manual claims ZPEM runs between one and two MHz, depending on the nature of the program. WordStar takes only 20 seconds to load, because the speed of disk accessing doesn't change. Screen I/O, on the other hand, is far slower; it takes ten seconds just for a screen rewrite. A cursor movement takes close to a second, and searching for a word on the same line takes almost three. Terminal emulation is perfect. WordStar had no problems, and neither did

Common Formats Available

The beauty of multi-format programs lies in their ability to translate data from one "language" to another. This allows your computer to work on files that would otherwise be inaccessible on your machine. With the multitude of machines and formats currently in use, it was inevitable that a solution for this problem would be found—a software solution.

What follows below is a partial list of machine formats supported by multi-format software. Notice that it is "partial." Some programs offer close to 100 formats, and some of them are extremely obscure. These are only the best-known machine formats, but they're a representative sample of what's available.


Machine Brand	Disk Type	TPI
Bondwell 12	SS:DD	48
Bondwell 14	DS:DD	48
DEC VT-180	SS:DD	48
Epson QX-10	DS:DD	48
Epson QX-10 (European)	DS:DD	48
Heath w/Magnolia CP/M	SS:DD	48
Heath w/Magnolia CP/M	DS:DD	48
Hewlett-Packard HP-125	DS:DD	48
IBM-PC using CP/M-86	SS:DD	48
IBM-PC using CP/M-86	DS:DD	48
Kaypro II	SS:DD	48
Kaypro 4 or 10	DS:DD	48
Morrow MD2	SS:DD	48
Morrow MD3	DS:DD	48
NEC PC-8001	SS:DD	48
NEC PC-8801	DS:DD	48
Osborne 1	SS:DD	48
Osborne Executive	SS:DD	48
Otrona Attache	DS:DD	48
Sanyo MBC-1000	DS:DD	48
Superbrain JR	SS:DD	48
Superbrain 40 Track	SS:DD	48
Superbrain QD	DS:DD	48
Televideo	DS:DD	48
TI Professional CP/M-86	DS:DD	48
TRS-80 Mod 3 MM CP/M	SS:DD	48
TRS-80 Mod 3 Holmes CP/M	DS:DD	48
TRS-80 Mod 4 MT CP/M	SS:DD	48
TRS-80 Mod 4 CP/M	SS:DD	48
Wangwriter	DS:DD	48
Xerox 820-II	SS:DD	48
Xerox 820-II	DS:DD	48
Zenith Z-90 48 TPI	SS:DD	48
Zenith Z-100 CP/M	SS:DD	48
Zenith Z-100 CP/M	DS:DD	48

LADDER with its animation. It is the speed that may limit this emulator to being a toy rather than a useful tool.

(Editor's note: Another multi-format program for DOS, Read/CPM, came to our attention too late to be included in this article. Read/CPM offers more than 100 CP/M formats and allows you to access data on CP/M disks using standard DOS commands. It is available from Micro Interfaces Corporation of Miami, Florida, (305) 823-8088.)

When choosing, don't just look at the number of formats supported.

Some final comments

When choosing a multi-format program, don't just look at the number of formats supported. All of them have plenty, and you probably don't need to transfer files to all those obscure machines; the programs described here all support MS-DOS, which is the main concern nowadays. See which program runs in a manner you like. Do you want to be able to reconfigure a disk drive? Do you want to be able to run all the functions within a single program? Do you want to be able to use both drives in foreign formats? And if a program lacks a particular format you want, ask the company for details about its policy on adding formats; putting another entry in a BIOS table is not difficult. 

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Quick Reference Summary

Product: Compat (CP/M)

Manufacturer: Mycroft Labs, Inc.

P.O. Box 6045

Dept. PND

Tallahassee, FL 32314

Phone: (904) 385-1141

Sugg. Price: \$39.95

Product: Media Master (CP/M) and Media Master Plus (MS-DOS)

Manufacturer: Intersecting Concepts, Inc.

4573 Heatherglen Crt.

Moorpark, CA 93021

Phone: (800) 824-7888 (operator 251)

Sugg. Price: \$39.95 (CP/M), \$59.95 (MS-DOS)

Product: UniForm (CP/M) and UniForm-PC (MS-DOS)

Manufacturer: MicroSolutions, Inc.

125 South Fourth St.

DeKalb, IL 60115

Phone: (815) 756-3411

Sugg. Price: \$69.95 (both CP/M and DOS)