
Subject: comp.os.cpm Frequently Asked Questions (FAQ)

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Changes from the previous FAQ are marked with a "|" in the first
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While this FAQ is not intended to be an advertisement for any product,
please note that some of the contributor have a financial interest in
some of the items mentioned. Your editor has NO financial interest in
anything mentioned in this FAQ.

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Q1: Does CP/M stand for anything?

A: (Don Kirkpatrick)

There are at least three popular answers - Control Program for Microcomputers, Control Program for Microprocessors, and Control Program/Monitor. The issue is clouded by authors of popular CP/M books giving different answers. According to Gary Kildall (the author of CP/M), in response to a direct question on the PBS show "The Computer Chronicles" following Computer Bowl I, the answer is: Control Program for Microcomputers. This is also consistent with DRI documentation. See, for example, p. 4 of the DRI TEX manual.

Q2: Is CP/M in the Public Domain?

A: (Jay Sage, Don Maslin, Tilmann Reh, Kirk Lawrence)

CP/M is not in the public domain, and there is at least two sources for the purchase of new, legal copies of CP/M:

David McGlone
149 W. Hilliard Lane
Eugene, OR 97404-3057,
(503) 688-3563.
+ d.mcglone@genie.geis.com

or you can get a copy with documentation for \$9, plus shipping,

from:

California Digital, Inc.
17700 Figueroa Street
Gardena CA 90248
310-217-0500
800-421-5041

On the other hand, there have been lots of greatly improved clones, including ZCPR3 for the command processor and several replacements for the BDOS. Some of these are commercial (e.g., ZSDOS/ZDDOS), but many have been released to the public. Most of the latter can be obtained from oak.oakland.edu and many BBSs.

There is also a CP/M-Plus replacement named ZPM3, written by Simeon Cran. It offers much more performance and some additional features compared to CP/M-Plus. An extended CCP, the ZCCP, is also available. Unfortunately, it still seems to have some bugs. ZPM3 and ZCCP are free! However no sources as Simeon won't give them away.

New legal copies of CP/M-86 were still available, for \$75, from:

DISCUS Distribution Services, Inc.
17607 Vierra Canyon road
Salinas, CA 93907-3312
(408) 663-6966

And CP/M-68K is available from:

James Knox
TriSoft
1825 East 38 1/2
Austin, TX 78722
(512)472-0744
(800)531-5170
(512)473-2122 (FAX)

Q3: Where are the CP/M archives?

A: (Don Maslin, Ralph Becker-Szendy, Paul Martin, Ulrich Hebecker)

Simtel20 is no more. Six sites that stock CP/M files are:

oak.oakland.edu
wuarhive.wustl.edu
ftp.update.uu.se
ftp.demon.co.uk
reze-2.rz.rwth-aachen.de
soltrans.cr.usgs.gov

The main archive is oak.oakland.edu. Assuming the availability of anonymous ftp, look into the subdirectories of /pub/cpm. There is a *lot* there! One of the first directories to check is starter-kit. It contains everything you need to get up and running.

If you wish to submit material to oak.oakland.edu, contact:

Jeff Marraccini
Senior Computing Resource Administrator
Oakland University
Rochester, MI USA 48309-4401
(810)370-4542

jeff@vela.acs.oakland.edu <- Work
jdm@msen.com

He will send you instructions and passwords necessary to perform an ftp upload.

Ftp.update.uu.se specializes on CP/M programs for the DEC Rainbow, but has also some generic CP/M software such as a Micro Emacs, the HI-TECH Z80 C compiler and a few games. Questions about this site can be directed to Tom Karlsson, <tomk@Student.DoCS.UU.SE>, the site administrator.

There is a European file server group, named TRICKLE. This group mirrors oak.oakland and other archives. For more information, get in touch with your local TRICKLE operator.

Q4: Can I subscribe to com.os.cpm via E-Mail?

A: (Keith Petersen)

To join the CPM-L mailing list, which is gatewayed to and from comp.os.cpm, you must send email to the list server. If you are on BITNET, send the following command:

SUBSCRIBE CPM-L your full name

to LISTSERV@RPITSVM. You can send that in an interactive if your system supports them (e.g. the CMS TELL command), or in the body of a mail message (*not* the subject line).

If you are not on BITNET, the Internet subscription address is LISTSERV@VM.ITS.RPI.EDU. Send mail to that address with this text in the body of the message:

SUBSCRIBE CPM-L your full name

Q5: What languages/compilers/databases/editors are still available?

A: (Ralph Becker-Szendy, Ulrich Hebecker, Jay Sage)

Unfortunately, SLR sold out to Symantec and all products except for one DOS (or Windows) tool have been withdrawn from the market (what a shame). However, Sage Microsystems East (contact Jay Sage) does carry the excellent ZMAC package including a macro relocatable assembler, linker, and librarian. Except for the speed, ZMAC is better and cheaper than the standard SLR tools.

MIX C and other MIX products are available from:

Ed Grey
P.O. Box #2186
Inglewood, CA 90305
(213)759-7406
<ac959@cleveland.Freenet.Edu>.

Hi-Tech C V3.09 for CP/M is now freeware. The authors are still maintaining their copyright, but are allowing free use for both private and commercial users without royalty. The original is on their bbs in Australia, at (61)(7)300-5235. Copies can be obtained from:

ftp.update.uu.se: /pub/rainbow/cpm/c
ftp.mcc.ac.uk: /pub/8051c/htc.zip
oak.oakland.edu: /pub/cpm/hitech-c
ftp://ftp.hitech.com.au/hitech/cpm
http://www.hitech.com.au

Sage Microsystems East still offers BDS C, in both the original, straight CP/M version and in a version that includes Z-System support. The package, with both versions of the compiler and a very large manual, is only \$25.

Micro Emacs is available from:

ftp.update.uu.se: /pub/rainbow/cpm/emacs

Public domain CP/M programs are available via:

Elliam Associates
Box 2664
Atascadero, CA 93423
(805)466-8440

In the past, Elliam has sold Turbo Pascal, Uniform, Nevada COBOL, SuperCalc, and much more. Call for availability and price.

WordStar 4.0 is available from:

Trio Company of Cheektowaga Limited
3290 Genesee Street
P. O. Box 594
Cheektowaga, NY 14225-0594
716-892-9630

Dynacomp stills sell CP/M software (or to be accurate, they still had several dozen CP/M programs in the 1992 catalog.) It is the kind of programs which ought to be written in BASIC: Typing tutors, little engineering programs like calculation of the stiffness of beams, education math programs. Their address is:

Dynacomp
178 Phillips Road
Webster, NY 14580
(800)828-6772 orders
(716)265-4040 support

There is no known U.S. source to purchase the following programs:

muMath/muSimp
Any Microsoft product (M80, L80, F80, Pascal, BASIC)
VEdit

but Jay Sage has copies of a number of programs that were donated to his Boston Computer Society Zitel User Group. As of this writing, there are some copies of Turbo Pascal, F80/M80/L80, Perfect Writer and other programs in the Perfect line, WordStar and other programs in the 'Star' line, and quite a number of others. They may be obtained in exchange for a cash donation to the user group. Contact Jay Sage.

Most have been "abandoned" by their makers, but not placed in the public domain.

For our European readers, much is available in Germany. dBASE,

dBASSI, WordStar 3.0, Multiplan, SuperCalc PCW, and Microsoft Basic (Interpreter and Compiler), M80, L80, CREF80, and LIB80 can be ordered in either PCW format or C128 (also native 1571) format from:

Fa. Wiedmann
Unternehmensberatung
Korbinianplatz 2
D 85737 Ismaning
Tel.: +49.89.965029 (from 9:00 to 18:00)

Also, for our European readers, Z3PLUS (for CP/M, DM 70.--), NZCOM (for CP/M 2.2, DM 70.--), (both for package 100.--), Z-Systems come complete with Z3COMs and ZHELPS (another 14 Disks at 360K app. or equ.) and German manual(!), BDSC-Z, TURBO Tools, Turbolader, and Juggler (DM 50.--) from:

Helmut Jungkunz Zacherlstr.14 D 85737 Ismaning
Tel.: +49.89.9614633 (18:30 to 21:30)
+49.89.969374 (18:30 to 21:30)
BBS : +49.89.9614575 (17:00 to 3:00) "ZNODE 51"
100024.1545@compuserve.com

and C128 CP/M Plus (DM 80.-) from:

Schaltungsdienst Lange Berlin Tel.: 030/7036060

Q6: Where can I find Z80 math routines?

A: (Roger Hanscom)

+ Programmers looking for examples of commonly used Z80 assembler routines may want to look at "Z80 Assembly Language Subroutines" by Leventhal and Saville. It was published by Osborne/McGraw-Hill in 1983 (ISBN 0-931988-91-8), and it 497 pages long. It also contains general programming information, as well as a summary of the Z80 instruction set and reference data for the Z80 PIO. Assembler routines given in the book fall into the following categories:

| | |
|-------------------------------|----------------------------------|
| + - code conversion | -array manipulation and indexing |
| + - arithmetic | -bit manipulation and shifts |
| + - string manipulation | -array operations |
| + - I/O | -interrupts |

+ For transcendental routines, it is generally better to use a high level language, such as Hi-Tech C, where they are built-in.

Q7: What new CP/M computers are available?

A: (Ralph Becker-Szendy, John D. Baker, Tilmann Reh)

The YASBEC (uses a 64180, has SCSI interface), written up in TCJ, issues #51 and #52. It is important that the YASBEC uses a proprietary bus system.

The CPU280 (uses a Z280, an IDE interface is available), also written up in TCJ, issues #52 and #53. Circuit boards are available from Jay Sage and Ralph Becker-Szendy. CPU280 uses the ECB-bus which allows many other I/O cards to be connected.

Ampro Little Board products were available from Dean Davidge of Davidge Corporation, Buellton, CA, but he may have moved and the

address and phone number are unknown.

The Micromint SB180/SB180FX is also still available from:

Micromint, Inc.
4 Park Street
Vernon, CT 06066
203-871-6170 (technical assistance)
800-635-3355 (for order placement)

Q8: What is this I hear about a CP/M CD ROM?

A: (Jack Velte)

The disk is now being shipped. It contains over 19,000 files with executable programs, source code, documentation, and other materials. Included are the the entire Simtel20 pub/cpm archives, the contents of some major bulletin boards, and the personal collections of several leaders in the CP/M community. You'll find:

Assmeblers, compilers, code libraries, and programming tools
Editors, word processors, spreadsheets, calculators
Disk, printer, modem and other system utilities
Archive and compression tools
Telecommunication software for users and BBS operators
Articles from user's group journals and other publications
Games and educational software
Help files

You'll also find CP/M emulators and other tools for working with CP/M files under DOS, OS/2, and Unix. Most programs include not only documentation but also complete source code. Programs for all different computers are on the disc: Kaypro, Osborne, Commodore, Amstrad, Starlet, and others. This disc comes with a MSDOS view program which allows you to view, decompress, or copy files to your disk. It's fully BBS'd with description files compatible with popular MSDOS BBS programs.

The cost is \$39.95 plus \$5 shipping and handling (per order, not per disk) for US/Canada, and \$10 for airmail overseas. If you live in California, please add sales tax. For further information:

info@cdrom.com
Walnut Creek CDROM
1547 Palos Verdes, Suite 260
Walnut Creek, CA 94596 USA
(510)674-0783 voice
(510)674-0821 fax
(800)786-9907

Q9: How can I transfer my CP/M files to DOS?

A: (Don Maslin, Will Rose, Alan Ogden, Tilmann Reh, Herb Johnson)

One solution is Sydex' excellent shareware program 22DISK which permits reading, writing, and formatting many CP/M format disks on a PC. It is available on:

oak.oakland.edu: /pub/msdos/diskutil/22dsk142.zip

22DISK is shareware and should be registered. It supports 8-inch

drives on PC's, provided either a adaptor is wired to the PC's floppy controller or that a CompatiCard is installed. Sydex or Herb Johnson can provide assistance with using standard PC controllers. Sydex can be reached at:

Sydex
P.O. Box 5700
Eugene, OR 97405
Voice: (503) 683-6033
FAX: (503) 683-1622
Data: (503) 683-1385

There is also UniForm by Micro Solutions that should still be available from them. There are versions for both the IBM-pc's and a lot of different cp/m machines. Micro Solutions can be reached at:

Micro Solutions
123 W Lincoln Hwy.
DeKalb, IL 60115
(815)756-3411 Voice
(815)756-2928 Fax
(800)890-7227

If it's for an IBM type system, talk to them about what kind of hardware/software you have. Some flavors of PC have a problem with both UniForm and 22disk and UniForm will not operate properly under DRDOS v6.0. UniForm also fails if the machine clock exceeds ~20MHz. This has been confirmed with Micro Solutions, and no fix is available.

You need not use the DOS machine - there are also at least three transfer programs running under CP/M: TRANSFER (for CP/M-2.2), of which a quick-hack CP/M-3 adaptation also exists; DOSDISK, and MSDOS for CP/M-Plus written by Tilmann Reh, latest version 2.1 of Oct 93. TRANSFER and MSDOS are freely available, DOSDISK is commercial. MSDOS has two related utilities: MSFORM will create the DOS Boot Record, FAT and directory structure on a freshly formatted disk, and MSDIR will give you a quick look at the main directory of a DOS disk.

DosDisk is a standard CP/M product. As supplied, it runs only on the following specific hardware:

all Kaypros equipped with a TurboROM
all Kaypros equipped with a KayPLUS ROM and QP/M or CP/M
Xerox 820-I equipped with a Puls-2 ROM and QP/M
Ampro Little Board
SB180 and SB180FX equipped with XBIOS
Morrow MD3 and MD11
Oneac On!
Commodore C128 with CP/M-3 and 1571 drive

There is also a kit version for which the user can write his own driver, provided the BIOS implements a table-driven disk interface. Contact Jay Sage for details. DosDisk and MSDOS both handle DOS subdirectories.

Remember, these conversion programs only move the data, as is, in its current binary form, from one disk format to another. They do not reinterpret the data so that a different program can use the information. However, there are some tools under DOS that will convert word processing file data among different word processors, such as WordStar, Word Perfect, and Microsoft Word. If the CP/M

computer that made the original disk is still running, you might want to try to generate a pure text (ASCII) version of your information (e.g., by "printing to disk") before moving it over to a DOS disk. If the computer is not working but you still have the program, you might try copying it over to a DOS disk and running it under a CP/M emulator on the DOS machine to produce a text file.

Q10: How can I convert an (insert name) disk to (insert name) format?

A: (Jay Sage, Curt Schroeder, Mike Gordillo, Helmut Jungkuz, Tilmann Reh, Randy Winchester)

David McGlone and Elliam Associates (see above) offer disk conversion services at modest prices that can convert from just about any format to just about any other format.

If you have a Kaypro equipped with an Advent TurboROM, Plu*Perfect Systems offers a program called MULTICPY that can read/write about one hundred different 5 1/4 formats.

It is not possible to directly read/write Apple II CP/M disks on any other host machine because an Apple disk is recorded in GCR which is incompatible with FM/MFM disk controllers. The only way to get CP/M files in or out of Apple II CP/M disks is via a serial link with a non-Apple II host or with special hardware. For example, MicroSolutions had a device called the MatchPoint PC. When used in conjunction with a MicroSolutions Compaticard, files can be read from an Apple CP/M disk and transfer to another disk format with a special configuration of UniForm. MicroSolutions can be reached at:

(815)756-3411

There exists a program called "Jugg'ler" for the C128's CP/M that will read/write 140 different CP/M formats both 3.5 and 5.25 MFM (and some GCR) formats. A demo version with 22 formats, and other C128 specific CP/M software, can be found at:

<ftp://ccnga.waterloo.ca/pub/cbm/os/cpm>

The last known source for the complete version of Jugg'ler, Herne Data Systems, is no longer in business. Randy Winchester is in negotiations with the former owner and may be able to supply the complete Herne product line in the near future. Watch here for details.

The CPU280 CP/M-3 implementation offers the AutoFormat feature which allows to format, read and write almost every disk format.

Another way of converting formats is to use a PC with 22DISK - just copy the files from one CP/M disk to DOS, and then back to the other CP/M disk.

Q11: Where can I buy new diskettes?

A: (Don Maslin)

+ California Digital still lists hard and soft sector diskettes - both
+ 10 and 16 sector at \$9.95. They also list 8" double density
+ diskettes at \$12.95.

+ California Digital, Inc.

+ 17700 Figueroa Street
+ Gardena CA 90248
+ 310-217-0500
+ 800-421-5041
+ 310-217-1951 Fax

Q12: Can I run CP/M on my MSDOS machine?

A: (Juergen Weber, Udo Munk, Paul Martin, John D. Baker,
Mark Litwack, Tilmann Reh)

Available by anonymous ftp from the primary mirror site
OAK.Oakland.Edu and its mirrors:

simtel/msdos/emulator/zsim241.zip

ZSIM is an (extremely accurate) Z80 emulator (80386/40 -8 MHz Z80) in conjunction with a CP/M 80 BIOS, i.e. it simulates a Z80 machine, that can run CP/M. Together with the original CP/M operating system you have a full Z80-CP/M machine.

If you don't have a CP/M system disk at hand, you can use the included public domain CP/M compatible operating system P2DOS.

ZSIM uses CP/M format disks, a ram disk and a hard disk. Supported disk formats are CP/M 86 single sided and double sided, but you can install any singled sided CP/M format PC drives can physically read. So you can use ZSIM to transfer data to MS-Dos. The ram disk can be saved to the PC hard disk. The hard disk is in an MS-Dos file. A sample hard disk containing the SMALL-C compiler is included.

As ZSIM uses an original operating system and CP/M disks it should run every CP/M program that does not use special hardware. ZSIM is free for personal use. Sources of the CP/M BIOS are included.

On silver.cstpl.com.au (formerly: raven.alaska.edu) you'll find:

/pub/coherent/sources/z80pack.tar.Z.

(Also available as z80pack.tgz at ftp.cs.uni-sb.de in the directory /pub/others.)

This is a Z80 CPU emulation completely written in C, an I/O emulation for a typical CP/M system also is included. The package also comes with the BIOS source for the I/O emulation and a Z80 cross-assembler. It was developed it under COHERENT but it's known that it does work under Linux and SunOS too. You still need a CP/M license to get CP/M running or you might try to get one of the free available CP/M clones running on it. On a 486/66 DX2 running COHERENT it's like a 11Mhz Z80 CPU, so the emulation speed is acceptable.

On sunsite.unc.edu you'll find:

/pub/Linux/system/Emulators/cpm-0.2.tar.gz

This package, written by Michael Bischoff, is well integrated into the host operating system. It provides options to use either a container file for the CP/M disk for full BIOS compatibility, or to access the Linux file system through the included BDOS emulator. The Z80 emulator is written in 86 assembler and the rest is in C. A

pre-assembled ZDOS CCP is included with the package. The emulation speed on a 486/66 is approximately a 22 Mhz Z80, and on a Pentium/90 it is 50 Mhz. Full source is included.

On oak.oakland.edu you'll find:

/pub/msdos/emulator/myz80111.zip

MYZ80 is a Z80/64180 emulator package. The new 80486, 80386 & 80286 machines with the fast hard drives and the snazzy OS/2 operating systems are such a delight... but for many, the Z80 machines still have to be fired up from time to time in order to develop code for CP/M and the Z80 chip. Well, not any more, thanks to MYZ80.

Other emulators on the market are less than satisfactory solutions. Of the small number which can actually run without causing system errors under the later versions of DOS, apparently none is capable of running real CP/M. Instead they use an emulated version of CP/M which is only as accurate as the developers have bothered to make it.

MYZ80 can run CP/M 3.0 and ZCPR (which is such a useful Z80 developer's environment). So if you suffer from less than perfect Z80 emulation and slow overall performance, give MYZ80 a try, and save the 'real' Z80 machines for those cold winter mornings when you really need the heat. The author of MYZ80, Simon Cran, can be reached at:

Simeon Cran P/L
PO Box 5706
West End, Queensland, AUstralia 4101
Simeon.Cran@f236.n640.z3.fidonet.org

22NICE is (like 22DISK) from Sydex. It emulates the application program while translating all BDOS and BIOS calls into the appropriate DOS calls. This way, it's comparably fast and allows for free use of the DOS file system (including paths). You are able to map drive/user combinations to particular paths in the DOS file system. The emulator can be configured for different emulation modes (8080, Z80, and automatic detection) and different terminal emulations. There are two run-time options: First, you can create a small COM file which will then load both the emulator and the CP/M program (contained in a .CPM file to avoid confusions); Second, you can build the emulator and the application together to a single COM file (which is larger then but needs no run-time module).

MicroSolutions still has their UniDOS Z80 card available. It has an 8MHz Z80 with 64k of ram with UniDOS system software and Uniform-PC. It's a half size plug-in card.

Q13: Where can I get a boot disk for (insert system name)?

A: (Don Maslin, Herb johnson)

Getting a system disk is pretty easy - if Dina-SIG CP/M System Disk Archives has it. However, some dialogue with the requester has usually been necessary to assure that we are talking about the same Jurassic inhabitant! There are just too many variants in the CP/M world. A request with specifics on the computer, an address to mail to, and some recompense is all it takes. Since this is an unfunded effort on the part of the SIG, the costs of media, mailer, and

postage must be recouped. In general, and there are variations, this runs \$3 for the first disk and \$2 or less for each additional. Eight inch disks are a bit more! However, a swap can be arranged if the other party has disks that are not duplicative of ones already in the archive. If you can help augment the archive, yours is free.

The keeper of the archives can be reached at:

Don Maslin
7742 Via Capri
La Jolla CA 92037
619-454-7392

or use the email address given above.

David McGlone of Lambda Software Publishing has a variety of boot disks, and he sells CP/M with them. He can be reached at:

Lambda Software Publishing
149 West Hilliard Lane
Eugene OR 97404-3057
(503) 688-3563

Q14: What terminal emulation programs are available?

A: (Peter A. Schuman, Howard Goldstein)

The leading CP/M public domain or freeware (author kept copyright but distributed it for free) modem programs are:

MDM740 - The last of the "MDMxxx" programs.

IMP245 - This is nice, and works smoothly within what it does. What it does, it does very well. IF you have slow floppy drives, there is a patch to cut down the receive buffer size.

MEX114 - different from the above two, but minimally functional with just a MDM740 overlay. To use all of its fine features, you need MEX overlay for your machine.

ZMP15 - This program includes ZMODEM file transfers.

KERMIT - This program may have the widest implementation base because it uses only printable characters for its file transfers. This is a plus because the MODEM7 family of protocols send binary characters that sometimes conflict with the underlying system use. It is a minus because many more characters must be sent and thus is slower. KERMIT may be found on watsun.cc.columbia.edu.

QTERM43F - This is somewhat like using QMODEM on an MSDOS machine. Qterm has VT100 emulation mode as well as XMODEM and KERMIT protocol. If you can get (or write) a good overlay, this is a nice program. (Bug fixes to 43E were released in a separate library to bring it up to 43F. The FIX library did not include a new binary; users had to do their own patching.)

For high speed transfers, you will probably need interrupt-driven routines, which are available for some these. The exact baud rate where it becomes necessary varies by system and program.

Q15: How do you unpack a .ARK or .ARC file?

A: (Gier Tjoerhom, Don Kirkpatrick)

Archive files are a collection of related files packed together so they stay together. They have somewhat been replaced by libraries, but are still encountered often. The C or K at the end only differentiate the original packing program, they are otherwise identical. Some archives are self extracting, just rename them with a .com ending and execute them. Others must be unpacked with a program, unarc16.ark containing one of the most popular (in a self extracting archive). This archive can be found at:

oak.oakland.edu: /pub2/cpm/arc-lbr/unarc16.ark

Q16: How do you unpack a .lbr file?

A: (William P. Maloney, Peter A. Schuman)

A .lbr is a single file that contains a number of compressed files inside. The files must be extracted from the .lbr before they can be used.

One very good library extract program is called lbrect.com. It's simple to use and uncrunches the files at the same time. EXAMPLE:

```
A>lbrect b:myfile.lbr c:*. * uo
```

This takes the lbrect.com file on 'A' to extract all the files in myfile.lbr on 'B' and put them on 'C' uncrunched. A simple 'lbrect' first will show you how to use the .com file.

Other popular library maintenance programs are LUE, DELBR, and NULU, the latter being one of the best CP/M programs for handling LBRs. However, don't use NULU to extract and unsqueeze simultaneously. It occasionally screws up doing this, and it can trash an entire disk when it does so.

LT31 is also able to unpack libraries and also supports all current compression standards (including LZH 2.0!). It is a very useful utility and can replace several single programs.

Q17: What are all these .xQx, .xYx, and .xZx file types?

A: (Don Kirkpatrick)

These are compressed files, a.k.a. squeezed or crunched files. They must be uncompressed before they can be used. They differ in the compression algorithm; .?Q? was the first generation and .?Y? the newest. There are many fine programs that uncompress files, but most handle only one or two compression types (e.g. SQ111.ARC and CRUNCH24.LBR). One program that will uncompress all three types can be found in CRLZH20.LBR.

Q18: Are any of these .ARK, .LBR, or CRUNCH utilities on MSDOS?

A: (Geir Tjoerhom)

Yes, MSDOS versions do exist and can be located as follows:

```
oak.oakland.edu: /pub/msdos/arcutil/lue220.zip      (.LBR)
nic.switch.ch: /mirror/msdos/archiver/arce41a.zip  (.ARK)
nic.funet.fi: /pub/msdos/packing/compress/alusq.com (.xQx)
nic.funet.fi: /pub/msdos/packing/compress/unocr233.zip (.xZx)
```

Also check out the files in oak.oakland.edu: /pub/unix-c/cpm.

Q19: Why does my Kaypro drop characters above (insert baud rate)?

A: (Jeff Wieland, Stephen Griswold, Don Kirkpatrick)

The basic problem is that updating the screen takes too long and some incoming characters are missed. The exact baud rate where characters begin to disappear depends on the configuration of the Kaypro and the terminal program. Generally, the older non-graphic Kaypros will run at a much higher baud rate before characters start to disappear. Stock Kaypros are not interrupt driven and the BIOS ROM has several built-in delays, which demanded too much of a 2x/4x/10's time.

Several things can be done to help the situation. If your Kaypro came with the MITE software package, you can use it for high speed terminal emulation. A Kaypro 2X using MITE can go as fast as 19200 bps. MITE uses interrupts to achieve this.

Sometimes the problem can be ignored. A 2X will drop characters at 300 baud using Kermit-80. File transfers work fine at 19200 bps. It is always a good idea to run file transfers in the quiet mode if terminal mode is dropping characters as then the display update time is minimized.

The graphic-equipped Kaypros can be significantly improved in terminal mode just by turning off the status line at the bottom of the screen. As most terminal programs have an initialize sequence available, just send the no status line command to the Kaypro - <ESC>, C, 7 [1BH, 43H, 37H in hex].

There are several hardware changes that can lessen or eliminate the problem. There is a speed modification for the 1983 Kaypro-II's & IV's requiring changing some chips to faster versions and outfitting the back with a toggle switch. Upgrading to a MicroCornucopia MAX-8 or Advent TurboROM also helps.

If your machine is equipped with the Advent TurboROM and you choose to run QTERM, Don Kirkpatrick can send you an interrupt driver that allows the graphic-enhanced Kaypros to work just fine to at least 2400 baud.

Q20: What is an Advent TurboROM?

A: (Don Maslin)

The Advent TurboROM is a firmware upgrade to the Kaypro. It replaces the original Kaypro system ROM and provides flexible configurations, additional disk formats, greater speed, and bug fixes. Contact point for this is:

Chuck Stafford

4000 Norris Avenue
Sacramento CA 95812
916/483-0312
+ 73664.2470@compuserve.com

Q21: How can I add a hard drive to my Kaypro?

A: (Don Kirkpatrick)

Chuck Stafford (see above) sells hard drive conversion kits. Emerald Microware used to offer hard drive kits for the Kaypro, but has run out of hard disk controllers. If you already have your own WD-1002-05 or WD-1002-HDO or can find one, then Emerald can provide you with controller software. They can be contacted at:

EMERALD MICROWARE
P.O. Box 1726
Beaverton OR 97075
503/641-8088 Brian/Patricia

Q22: What belongs in the unpopulated board area on a Kaypro?

A: (Don Maslin, Don Kirkpatrick, Peter A. Schuman)

A clock and modem go there. The modem is rather useless as it is only 300 baud. The clock/calendar is useful. The Computer Journal, issue 64, Nov./Dec. 1993, describes the installation procedure. There is also an area on a 2X for a hard drive interface.

Q23: What is The Computer Journal?

A: (Kevin Spears, Don Kirkpatrick, David Baldwin)

The Computer Journal is a magazine specializing in CP/M, small systems, and related topics. The Editor is Bill Kibler. Chuck Stafford writes a regular column on Kaypros and Herb Johnson writes one on S-100. In their own words:

"The Computer Journal has been supporting CP/M and Z80s for TEN years. TCJ has recently increased our support by providing more beginner CP/M articles, as well as our regular advanced ZCPR column. The ZCPR column is written by one of the ZCPR authors and guides people in replacing CP/M with this do-it-yourself operating system.

Tired of PC/MSDOS files getting bigger and bigger? Like to do things in a simple way? How about learning about new devices without having the latest "C" compiler? Have you been wondering about using the new IDE drives on your CP/M system? We do all that and more at The Computer Journal."

There are six issues per year, and the subscription rate is \$24 for 1 year, or \$44 for 2. Subscriptions may be sent to:

The Computer Journal
P.O. Box 535
Lincoln, CA 95648
(916) 645-1670

The Computer Journal (TCJ) is also on the Internet.

Email tcj@psyber.com
Web page <http://www.psyber.com/~tcj>

Q24: Are there other magazines supporting CP/M?

Other magazines of interest include the Z-Letter from McGlone, "exclusively for CP/M and the Z-System. Eagle computers and Spellbinder support":

The Z-Letter
\$18/year, 6 issues
Lambda Software Publishing
149 West Hilliard Lane
Eugene OR 97404-3057
(503) 688-3563

and Historically Brewed, edited by David Greelish: "computer history".

Historically Brewed
\$18/year, 6 issues
2962 Park Street #1
Jacksonville FL 32205

These magazines list other publications, support groups and CP/M supporting companies.

Q25: What is ZCPR and the Z System?

A: (Jay Sage, Mike Finn, Don Kirkpatrick)

The original ZCPR was written in Z80 code and was called the "Z80 Command Processor Replacement". It was a drop-in replacement for the Digital Research CCP (Console Command Processor) and adhered to the 800H space restriction. ZCPR2 (February 14, 1983) was the first experiment in greatly extending the power of the command processor. It added additional memory modules for supporting such things as multiple commands on a line, a dynamically reconfigurable command search path, and directory names associated with drive/user areas. The ideas and implementation in ZCPR2 were only half-baked, and they came to logical fruition in ZCPR3 (Richard Conn's 3.0 and Jay Sage's 3.3 and 3.4).

ZCPR3 gives you UNIX-like flexibility. Features implemented include shells, aliases, I/O redirection, flow control, named directories, search paths, custom menus, passwords, on line help, and greater command flexibility. ZCPR3 can be found on many BBS and SIMTEL mirrors. The Z System commercial version is available for a nominal fee from Jay Sage. Further details can be found in the text "ZCPR3, The Manual", by Richard Conn, ISBN 0-918432-59-6.

You can find a detailed history of the development of ZCPR and the Z System in Jay Sage's column in issue #54 of The Computer Journal. This article celebrated the 10th anniversary of ZCPR, which was first released on February 2, 1982. His "ZCPR33 User's Guide" also has a section on the history (it can be ordered from Jay for \$10, domestic shipping included).

There still are active Z-nodes supporting Z-system and many RCP/M's

supporting CP/M as well as some special interests. The files RCPM0594.BRF and RCPM0594.LST give the brief and full list of international RCP/M's. The file ZNODE67.LST which gives the list of active Z-nodes. Ian Cotrell has been keeping the RCPM list as updated as he can.

Q26: What ever happened to the Z800?

A: (Ralph Becker-Szendy, Frank Zsitvay)

The Z800 was planned to be NMOS, and was finally implemented as the Z280 in CMOS, five years late. And it does have a 4kB/8kB paged MMU, and separate I/D space, and cache. There are small differences between the Z800 preliminary spec and the final Z280 specification.

The Z180 was not an outgrowth of the Z800. It was a joint effort between Zilog and Hitachi. The first two versions of the HD64180 were slightly different from the current Z180. The current HD64180 and Z180 are identical, and both have flags in one of the control registers to emulate the earlier versions. The changes are mostly bus timing, as the HD64180 was designed to interface with Motorola 6800 style peripherals as well as Intel and Zilog, which wasn't too strange since Hitachi second sources some Motorola 6800 series products.

Q27: What is the status of the Z380?

A: (Ralph Becker-Szendy)

The Z380 is a 32-bit version binary-compatible upgrade of the HD180. The 18MHz part in the 100-pin QFP package is shipping. The plan for a PGA-package for the Z380 has been scrapped. Zilog is working on a 25MHz part, but it isn't quite ready yet. The "Preliminary Product Specification", Zilog part number DC6003-02, documents the part. According to the manual, the plans include a 40MHz part, but the time frame is uncertain.

Q28: What is the KC80?

A: (Ralph Becker-Szendy)

There was an announcement in the trade press about a deal between Kawasaki Heavy Industries and Zilog. Kawasaki has developed something called the KC80, which is a Z80 (no MMU, extended address space, or 32-bit enhancements), but speeded up to execute most instructions in one or two cycles, and running at 20MHz. Zilog has the rights to the design. The catch is that Zilog is currently not planning to sell it as a chip.

Q29: What is the S-100 bus?

A: (Herb Johnson)

The S-100 bus, also known as the IEEE-696 bus, is a bus standard of 100 pin cards, 50 pins per side, which plug into 100-pin edge connectors on a passive (i.e. no computer logic) backplane once called a "motherboard". Dozens of computer companies produced cards and systems to this standard in the 1970's and 1980's.

One of the first popular microcomputers was the Altair 8800 by MITS, which was offered as a kit in the January 1974 issue of Popular Electronics. Each functional block of the computer, which at that time required many logic or memory chips each, was designed to fit a single card which plugged into a bus or "motherboard". The function and timing of signals on the 100-pin connectors of that bus became known as the "S-100 bus".

An industry was started in producing cards compatible to the Altair, followed by the production of whole systems. The bus evolved as other manufacturers, such as Cromemco and Compupro, used slight variations of the bus design for their product line. These differences were finally addressed with the IEEE-696 standard, published by the Institute of Electrical and Electronic Engineers in 1983. The standard was already in use by then but only influenced designs for the next few years. Most new CP/M personal systems went to single-board designs with no bus at all, and competition from IBM and Apple systems caused S-100 system production to decline.

IEEE-696 systems were subsequently developed primarily for industrial and development applications, particularly where multiprocessing or speed were important, through the rest of the 1980's. Compupro and Cromemco still support these systems at commercial prices, but apparently do not support their prior CP/M systems except as cards for sale. Heath (later Zenith) produced the Z-100 system (labeled Z-120, Z-121) which was IEEE-696 compatible. While they no longer support it, there are many active Heath user groups with some Z-100 interests.

A further distinction can be made in S-100 standards: boards designed for the Altair, IMSAI and early Cromemco systems with front panel switches and LED displays can be called "MITS/Altair" cards. Subsequent cards (after about 1979) grounded certain pins and reused other pins that affected the use of front panels.

One person who provides S-100 cards, documentation, and some support (1994) is Herb Johnson. As "Dr. S-100" he writes a regular column in The Computer Journal and corresponds with S-100 and IEEE-696 owners. As of 1995 he can be reached at The Computer Journal or:

Herbert R. Johnson
Dr. S-100
CN 5256 #105
Princeton NJ 08543
(609) 771-1503
internet: hjohnson@pluto.njcc.com

Q30: Anyone know a good source for cross assemblers?

A: (Roger Hanscom, Mike Morris)

There are a variety of sources for cross platform development tools.

The C Users' Group (1601 W. 23rd St., Suite 200, Lawrence, KS 66046-2700) has a library of software that includes all kinds of development tools. Source code is distributed with many of them. They charge \$4/disk and \$3.50 s&h per order, and can supply 3.5" or 5.25" DOS formats. Those of you seeking assemblers or disassemblers will be particularly interested in volumes number 398, 363 (2 disks), 348, 346 (2 disks), 338 (2 disks), 335 (4 disks), 316, 303, and 292(4 disks). They also market a CD-ROM of volumes 100 through

364 for \$49.95 list (it can usually be found at computer shows for \$25 to \$35). They can be reached at 913/841-1631 FAX: 913/841-2624.

The Circuit Cellar BBS is on-line 24 hours per day with some cross development tools, particularly for CPU's that are commonly used as controllers. They have a Courier HST running 2400/9600 bps at 203/871-0549, and another line that will do up to 14.4k bps (8N1) at 203/871-1988. Both of these numbers are in Connecticut.

The Motorola BBS is in Austin, Texas, on 512/440-3733. They have downloadable cross development products mostly for the 68xx and 68xxx architectures. Like the Circuit Cellar BBS, this BBS seems to specialize in micro-controller development. Many of these files can also be accessed over the network on bode.ee.ualberta.ca (129.128.16.96).

2500AD software lists a Z80 assembler, a Z80 C compiler (that includes the assembler in the package), a Z280 assembler, a Z280 C compiler (that includes the assembler), and a Z380 assembler.

Don't forget to look in the old familiar places, such as oak.oakland.edu and wuarchive.wustl.edu.

The Walnut Creek CDROM has some tools from some of the sources listed above on the CP/M CDROM.

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End of FAQ
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