# CP/M EMULATOR INSTALLATION GUIDE

## THE CORVUS CONCEPT

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# CP/M EMULATOR INSTALLATION GUIDE

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# SCOPE

## Purpose

This installation guide provides the necessary instructions to set up the CP/M Emulator with your Corvus Hard Disk System. This guide is designed to be used by the system manager, the person in charge of maintaining your Corvus Hard Disk System.

You should be familiar with the "Corvus Concept System Manager's Guide." Refer to that guide if you need more information on creating volumes, adding or changing users, setting up user accounts, or managing disk resources.

This installation guide does not provide you with an explanation of the CP/M operating system. Documentation from Digital Research Corporation or other publishers should be consulted if you need more information about the CP/M operating system. Information on specific application programs should also be obtained from the source of the application program.

The CP/M Emulator for the Concept emulates the Intel 8080 microprocessor and supports CP/M version 2.2. Enhancements to version 2.2 are not supported. The Zilog Z-80 microprocessor and the Intel 8085 microprocessor are not supported, nor are any undocumented operation codes for the 8080 microprocessor.

## Conventions

The word "**Type**" is used throughout this guide to mean that two or more characters are to be entered on the Concept keyboard. All words, symbols, spaces and punctuation to the right of the word **Type** should be typed exactly as shown. Do not add or delete punctuation at the end of the statement you are typing, and type all spaces that appear within the statement.

The word "**Press**" is used throughout this guide to mean a single character or keytop symbol is to be entered on the Concept keyboard. Function key labels are used in a way similar to keytop symbols. The functions of these keys display across the bottom of the Concept screen. Pressing the [COMMAND] key displays another set of labels. If some or all of the new labels are blank, it simply means that the corresponding keys do not have any functions assigned to them.

## Hardware and Software Needed

The following minimum hardware is needed to install the CP/M Emulator on the Corvus Concept:

■ Corvus Concept Personal Workstation

■ Corvus Hard Disk System

■ Corvus Floppy Diskette Drive

The complete computer system should be set up with the Corvus Concept Operating System (CCOS) software installed.

The following software is needed in addition to the Concept Operating System:

■ CPMDIST diskette containing these files:
    CC. CPM
    CC. CPMUTIL
    CPMD. DEFAULT
    CPMD. ADM3
    CPMD. SOROC
    SYSTEM. UPDATE

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■ CP/M MASTER diskette containing these files:

| | |
|---|---|
| PIP. COM | ED. COM |
| SUBMIT. COM | ASM. COM |
| XSUB. COM | DDT. COM |
| LOAD. COM | STAT. COM |
| DUMP. COM | DUMP. ASM |
| EXIT. COM | SPOOL. COM |

If you do not have both diskettes, contact your dealer immediately.

# CREATING CP/M VOLUMES | 1

## Allocating Space for CP/M Volumes

The Concept with the disk system must be set up and operating under the CCOS operating system before the CP/M volumes are created and the CP/M Emulator added to the system.

The first step is the creation of volumes that will be configured for CP/M files. The three key points are as follows:

■ How many CP/M volumes are needed? Each user can have a maximum of 14, plus 2 diskette drives.

■ How large will each volume be? The maximum size is 8 megabytes, or approximately 16,380 blocks.

■ Which users will have access to which volumes?

For your own convenience, we recommend that the CP/M configured volumes for the Concept be named CPM1, CPM2, etc. These names will be used in this Installation Guide when referring to the volumes.

## Creating CP/M Volumes

The following steps summarize the procedure presented in detail in "The Corvus Concept System Manager's Guide." Refer to this guide for more detailed instructions or additional information.

First, enter the Drive Manager program.

**Press** [ Const II ]
**Press** [ Drive Manager ]

Next, select the Volume Manager option:

**Press** [ Volume Manager ]

Enter the drive name and drive password. If the defaults shown are correct, **press** [ RETURN ] ; otherwise, type the correct response.

Next, a menu is displayed, along with a different level of function key labels.

**Press** [Add a Volume]

Enter the volume name and attributes. The volume must be of the UCSD/Pascal volume type. **NOT** CP/M 80. A sample entry looks like this:

Enter attributes of new volume:

```
                 Name:   CPM1
         Size (blocks):  1024
             Location:   7376
          Volume type:   UCSD/Pascal
```

Select from:

```
        UCSD/Pascal
        CP/M 80
        MSDOS
        Corvus Concept
```

When you are finished specifying the volume attributes, add the volume to the system:

```
     OK to add volume (Y/N)? Y
```

**Press** [RETURN]

```
     Does the new volume need
               to be formatted (Y/N)? Y
```

**Press** [RETURN]

You are now finished adding the first CP/M volume. Repeat this procedure for each additional CP/M volume.

When you are finished adding volumes, leave the Drive Manager program, and return to the Constellation II Manager level.

**Press** [Exit]

## Assigning CP/M Volumes to Users

Now, use the Access Manager program, to grant access to existing users.

**Press** | Access Manager |

As System Manager, you should now assign each user the CP/M volumes they will be using. A volume must be mounted for a user before it can be accessed.

When you are finished assigning access to the CP/M volumes, leave the Drive Manager program and return to the Dispatcher level on the Concept. Reboot your system.

# INSTALLING THE CP/M EMULATOR | 2

## Transferring the CP/M Emulator

The CP/M Emulator is on the diskette labeled CPMDIST. You must transfer the files on this diskette to the hard disk.

Insert the diskette labeled CPMDIST into the diskette drive.

From the Dispatcher level on the Concept:

Hold down the [Command] key.
**Press** [ExecFile]

The Command window displays:

Execute which command file? __

**Type** /CPMDIST/SYSTEM. UPDATE
**Press** [RETURN]

The files are listed on the screen as they are copied from the diskette to the disk.

**Press** Y
**Press** [RETURN]

When all files have been transferred, the Dispatcher level of function keys displays.

If a message is displayed on the screen telling you that a file could not be copied, repeat this procedure. If the same message is displayed again, check the free space available on the /CCSYS and /CCUTIL volumes.

## Creating the CP/M Boot File

Next, use the program called CC. CPMUTIL to create the file /CCSYS/CC. CPM1.

**Type** /CCUTIL/CC. CPMUTIL
**Press** ‾RETURN‾

A second level of function key labels appears, and a menu displays on the screen.

**Press** ‾Install‾

The screen now displays the next instructions:

```
Install CP/M


Insert CP/M master floppy into Floppy 1
OK to install CP/M?
```

Insert the diskette labeled CP/M MASTER into the diskette drive.

**Press** Y

The screen displays this message:

```
File !CC. CPM1 written
```

The CC. CPM1 file contains the CP/M operating system in 8080 code.

# INITIALIZING THE CP/M VOLUMES | 3

## Choosing the CP/M Volume Parameters

You have the choice of using a set of default parameters for each CP/M volume during the initialization process, or setting your own block size and number of entries. For most applications the default parameters should be used. You should use only one method to initialize a CP/M volume, and skip the section on the other method.

If you decide to set your own parameters, please read the section entitled "Information on CP/M Volume Parameters in the chapter "Technical Notes on the CP/M Emulator Program." After you have finished reading the chapter, skip the next section, "Using the Default Parameters," and proceed to "Setting Different Block and Entry Parameters."

## Using the Default Parameters

Each CP/M volume that you created earlier must now be initialized. We recommend that you use the default parameters for block size and number of directory entries in a volume. This procedure is demonstrated for volume CPM1:

**Press** [Init Dir]

The screen displays the first prompt:

CP/M Volume Initialization


Volume name: __

**Type** CPM1
**Press** [RETURN]

The screen now displays:

Use default parameters?

**Press** Y

The prompt for clearing the directory appears:

---
OK to destroy directory of volume CPM1?

---

**Press** Y

The screen displays the following message when the volume is initialized:

---
Zeroing directory on volume.

. . . . .
CP/M volume initialization complete

---

Repeat this procedure for every CP/M volume created.

When you are finished, leave this program.

**Press** [Exit]

You should now reboot the log on again as System Manager. Skip the next section, "Setting Different Block and Entry Parameters" and continue to "Transferring Files from the CP/M Master Diskette."

## Setting Different Block and Entry Parameters

To set different parameters for the block size and number of entries, follow this procedure. CPM1 is used for the volume name.

**Press** [Init Dir]

The screen displays the first prompt:

---
CP/M Volume Initialization


Volume name: __

---

**Type** CPM1
**Press** [RETURN]

The screen now displays the prompt for default parameters:

---
Use default parameters?

---

**Press** N

The first question appears:

---

CP/M block allocation size   definition (nK
blocks].   Allocation size [1,2,4,8,16]   2

---

Select the logical block size desired.

**Press** 4
**Press** [RETURN]

The screen next displays:

---

Number of entries [512 maximum]:   128

---

Enter the maximum number of directory entries desired.
For example, to get 256 entries:

**Type** 256
**Press** [RETURN]

The screen displays the prompt to destroy the old directory
and create a new one:

---

OK to destroy directory of volume CPM1? __

---

**Press** Y

When the new directory is complete, you will see this
displayed:

---

Zeroing directory on volume

. . . .
CP/M volume initialization complete

---

Repeat the initialization procedure for each of the CP/M
volumes you have created.

When you are finished initializing every CP/M volume,
return to the Dispatcher level on the Concept.

**Press** [Exit]

You should now reboot the Concept and log on again as
System Manager.

## Transferring Files from the CP/M Master Diskette

The CP/M MASTER diskette contains a number of CP/M files that you will need. These files should be copied to one of the CP/M volumes you have created, preferably CPM1.

You should be at the Dispatcher level of the Concept.

**Press** [CP/M]

The screen displays the mounted volumes, like this:

```
Mounting Volume CPM1   on UNIT A:
Mounting Volume CPM2   on UNIT B:
Mounting Floppy 1      on UNIT C:


Corvus Concept CP/M Emulator
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A >
```

The CP/M Emulator will automatically mount all volumes that are configured as CP/M volumes if the volumes are in the User Mount Table.

These CP/M volumes are designated in this manner:

| Concept Volume | CP/M Designation |
| --- | --- |
| CPM1 | Unit A: |
| CPM2 | Unit B: |
| Floppy Drive 1 | Unit C: |
| Floppy Drive 2 (Optional) | Unit D: |
| CPM3 | Unit E: |
| . | . |
| . | . |
| . | . |
| CPM14 | Unit P: |

When the A> prompt for CP/M appears, transfer the CP/M files from the diskette to the CP/M volume on the disk using the PIP command.

**Type** C:PIP A:=C:*.*
**Press** [RETURN]

As each file is copied from the diskette to drive A:, the file name displays on the screen. It will take several minutes for all the programs to be copied. When this task is completed, A> displays again.

To exit from CP/M:

**Type** Exit
**Press** [RETURN]

You return to CCOS and the Dispatcher level of labels displays.

# SELECTING TERMINAL TYPE | 4

## Creating a 24-by-80 Character Window

The Concept screen is about four times the size of the standard 24x80 screen used by most terminals. We recommend that you create a smaller window of 24x80 character size for most programs that format the screen. This window is created before you enter the CP/M Emulator. Start from the Dispatcher level.

Hold the [COMMAND] key down.
**Press** [CreWndow]

Move the cursor to the top left corner of the screen.

**Press** [RETURN]

Now, move the cursor down 24 lines, and across 80 columns. The Command Window displays a message indicating the size of the window. Stop when you have a 24-by-80 window.

**Press** [RETURN]

## Screen Displays Available

The CPMD. xxxxx files included with the CP/M Emulator program contain display parameters matched to a number of popular terminals. The default file is called CPMD. DEFAULT and contains parameters for the ADM3 screen display. Another file is called CPMD. ADM3 and also contains parameters for the ADM3 display. A third file is called CPMD. SOROC and has the parameters for the SOROC screen display.

To change screen display parameters, the file name must be changed to CPMD. DEFAULT, using the File Manager program. CPMD. DEFAULT is found in the /CCSYS volume.

You can create your own file of screen display parameters, using the BLD. CRT file located in the /CCUTIL volume. See "The Corvus Concept Operating System Manual" for more information.

## Terminal Code Translation Table

The CPMD. xxxxx files contain translation tables for particular terminal types. For example, the table below shows the parameter assignments for an ADM-3A screen display:

| ADM-3A | HEX | FUNCTION |
|---|---|---|
| Control-H | 08 | backspace |
| Control-I | 09 | tab |
| Control-J | 0A | line feed |
| Control-K | 0B | cursor up |
| Control-L | 0C | cursor right |
| Control-M | 0D | carriage return |
| Control-Z | 1A | clear screen |
| Control- $\wedge$ | 1E | home cursor |
| Escape-) | 18,29 | inverse video |
| Escape-( | 18,28 | normal video |
| Escape-= r+32 | 18,3D | goto xy (c, r) |
| c+32 | | |

The table containing the control code assignments is loaded during initialization of the CP/M program.

## Configuring Screen Displays for Application Programs

Certain application programs can be tailored for a particular screen display such as the ADM-3A. A file, which may be called INSTALL. COM, is used to set up the screen display through a menu-driven procedure. Consult the application program manual for detailed instructions.

# INTERFACING TO OTHER DEVICES | 5

## Assigning CP/M Devices

Some default device assignments in CP/M will need to be changed for the Concept. Use the STAT command for setting device assignments. The table below shows the logical device and the Concept equivalent to be assigned:

| DEVICE | DEFAULT | REASSIGN TO | CONCEPT EQUIVALENT |
|--------|---------|-------------|--------------------|
| LST: | TTY: | LPT: | Printer |
| RDR: | TTY: | UR1: or UR2: | RS232 Port 1 or Port 2 (Input) |
| PUN: | TTY: | UR1: or UR2: | RS232 Port 1 or Port 2 (Output) |

For example, the LST: device is changed to LPT: like this:

**Type** STAT LST:=LPT:
**Press** [ RETURN ]

To check the status of the devices:

**Type** STAT DEV:
**Press** [ RETURN ]

A listing of all the device assignments will be displayed.

## Assigning the Software Drivers for the Concept

The drivers for the printer and both RS232 Data Comm ports must be assigned before entering the CP/M Emulator. The procedure for assigning these drivers is covered in "The Corvus Concept Personal Workstation User Guide." These drivers must be assigned each time the Concept is powered on.

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## Printing a File

The PIP command in CP/M is used to output files to the printer after the printer driver and device assignment are complete. For example, to output the file SILVER. DOC from unit B:, do this:

**Type** A:PIP LPT:=B: SILVER. DOC
**Press** RETURN

### Setting Up the Pipes Area

You will have to create the pipes area on the disk prior to using the Spool program. If a volume called Pipes exists on your disk, this step has already been done. Refer to "The Corvus Concept System Manager's Guide" for instructions on how to create the pipes area and initialize the pipes.

### Spooling Files in CP/M

A file must first be sent to the pipes area before it can be despooled. Once a file has been spooled, it remains in the pipes area until it is removed or despooled. When a file is despooled, the destination may be the printer, a file, or the console.

To enter the Spool program from CP/M:

**Type** SPOOL
**Press** [ RETURN ]

The main command line for the Spool program displays:

Spooler[2.0]: S(pool D(espool L(ist Q(uit: __

**NOTE:** YOU MUST USE CAPITAL LETTERS FOR COMMANDS IN THE SPOOL PROGRAM.

To view the pipes area:

**Press** L

The pipes are listed, for example:

Active Pipes are:


1. PRINTER  Closed --- Contains data  2 blocks
2. DEMO     Closed --- Contains data  6 blocks


Spooler[2.0]: S(pool D(espool L(ist Q(uit: __

To spool a file to the pipes area:

**Press** S

The spool menu displays:

```
SPOOL PARAMETERS
P(ipe name:  PRINTER
F(ile name:
M(essage:
T(ype of File:  F(ormatted Text
L(inefeeds:  TRUE
N(ew pages:  FALSE
I(nclude Files:  FALSE


S( P( F( M( T( L( N( I( Q( : __
```

Enter the information for your file. When you have finished:

**Press** S

A message appears indicating the file has been spooled:

```
Spooling file to pipe PRINTER[ 1]
. . . . .
2 blocks written to pipe PRINTER[ 1]
```

To exit:

**Press** Q

## Despool Files in CP/M

Enter the spool program from CP/M:

**Type** SPOOL
**Press** [RETURN]

The spool program command line appears.

**Press** D

The Despooler menu now displays:

```
DESPOOL PARAMETERS
P(ipe name:  PRINTER
W(here:  Line PRinter
M(ax Lines/Page:  0
E(xpand Tabs:  8
L(inefeeds:  TRUE
```

Set up the parameters for your file.

When the parameters are set:

**Press** D

The despooling information is shown, for example:

```
Despooling from pipe PRINTER[ 1]
......
Pipe PRINTER[ 1] contained 2 blocks


Waiting to Despool Pipe "PRINTER"
Depress any key to escape . . .
```

The last two lines repeat continuously until you exit the despooler. To leave, press any key.

To exit the Spool program completely,

**Press** Q

The main CP/M prompt now displays.

## Spooling Between CCOS and CP/M

To transfer CP/M files from CP/M to CCOS, use this procedure:

First, enter the CP/M Spool program.

Next, spool the file from CP/M to a pipe.

Exit CP/M.

Use the despool option of the Spool program to despool the pipe. The Spool program is accessed through the File Manager program.

Files are transferred from CCOS to CP/M by spooling from CCOS to a pipe, entering CP/M, and despooling from the same pipe.

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# TECHNICAL NOTES ON THE CP/M EMULATOR | 7

## CP/M Volume Parameters

The block and directory size are among the most important variables that affect the way information is stored and retrieved under CP/M. They have a direct impact on the file access speed, disk storage efficiency, and size of the CP/M disk interface software.

A block is the fundamental unit in the addressing scheme that CP/M uses to specify the location of files on the disk. When a file is accessed by CP/M, it decodes each block number into the appropriate track and sector numbers for the various sectors that make up a block.

On a standard 8-inch, soft-sectored, IBM-format diskette (standard CP/M format), the blocks are 1K (1024 bytes) each. CP/M can support 1K, 2K, 4K, 8K and 16K blocks. 1K blocks are most efficient in disk space utilization, but there are some constraints. CP/M requires memory space for an allocation map for each drive. This table uses one bit for each block on the drive and is used by the system to keep track of which blocks are allocated. Thus 1K blocks require more memory space than larger block sizes.

There are some rules that can be helpful in choosing the block size. Volumes that consist primarily of small files should normally be configured with a small block size, and volumes with large files would be configured with a large block size. For example, a volume with two 1000K files would waste at most 32K of disk space if configured with 16K blocks. A tradeoff among block size, file access speed and memory utilization can affect your choice of block size.

The directory space in CP/M is also allocated in units of blocks. Each directory entry uses 32 bytes. One 8K block can hold 256 directory entries. However, on large directories, CP/M performs slower because directory

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searches take longer. In addition, after each warm boot, CP/M must completely scan the directory of each new volume that is selected in order to build its allocation table.

There is an additional detail that affects choice of directory size. The last 16 bytes of a directory entry give a list of the block numbers used by the file. A directory entry can describe the allocation of only 8 blocks for large volumes, since two bytes are used to describe each block number. Should the file size exceed 8 blocks, more directory entries are used until the complete file allocation is described. These additional entries do not show up with the directory listing command (DIR). This detail partly explains why file access is faster with larger block sizes. For example, a 2000K file on a volume using 2K blocks will use up 126 directory entries. However, the same file on a volume using 8K blocks would use only 32 directory entries. Thus, the directory size depends not only on how many files you expect to save, but also upon the typical file size, block size, and system performance speed.

## The Concept 8080 Emulator Code

The 8080 emulator for CP/M on the Concept is written in 68000 assembler code. The emulator sets its program counter to the address of the first 8080 instruction, which is a jump to the cold boot routine in the BIOS. The emulator then keeps executing 8080 instructions until it finds a HLT command. One of two results occur:

| | |
|---|---|
| HLT | warm boot request, return to loader |
| HLT,HLT,n | BIOS request |

The BIOS is written in 68000 assembler code. The BIOS is is called by the emulator when the HLT, HLT instruction sequence occurs. The program counter points to an index representing a particular I/O request. If n is in the range 0 to 16, this request is valid and is carried out with a Unit I/O call to the Concept operating system (CCOS). Execution of any other n value causes an exit from CP/M and return to CCOS.

The Concept 8080 emulator treats the following instructions as NOP's:

IN
OUT
DI
EI

Interrupts are not implemented on the emulated 8080 processor.

## Volume Structure

The 8080 emulator uses Concept UCSD/Pascal volumes as shells to contain the CP/M volume. Each volume can be thought of as a single diskette which is variable in size. The UCSD volume, when enveloping a CP/M volume, uses the first four blocks of the volume for header information, as follows:

Block 0 Reserved
Block 1 Reserved
Block 2 UCSD header defines one file CPM. VOLUME
Block 3 CP/M volume header, containing the Disc
Parameter Block (DPB) for the volume
(bytes 16-31). The DPB is read into
BIOSA when the volume is mounted.
Block 4 Start of CP/M volume

The maximum size of a CP/M volume on the Corvus hard disk is 8 megabytes. When the volume is initialized using CC. CPMUTIL, a DPB is constructed which reflects the actual size. Sector interleaving is not used.

The Concept 8-inch diskette drive is in standard IBM 3740 format. The first two tracks are reserved as system tracks. The CP/M directory begins in Track 2. Non-system tracks use standard CP/M interleaving.

## Configuration of CP/M Address Space

A full 64K of contiguous memory space in the Concept is allocated as CP/M address space by the loader program. This is the maximum possible memory for CP/M. The diagram below shows the layout of this memory area:

```
                                                    Emulated
                                                    Address (HEX)
┌─────────────────────────────────────────┐        FFFF
│                  BIOSA                    │
├─────────────────────────────────────────┤
│                  BDOS                     │
├─────────────────────────────────────────┤
│                  CCP                      │
├─────────────────────────────────────────┤
│                                           │
│                                           │
│                  TPA                      │
│                                           │
│                                           │
│                                           │
├─────────────────────────────────────────┤        0100
│        System Tables and Buffers          │
└─────────────────────────────────────────┘        0000
```
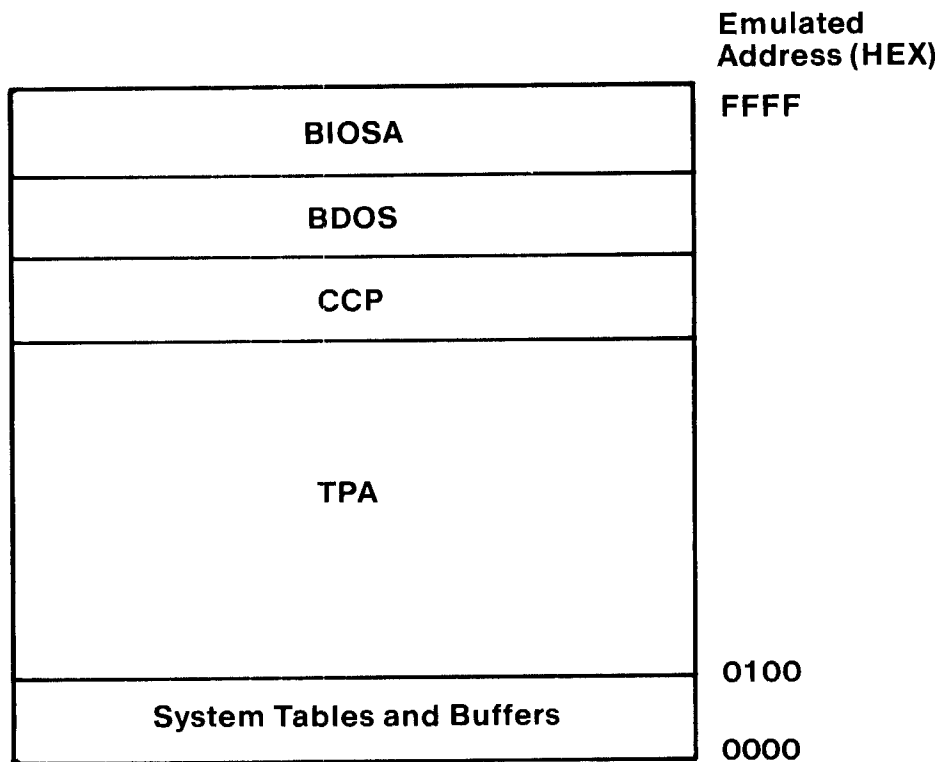
**BDOS**  Basic Disk Operating System. This part of CP/M
handles disk I/O requests.

**BIOS**  Basic I/O System. This part of CP/M performs low-
level I/O functions. In the CP/M emulator, the BIOS is
written in 68K assembly code, and is located outside
of the CP/M memory area.

**BIOSA**  Basic I/O System Area. This section of CP/M is
located at the top of the memory area. It contains
tables used by the BDOS and the BIOS.

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# BIOSA

In the Concept CP/M Emulator, the BIOS is written in 68000 assembler language and is located outside the CP/M address space. The BIOSA contains the tables that provide the link between the BDOS and the BIOS. The address map below shows the layout of the BIOSA:

| | |
|---|---|
| JMP HLT0<br>. . .<br>JMP HLT16 | (jump table) |
| HLT,HLT∅<br>. . .<br>HLT,HLT,16 | (halt table) |
| DPE0<br>. . .<br>DPE15 | (DP entries) |
| DPB0<br>. . .<br>DPB15 | (DPB's —<br>1 per volume) |
| DIRBUF | (Directory buffer) |
| Translate Table for floppies | |
| Checksum for first floppy | |
| Checksum for second floppy | |
| ALV∅<br>. . .<br>ALV15 | (allocation map<br>for DPE's) |

## Language Compatibility with the CP/M Emulator

High level languages such as Basic and Pascal will work under the CP/M Emulator, provided the language is designed to run on an Intel 8080 microprocessor. Execution of user programs will be identical, producing the same result as an 8-bit, 8080 CP/M system. However, since software emulation is used, each instruction will take longer to execute and the program will run slower.

## Error Messages

In addition to regular Concept error messages, the CP/M Emulator has a special set of error messages:

| Message | Meaning |
| --- | --- |
| Bad header block | The volume type is wrong: CP/M volumes for the Concept must be in UCSD/Pascal format. |
| Error reading BDOS | Indicates probable Concept hardware error. |
| Error reading CCP | Indicates probable Concept hardware error. |
| Error reading floppy | Floppy diskette cannot be read. Possible problem with diskette drive. |
| Error reading floppy block bbbb | Diskette has bad sectors or tracks. |
| Error <> setting up | CCOS system error. |

| | |
|---|---|
| Error writing file | Bad I/O result. |
| ***Floppy drive is not mounted | The diskette drive must be mounted and accessible to the user. |
| Floppy 1 must contain a system diskette. | The CP/M Master Diskette must be in diskette drive 1. |
| Insert CP/M Master diskette into drive | The CP/M Master Diskette must be in diskette drive 1. |
| Insufficient memory | Occurs in 256K machines when too many drivers are loaded. |
| IO RESULT FROM UNITSTATUS = <> | CCOS software problem. |
| ***Invalid block allocation size | The block allocation size must be one of the option values. |
| ***Invalid number of directory entries | The number of directory entries must be between 1 and 512. |
| Invalid volume name | The named volume cannot be found. Make sure volume is mounted. |
| No CP/M volumes available | CP/M Emulator cannot find any CP/M volumes on the disk system. |
| Not necessary to initialize floppy disk | Do not attempt to initialize volumes on the diskette drive. |
| Unable to open <filename> | CP/M Emulator has not been installed, or volume is not mounted. |

| | |
|---|---|
| Unable to open<br>    CPMD. DEFAULT | CP/M Emulator cannot find the screen parameter file. Check /CCUTIL to see if file exists. If necessary, rename CPMD. ADM3 If necessary, rename CPMD. ADM3 or CPMD. SOROC to CPMD. DEFAULT |
| Unable to write file <> | The file cannot be written to the volume specified. Possible reasons include: volume not mounted; no room in volume; user does not have access to volume. |
| Unitwrite error nnnn | Indicates bad I/O result. CCOS system problem. |
| Volume <> has bad header | The volume specified does not have the correct header information. Make sure volume is of UCSD/Pascal type. |
| 5¼″ floppy not<br>    implemented | Currently only the 8″ diskette can be used with the CP/M Emulator. |