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**CP/M INSTALLATION INSTRUCTIONS****VERSION 2.26F0**

Before attempting to install Altos CP/M 2.26F0, read this document carefully. It is assumed that this is an installation on one of the following Altos systems:

- \* ACS 8000-10
- \* ACS 8000-12
- \* ACS 8000-14 ✓
- \* ACS 8000-15

Currently, the maximum hardware configurations supported are:

- 2 - Floppy Drives
- 1 - 8-inch Hard Disk Drive (-10, -12, or -14)

The file structure supported by this version is exactly compatible with versions 2.0 or greater of MP/M II. The file structure on the hard disks is different from the hard disk file structure used in either CP/M 2.24 or MP/M 1.1.

**1.0 ENHANCEMENTS**

**Memory:** This version of the CP/M uses all four banks of memory available on the Altos computer systems. The TPA area (User Area) has been increased to 58K. Bank 0 contains the CP/M operating system, jump tables, allocation vectors and disk parameter blocks. A copy of the CCP is kept in Bank 1 for warm boot.

**Disk Cache:** Up to 80K of memory from Bank 1 and Bank 2 are used for I/O buffering for hard disks. Whole tracks are read and written at a time. This reduces disk access substantially, and reduces response time. In addition to the disk cache for hard

disk I/O, directory tracks are buffered in a separate bank. Up to five tracks of hard disk directory space is always maintained in memory. This provides for instant access to about 1500 4K Block size directory entries. The directory buffers are written to the disk during a warm boot and a write to the directory sector. De-pending on the application, this scheme has improved the performance up to a factor of four over the earlier versions of CP/M and single user MP/M.

## 2.0 INSTALLATION INSTRUCTIONS

If you have already installed MP/M II, then there is no need to run the diagnostics or the hard disk initialization program. Otherwise, before you install CP/M on your system, you should run all the diagnostics and HRDINIT8 from your diagnostic disk. HRDINIT8 will create the bad sector table and assign alternate sectors to the bad sectors. You should have ALTOS Diagnostic Monitor Version 2.6. ✓

This section discusses the Altos CP/M version 2.26F0 of CP/M version 2.2 from Digital Research, Inc. You should also familiarize yourself with the CP/M User's Manual. Altos recommends that you perform the following tasks upon setting up your system to insure retention of disk data. Unless otherwise stated, an asterisk (\*) within a user response to a prompt is part of the command and must be entered.

- a. Make a backup copy of the system disk and store the original in a safe place. Use the copy for daily operations.
  1. If your system has only one floppy disk drive and a hard disk, refer to section 4.1 for instructions.
  2. If your system has two or more floppy disk drives, refer to section 4.2 for instructions.

In all cases, the utility programs provided on the Altos ADX diagnostic disk supplied with your computer system are required.

- b. Review the CP/M User's Manual to become familiar with the operating system.
- c. Read these instructions thoroughly.

## 3.0 CP/M FILE DIRECTORY

If you wish to see the file directory of your CP/M system disk, after receiving the system prompt A>, simply type DIR, press RETURN and you will see directory on the screen. If you wish to have a hardcopy of the directory and you have the printer installed, perform a ^PT and it will type the directory while it

lists the directory on the screen.

#### 4.0 BACKUP

##### NOTE

Currently, CP/M can be booted only from a double-density (Mode 2) disk.

#### 4.1 One Single-Sided Floppy Disk Drive (Hard Disk Required)

##### 4.1.1 Procedure for Backing Up Copies of System Disks

- a. Format a blank disk for double-density (Mode 2) using the FLPY utility of the ADX diagnostic disk.
- b. Copy the first two tracks of the source disk onto the blank, formatted disk, using the BOOTCOPY utility of the ADX diagnostic disk.
- c. PIP all programs from the source disk to the hard disk using the PIP utility on the CP/M disk. The User's Manual describes the logical drive designations for all drives in your system. The example below uses hard disk logical drive C:

A>PIP C:=A:\*. \*[V]                    <CR>

- d. Log on to the hard disk:

A>C:                                    <CR>

- e. Load the object disk that contains the results of the BOOTCOPY operation into the floppy drive and execute the following command:

C>PIP A:=C:\*. \*[V]                    <CR>

##### NOTE

Execute a selective PIP if there are files or programs on the hard disk other than those that were contained on the system disk. Use a similar method to backup other floppy disks.

#### 4.2 Double-Density, Single-Sided Backup Procedure

When making a double-density backup copy of the system disk,

proceed as follows:

- a. Format a blank disk for double-density using the FLPY or the FLPYFORM utility of the ADX diagnostic disk.
- b. Place the system disk in Drive A, the blank, formatted disk in Drive B; boot up the system.
- c. Make a backup copy of the CP/M system disk using the FLPY utility of the ADX diagnostic disk.

Initially, the system is set up for an ACS 8000-10 system. This will also support ACS 8000-15.

There are two files provided to support the other configurations. The files are:

1. CBIOS20.COM support for ACS 8000-12
2. CBIOS40.COM support for ACS 8000-14

You should rename one of the above files to CBIOS64.COM to get the correct configuration for your system. You will have to reboot the system to get the correct configuration after renaming. Run DISKSTAT to get information about your system.

The default names for the various logical devices are:

Drive A = Floppy #1  
Drive B = Floppy #2

The number of logical hard disks available is dependent on the type of system you have:

- (-10, two logical drives (drives C and D)
- (-12, three logical drives (drives C, D, and E)
- (-14, five logical drives (drives C, D, E, F, and G)

#### Functions Not Currently Supported:

1. Only one hard disk is supported.
2. Mode 1 (blocked double-density) not supported.
3. Ability to change names assigned to logical devices.

#### 5.0 CPMSETUP

The CPMSETUP program allows you to change certain parameters about your system such as console and printer baud rates. In addition, you will be able to cause your system to boot from the hard disk instead of the floppy disk. The changes are made to CBIOS64.COM file, and take affect only after a reboot.

**Procedure for Running CPMSETUP:**

Invoke CPMSETUP.

The screen will display the following menu:

1. Copy bootfile to hard disk.
2. Console baud rate setup.
3. Printer setup.
4. Update setup.
5. Exit

Following is a brief description of the above functions.

1. Copy bootfile to hard disk  
This function copies the boot records to the hard disk so that system boot can be performed from the hard disk. Note that the boot tracks for the CP/M and MP/M are the same. If you boot from hard disk, the logical names will be reversed. Use DISKSTAT to get the names assigned to the logical devices.
2. Console baud rate setup  
This function is used to setup the baud rate for the primary console. (CP/M supports only one console.)
3. Printer setup  
CP/M supports only one printer. You can choose either a parallel or a serial printer using this function. If you do not have a parallel printer, then you can change the baud rate for the serial printer.
4. Update setup  
This function actually changes the parameters in the CBIOS64.COM file. Select this function after you have set up the printer and console.
5. Exit

This function allows you to exit the CPMSETUP program.

**6.0 ALTOS CP/M VERSION 2.26F0 COMMANDS**

Altos release 2.26F0 of CP/M version 2.2 contains many commands applicable to the user of 8500 CPU PCB Computer Systems. Three of the most used commands are described below.

<b>CPMSETUP</b>	This command is discussed in section 1.2.
<b>MODE</b>	Allows the user to change the density of any floppy disk drive. This command is of particular value when the user has a

default density which is different from the density of the various applications software disks used. If the user forgets to change the density on a floppy and attempts to read from or write to a disk which is in a different density, an error display will be generated which would indicate that a software or hardware problem existed. The MODE command is contained on the CP/M disk. To invoke the MODE command, enter: **A>MODE <CR>**

Instructions on how to select the drive and density you wish to alter will be given.

### DISKSTAT

An Altos written program that allows the user to obtain information on floppy and hard disk I/O errors are suspected. The screen display should show:

Select: **DISKSTAT <CR>**

**ALTOS DISK STATUS V1.03**

**DRIVE(S):**

A	FLOPPY 77 CYLINDERS, 1 HEADS, 48 SECTORS PER TRACK 0 TEMPORARY ERRORS            0 PERMANENT ERRORS
B	FLOPPY 77 CYLINDERS, 1 HEADS, 48 SECTORS PER TRACK 0 TEMPORARY ERRORS            0 PERMANENT ERRORS
C,D	<sup>CDEFG</sup> HARD DISK <sup>512</sup> 256 CYLINDERS, <sup>8</sup> 4 HEADS, <sup>✓</sup> 17 SECTORS PER TRACK 0 TEMPORARY ERRORS            0 PERMANENT ERRORS

A temporary error is an I/O error that is successfully completed during a retry. If, after nine (9) retries, the error still exists, a permanent error is declared. In an error were declared, the screen would display:

**LAST ERROR ADDRESS: CYLINDER n HEAD n SECTOR n STATUS nn  
TYPE WAS (either TEMPORARY/PERMANENT) / (either READ/WRITE)**

The errors are cumulative from power-on to either system reset or power-off. Each time the system is powered-on the registers are set to 0 and will continually increment any time an I/O error occurs until either a system reset or power-off occurs.

**7.0 FILE TRANSFER PROGRAM (VERSION 2.5)**

The File Transfer Program (FTP) resident on CP/M master distribution diskette, is used to transfer files between two Altos Computer Systems through an asynchronous serial channel. FTP runs with either the Control Program Monitor (CP/M) or the Multi-Program Monitor (MP/M) Operating System, serving as a useful tool for transferring files between systems with 8 inch disks (such as the Altos ACS 8000-10 computers) and systems with 5-1/4 inch disks (such as the Altos Series 5 computers). Full error checking and correction is provided through a CRC-16 polynomial.

FTP Version 2.5 corrects the following problems:

1. More than 16 files can now be transferred using FTP under MP/M II.
2. FTP now works correctly with MP/M II V2.1.

The copies of FTP provided on the distribution diskette use the printer port on the Altos computers. The printer ports can be connected to each other with a null modem cable or with two modems. (The null modem cable is a standard RS-232 cable that swaps lines 2 and 3. Such a cable is available from Inmac; part number 270 in the fall '81 catalog.)

**NOTE**

**If you want to re-connect the printer after running FTP, be sure to re-boot the system.**

FTP is brought up on both the sending and receiving computers. It does not matter which side is brought up first.

Be careful that files transmitted with FTP do not have the Read Only (RO) attribute. If the file is Read Only, FTP will not be able to write it on the receiving side. If an RO file is accidentally received, erase it on the receiving side, change the attribute to Read Write (RW) using the SET command under MP/M II on the sending side, and transfer it again using FTP.

**Baud Rates**

There are several versions of FTP on the distribution diskette. The only difference between the various versions is the baud rate used for the transfer. The file named FTP.COM is the standard one that uses 9600 baud. The file name of each of the other versions indicates its baud rate. Both the sending and receiving sides must run at the same baud rate.



These slower versions may be used under either CP/M or MP/M:

FTP12 - 1200 bps  
FTP24 - 2400 bps  
FTP48 - 4800 bps  
FTP - 9600 bps

These faster versions only work in CP/M:

FTP31K - 31250 bps - max cable length - 75 feet  
FTP41K - 41666 bps - max cable length - 8 feet

Experimentation with 9600 vs. 31250 baud rates shows that there is very little difference in total transfer time. The experiment has run on floppy disk systems; on hard disk systems, there might be a greater difference.

Experimentation shows that the maximum baud rate for FTP under MP/M II with one user is 9600. That is, only FTP12, FTP24, FTP48, and FTP (i.e. 9600 baud) work on MP/M II. If more than one user is active, the maximum baud rate could be as low as 1200.

### Procedure

The sending side of the transfer is started by the command:

**FTP <afn>**

where <afn> is an ambiguous file name as described in the CP/M manuals. For example, the command:

**FTP \*.COM**

sends all of the .COM files to the receiving side. Whereas:

**FTP FILE.NAM**

sends only file FILE.NAM. The sending FTP periodically types an 's' while waiting for the receiver to become active.

The receiving side is started by one of the following commands:

**FTP or FTP u:**

where 'u' is the drive letter of the destination disk. If no drive letter is specified, the logged disk is the destination disk. The receiving FTP periodically types a 'w' while waiting for the sender to become active. Since the receiving side normally does not exist by itself, enter [CONTROL] C to get back to CP/M.

### NOTE

**The File Transfer Program is copyrighted  
by the Balcones Computer Corporation.**

## Appendix A

Logical Structure of the 8" Hard Disk Drives**ACS8000-10 and 10 Mbyte add on drives**

## Physical Characteristics:

Total Cylinders: 256  
 Heads per Cylinder: 4  
 Sectors per Head: 17  
 Physical Sector Size: 512 bytes

## Cylinder 0:

Head 0 - Bootstrap & Bad Sector Table  
 Head 1 - Reserved for future use  
 Head 2 - Alternate sectors  
 Head 3 - Alternate sectors

Cylinder 1, Head 0 through Cylinder 181, Head 2  
 First logical drive (723 tracks).

Cylinder 181, Head 3 through Cylinder 249, Head 3  
 Second logical drive (273 tracks).

Cylinder 250, Head 0 through Cylinder 255, Head 3  
 Diagnostic Area (24 tracks).

First logical drive

Total Capacity: 6 Mbytes (6,291,456 bytes)  
 Blocksize: 4096 bytes  
 Total Blocks: 1536  
 Directory FCB's: 1536  
 Directory Blocks: 12

Second logical drive

Total Capacity: 2.27 Mbytes (2,375,680 bytes)  
 Blocksize: 4096 bytes  
 Total Blocks: 580  
 Directory FCB's: 640  
 Directory Blocks: 5

**ACS8000-12 and 20 Mbyte add on drives**

## Physical Characteristics:

Total Cylinders: 512  
 Heads per Cylinder: 4  
 Sectors per Head: 17  
 Physical Sector Size: 512 bytes

Cylinder 0:  
 Head 0 - Bootstrap & Bad Sector Table  
 Head 1 - Reserved for future use  
 Head 2 - Alternate sectors  
 Head 3 - Alternate sectors

Cylinder 1:  
 Head 0 - Alternate sectors

Cylinder 1, Head 1 through Cylinder 181, Head 3  
 First logical drive (723 tracks).

Cylinder 182, Head 0 through Cylinder 422, Head 3  
 Second logical drive (964 tracks).

Cylinder 423, Head 0 through Cylinder 505, Head 3  
 Third logical drive (332 tracks).

Cylinder 506, Head 0 through Cylinder 511, Head 3  
 Diagnostic Area (24 tracks).

First logical drive

Total Capacity:	6 Mbytes (6,291,456 bytes)
Blocksize:	4096 bytes
Total Blocks:	1536
Directory FCB's:	1536
Directory Blocks:	12

Second logical drive

Total Capacity:	8 Mbytes (8,388,608 bytes)
Blocksize:	8192 bytes
Total Blocks:	1024
Directory FCB's:	1024
Directory Blocks:	4

Third logical drive

Total Capacity:	2.75 Mbytes (2,887,680 bytes)
Blocksize:	4096 bytes
Total Blocks:	705
Directory FCB's:	768
Directory Blocks:	6

**ACS8000-14 and 40 Mbyte add on drives**

Physical Characteristics:

Total Cylinders:	512	✓
Heads per Cylinder:	8	✓
Sectors per Head:	17	✓
Physical Sector Size:	512 bytes	✓

## Cylinder 0:

Head 0 - Bootstrap & Bad Sector Table  
 Head 1 - Reserved for future use  
 Head 2 - Alternate sectors  
 Head 3 - Alternate sectors  
 Head 4 - Alternate sectors  
 Head 5 - Alternate sectors  
 Head 6 - Alternate sectors  
 Head 7 - Alternate sectors

Cylinder 1, Head 0 through Cylinder 91, Head 2  
 First logical drive (723 tracks).

Cylinder 91, Head 3 through Cylinder 211, Head 6  
 Second logical drive (964 tracks).

Cylinder 211, Head 7 through Cylinder 332, Head 2  
 Third logical drive (964 tracks).

Cylinder 332, Head 3 through Cylinder 452, Head 6  
 Fourth logical drive (964 tracks).

Cylinder 452, Head 7 through Cylinder 508, Head 7  
 Fifth logical drive (449 tracks).

Cylinder 509, Head 0 through Cylinder 511, Head 7  
 Diagnostic Area (24 tracks).

First logical drive

Total Capacity:	6 Mbytes (6,291,456 bytes)
Blocksize:	4096 bytes
Total Blocks:	1536
Directory FCB's:	1536
Directory Blocks:	12

Second logical drive

Total Capacity:	8 Mbytes (8,388,608 bytes)
Blocksize:	8192 bytes
Total Blocks:	1024
Directory FCB's:	1024
Directory Blocks:	4

Third logical drive

Total Capacity:	8 Mbytes (8,388,608 bytes)
Blocksize:	8192 bytes
Total Blocks:	1024
Directory FCB's:	1024
Directory Blocks:	4

Fourth logical drive

Total Capacity:	8 Mbytes (8,388,608 bytes)
Blocksize:	8192 bytes
Total Blocks:	1024
Directory FCB's:	1024
Directory Blocks:	4

Fifth logical drive

Total Capacity:	3.73 Mbytes (3,907,584 bytes)
Blocksize:	4096 bytes
Total Blocks:	954
Directory FCB's:	1024
Directory Blocks:	8

**Appendix B**Logical Structure of the 8" Floppy Disk Drives**Single Sided Floppy Disk Drives**

## Physical Characteristics:

Total Cylinders (Tracks): 77  
Heads (Sides) per Cylinder: 1

Mode 0 (Unblocked single density format)

## Tracks 0 and 1.

Bootstrap tracks formatted in single density format.  
(Each track has 26 sectors of 128 bytes/sector.)

## Track 2 through track 76.

Physical Sector Size: 128 bytes  
Sectors per Track: 26  
Total Capacity: 243 Kbytes (248,832 bytes)  
Blocksize: 1024 bytes  
Total Blocks: 243  
Directory FCB's: 64  
Directory Blocks: 2

Mode 2 (Unblocked double density format)

## Tracks 0 and 1.

Bootstrap tracks formatted in single density format.  
(Each track has 26 sectors of 128 bytes/sector.)

## Track 2 through track 76.

Physical Sector Size: 128 bytes  
Sectors per Track: 48  
Total Capacity: 450 Kbytes (460,800 bytes)  
Blocksize: 2048 bytes  
Total Blocks: 225  
Directory FCB's: 96  
Directory Blocks: 2

**Double Sided Floppy Disk Drives**

## Physical Characteristics:

Total Cylinders (Tracks): 77  
Heads (Sides) per Cylinder: 2

Mode 0 (Unblocked single density format)

## Track 0, Sides 0 and 1.

Bootstrap formatted in single density format.  
(Each side has 26 sectors of 128 bytes/sector.)

Track 1, Side 0 through Track 76, Side 1.  
Physical Sector Size: 128 bytes  
Sectors per Side: 26  
Total Capacity: 492 Kbytes (503,808 bytes)  
Blocksize: 4096 bytes  
Total Blocks: 123  
Directory FCB's: 128  
Directory Blocks: 1

Mode 2 (Unblocked double density format)

Track 0, Sides 0 and 1.  
Bootstrap formatted in single density format.  
(Each side has 26 sectors of 128 bytes/sector.)

Track 1, Side 0 through Track 76, Side 1.  
Physical Sector Size: 128 bytes  
Sectors per side: 48  
Total Capacity: 912 Kbytes (933,888 bytes)  
Blocksize: 4096 bytes  
Total Blocks: 228  
Directory FCB's: 256  
Directory Blocks: 2