

2/15/83

CP/M INSTALLATION AND USER GUIDE

APPLE II

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CP/M INSTALLATION AND USER GUIDE

APPLE II

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SCOPE

This guide is designed to instruct Corvus disk and network users on the method by which CP/M is installed and used on Corvus disks and networks by the Apple II computer.

In a Corvus disk system for the Apple II, operating systems can be mixed. In order to provide users with the flexibility of mixing operating systems, Corvus Systems chose Pascal as the base operating system to which DOS and CP/M can be added. Thus, the Pascal operating system is required in order to use CP/M on a Corvus disk system with the Apple II.

This guide presumes that a Corvus disk has already been configured for use under Pascal or Pascal/DOS. If such a disk has not been created, refer to Corvus Systems' DISK SYSTEM INSTALLATION GUIDE or OMNINET DISK SYSTEM INSTALLATION GUIDE FOR THE APPLE II and configure a Pascal or Pascal/DOS disk.

Due to differences in appearance and performance of single user and multi-user (Constellation) software, this guide has a section devoted to installing CP/M on each. Those using single user software should ignore the section on Constellation software, just as Constellation software users should disregard the section addressing the single user. The Hardware Setup and Utilities sections are common to both the single user and the multi-user system.

Some users may desire to upgrade from a single user or multiplexer system to Omninet. These users should proceed directly to Appendix A: Upgrading to Omninet.



CONVENTIONS

The word **"Type"** is used throughout this guide to mean that two or more letters, numbers, or symbols are to be entered at the computer keyboard. The form of a **"Type"** statement is:

Type MOVCPM37 63 * RETURN

Be careful to type all the letters, numbers and symbols precisely as shown. Furthermore, except for the spaces immediately following **"Type"** and immediately preceding **"RETURN"**, all spaces must also be typed precisely as shown.

The word **"Press"** is used throughout this guide to mean that a single key is to be pressed on the computer keyboard. The form of a **"Press"** statement is:

Press Y

In the example above, you should only press the "Y" key. Do not follow the pressing of the "Y" key with any other keystroke (such as RETURN).

Keypoint symbols, such as RETURN and CTRL , are often used in **"Type"** and **"Press"** statements. When such a symbol appears, press the appropriate single key; do not type out the word within the keypoint symbol. For example:

Press RETURN

In the example above, the letters R-E-T-U-R-N are not to be typed, rather, the RETURN key is to be pressed.



SECTION ONE

Hardware Setup

This Hardware Setup section is designed for all types of Corvus disk and network products: single disk system, multiplexer network and Omninet network. Complete this section before attempting software setup as prescribed in sections two and three of this guide.



HARDWARE SETUP

1

1. If a single Apple II is to be used with the Corvus disk, configure the hardware according to the hardware setup section in Corvus Systems' DISK SYSTEM INSTALLATION GUIDE FOR THE APPLE II.

If multiple Apple IIs are to be used with the Corvus disk in a multiplexer network, configure the hardware according to the hardware setup section in Corvus Systems' MULTIPLEXER INSTALLATION GUIDE FOR THE APPLE II.

If multiple Apple IIs are to be used with the Corvus disk in an Omninet network, configure the hardware according to the hardware setup section in Corvus Systems' OMNINET DISK SYSTEM INSTALLATION GUIDE FOR THE APPLE II.

By following the guides mentioned above, the Corvus/Apple II transporter or flat cable interface card resides in slot six of each Apple II.

2. With all equipment powered off, place a MicroSoft SoftCard in slot seven of each Apple II in the system.
3. In slot four of the Apple II which will be used for software setup, connect a diskette drive.
4. Power on all equipment.
5. If a single Apple II is being used with the Corvus disk, proceed to Section Two and follow the software setup procedure for those using single user Corvus software.

If multiple Apple IIs are being used in a multiplexer or Omninet network, proceed to Section Three and follow the software setup procedure for those using multi-user, Constellation software.



SECTION TWO

Single User System

This section is designed for users of a Corvus disk with a single Apple II computer and single-user software. If more than one Apple II is being used, proceed to Section Three which addresses users of multiple Apple IIs with multi-user, Constellation software.



CONSTRUCTING THE CP/M BOOT AND CP/M SYSTEM VOLUMES

2

In order for an Apple II to access CP/M on a Corvus disk, a Pascal program must be executed. This Pascal program boots (starts up) CP/M and activates the CP/M system volume which mounts other CP/M volumes. This chapter is designed to instruct the user in the creation of a Pascal volume which contains the Pascal files to boot CP/M and in the creation of a CP/M volume in which the CP/M operating system files reside.

Creating CPMBOOT and CPMSYS

1. When the Apple II is powered on, the screen displays:

```
COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN
```

```
WELCOME SYS, TO APPLE II PASCAL 1.1  
BASED ON UCSD PASCAL II.1  
CURRENT DATE IS 13-JAN-83
```

```
°APPLE COMPUTER INC. 1979, 1980  
°U.C. REGENTS 1979
```

2. Press X

The screen displays:

```
EXECUTE WHAT FILE? _
```

3. Type VMGR

The screen displays:

```
VMGR:Q L[ST N[EW R[MVE W[PROT M[NT U[NM
```

4. Press N

The screen displays:

```
NEW VOLUME: ENTER VOLUME NAME: _
```

5. **Type** CPMBOOT

The screen displays:

ENTER LENGTH (BLOCKS): __

6. **Type** 256

The VMGR program finds the first available 256 block space and displays something like the following:

ENTER CORVUS DRIVE # {1..1}: 1

7. **Press**

The screen displays something like the following:

ENTER ADDRESS (BLOCKS): 1032

8. **Press**

The volume is added and the cursor returns to the VMGR command line:

VMGR:Q L(ST N(EW R(MVE W(PROT M(NT U(NM

9. **Press** N

The screen displays:

NEW VOLUME: ENTER VOLUME NAME: __

10. **Type** CPMSYS

The screen displays:

ENTER LENGTH (BLOCKS): __

11. The size of CPMSYS (CP/M drive A:) is variable but is suggested to be 512 blocks in length.

Type 512

The VMGR program finds the first available 512 block space and displays something like the following:

ENTER CORVUS DRIVE # {1..1}: 1

12. Press

The screen displays something like the following:

ENTER ADDRESS (BLOCKS): 1288

13. Press

The volume is added and the cursor returns to the VMGR command line:

VMGR:Q L[ST N[EW R[MVE W[PROT M[NT U[NM

14. Mount both volumes.

Press M

The screen displays:

MOUNT: ENTER VOLUME NAME: _

15. Type CPMBOOT

The screen displays:

MOUNT CPMBOOT: ON UNIT # _

16. Type 5

The volume is mounted and the cursor returns to the VMGR command line:

VMGR:Q L[ST N[EW R[MVE W[PROT M[NT U[NM

17. Press M

The screen displays:

MOUNT: ENTER VOLUME NAME: _

18. Type CPMSYS

The screen displays:

MOUNT CPMSYS: ON UNIT # _

19. In order to boot CP/M, the CPMSYS volume must be mounted on unit #12.

Type 12

The volume is mounted and the cursor returns to the VMGR command line:

```
VMGR:Q L[ST N[EW R[MVE W[PROT M[NT U[NM
```

20. With both volumes allocated and mounted, quit the VMGR program.

Press Q

The screen displays:

```
CHANGE DEFAULT MOUNT TABLE [Y/N]? _
```

21. Press Y

The screen displays:

```
COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN
```

Copying Files to CPMBOOT

A diskette containing Pascal files was supplied in the Corvus Apple CP/M package. Copy these files to the CPMBOOT volume.

1. Place the APPLE II CP/M UTILITIES—PASCAL 1.1 diskette into the diskette drive.
2. Press F

The screen displays:

```
FILE: G, S, N, L, R, C, T, D, Q [1.1]_
```

3. Press T

The screen displays:

```
TRANSFER ? _
```

4. Type #9:=,#5:\$

The screen displays:

```
CSCPM: CPMBOOT.CODE
--> CPMBOOT:CPMBOOT.CODE
CSCPM:CPMUTIL.CODE
--> CPMBOOT:CPMUTIL.CODE
CSCPM:UTILDATA
--> CPMBOOT:UTILDATA
```

Creating the CP/M System File

1. When the CP/M system file (SYSTEM.APPLECPM) is created, the file is written to the volume which is prefixed. Since the system file should reside in CPMBOOT, prefix CPMBOOT. From the filer command line:

Press P

The screen displays:

```
PREFIX TITLES BY ? _
```

2. Type CPMBOOT:

The screen displays:

```
PREFIX IS CPMBOOT:
```

3. Quit the filer.

Press Q

The screen displays:

```
COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN
```

4. **Press X**

The screen displays:

```
EXECUTE WHAT FILE? _
```

5. Type CPMUTIL RETURN

The screen displays:

CPMUTIL [1.4]: CORVUS APPLE CP/M UTILIT
°COPYRIGHT 1981, 1982, 1983 CORVUS SY

VALID OPTIONS ARE:

D — CP/M DIRECTORY LISTING
I — INITIALIZE CP/M VOLUME
U — UPDATE CP/M SYSTEM FILE (SYSTEM.A
V — LIST CP/M VOLUME NAMES
X — TRANSFER CP/M FILE
Z — INITIALIZE CP/M DIRECTORY

Q — QUIT

ENTER OPTION [<SPACE>, <OPTION>]: __

6. Press U

The screen displays:

CPMUTIL [1.4]: UPDATE CP/M SYSTEM FILE
°COPYRIGHT 1981, 1982, 1983 CORVUS SY

PLACE YOUR MICROSOFT LICENSED CP/M
SYSTEM DISKETTE (16 SECTOR) IN
UNIT #9.

ARE YOU READY TO PROCEED? [Y/N]: __

7. Place the MicroSoft CP/M diskette in the diskette drive.

8. Press Y

The screen first displays:

COPYING CP/M TO SYSTEM FILE
.....

Extra Step → PASCAL DISK
The screen then displays:

PLACE YOUR CORVUS SYSTEMS SUPPLIED
CP/M DISKETTE IN UNIT #9.

ARE YOU READY TO PROCEED? [Y/N]: _

9. Place the APPLE II CP/M UTILITIES—CP/M 2.2 diskette from Corvus in the diskette drive.

10. Press Y

The screen first displays:

COPYING CORVUS BOOT TO SYSTEM FILE
.....

The screen then displays:

PLACE YOUR CORVUS SYSTEMS SUPPLIED
CP/M DISKETTE IN UNIT #9.

ARE YOU READY TO PROCEED? [Y/N]: _

11. Press Y

The screen first displays:

COPYING CORVUS BIOS TO SYSTEM FILE
.....

The screen then displays:

CP/M SYSTEM FILE UPDATE COMPLETE

Initializing CPMSYS

The CPMSYS volume will contain the CP/M operating system files. In order for CP/M files to reside in CPMSYS, CPMSYS must be initialized for CP/M.

1. Press I

The screen displays:

ENTER CP/M VOLUME NAME: __

2. Type CPMSYS

The screen displays:

CP/M BLOCK ALLOCATION SIZE DEFINITION (N
ALLOCATION SIZE [1,2,4,8,16]: 2

3. Press

The screen displays:

NUMBER OF CP/M DIRECTORY ENTRIES DEFINIT
NUMBER OF ENTRIES [512 MAX]: 128

4. Press

The screen displays:

CP/M VOLUME PROCESSING COMPLETE

5. Press Z

The screen displays:

ENTER CP/M VOLUME NAME: CPMSYS

6. Press

The screen displays:

ZERO CP/M DIRECTORY ON VOLUME? [Y/N]: __

7. Press Y

The screen first displays:

ZEROING DIRECTORY ON VOLUME
.....

The screen then displays:

CP/M VOLUME INITIALIZATION COMPLETE

8. With CPMSYS initialized, exit the CPMUTIL program.

Press Q

The screen displays:

```
COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN
```

Copying Files to CPMSYS

1. In order to copy CP/M operating system files to CPMSYS, CP/M must be booted.

Press X

The screen displays:

```
EXECUTE WHAT FILE? _
```

2. Type CPMBOOT

The screen displays:

```
READY TO BOOT CP/M [Y/N]: _
```

3. Press Y

The screen displays:

```
APPLE ][ CP/M -- 56K V 2.22 OF 01-07-83
```

```
©1979 DIGITAL RESEARCH  
©1980 MICROSOFT  
©1983 CORVUS SYSTEMS
```

```
MOUNT?
```

```
A>
```

4. Place the MicroSoft CP/M diskette in the diskette drive.

5. **Type** C:PIP A:=C:*. *

The screen displays:

```
COPYING —  
FORMAT.COM  
COPY.COM  
MBASIC.COM  
GBASIC.COM  
CONFIGIO.BAS  
PIP.COM  
STAT.COM  
ED.COM  
ASM.COM  
DDT.COM  
LOAD.COM  
RW13.COM  
APDOS.COM  
SUBMIT.COM  
XSUB.COM  
DUMP.ASM  
DUMP.COM  
DOWNLOAD.COM  
CPM60.COM
```

A> _

6. Place the APPLE II CP/M UTILITIES—CP/M 2.2 diskette from Corvus in the diskette drive.

7. **Type** PIP A:=C:*.COM

The screen displays:

```
COPYING —  
MOUNT.COM  
REBOOT.COM  
ASIO.COM  
COPY.COM  
FORMAT.COM  
APDOS.COM
```

A> _

Three MicroSoft files were replaced: COPY.COM, FORMAT.COM and APDOS.COM; all three of these programs work with either a floppy based Apple CP/M system or a Corvus Apple CP/M system. MOUNT.COM is

used to mount CP/M volumes other than CPMSYS during the CP/M boot process. REBOOT.COM allows the user to boot back to Pascal from CP/M.

8. **Type** PIP A:CONFIGIO.BAS=C: C\$CONFIG.BAS

The Corvus replacement file (which works only on a Corvus Apple CP/M system) for CONFIGIO.BAS is copied and the screen displays:

A> _

9. Reboot Pascal.

Type REBOOT

The screen displays:

COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN

The CP/M boot volume and the CP/M system volume are now created. Proceed to Chapter 3 to create CP/M volumes.



CREATING CP/M VOLUMES

3

With the CPMBOOT and CPMSYS volume created so as to boot into CP/M, areas must be created for use once CP/M has been booted. Up to five CP/M volumes can be active (mounted) at any one time. This chapter instructs the user on creating and activating CP/M volumes.

Creating a CP/M Volume

The creation of a CP/M volume is a two step process. First the volume space is allocated by the creation of a Pascal volume. The Pascal volume is then initialized for CP/M and zeroed.

1. When Apple Pascal is booted, the screen displays:

```
COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN
```

2. **Press X**

The screen displays:

```
EXECUTE WHAT FILE? _
```

3. **Type VMGR**

The screen displays:

```
VMGR:Q L[ST N[EW R[MVE W[PROT M[NT U[NM
```

4. **Press N**

The screen displays:

```
NEW VOLUME: ENTER VOLUME NAME: _
```

5. Enter a name for the volume being created. For example:

Type CPM1

The screen displays:

```
ENTER LENGTH (BLOCKS):
```

6. In order to work in CP/M, a volume can be no larger than 8 megabytes (16,384 blocks). Enter the desired size of the volume. For example:

Type 2048

The screen displays something like the following:

```
ENTER CORVUS DRIVE # [1..1]: 1
```

7. Press

The screen displays something like the following:

```
ENTER ADDRESS (BLOCKS): 1800
```

8. Press

The volume is added and the cursor returns to the system manager command line:

```
VMGR:Q L[ST N[EW R[MVE W[PROT M[NT U[NM
```

9. Mount the volume.

Press M

The screen displays:

```
MOUNT: ENTER VOLUME NAME: __
```

10. Enter the name of the new volume, followed by .
For example:

Type CPM1

The screen displays:

```
MOUNT CPM1: ON UNIT # __
```

11. Type 10

The screen displays:

```
CPM1: MOUNTED
```

12. Quit the VMGR program.

Press Q

The screen displays:

```
CHANGE DEFAULT MOUNT TABLE [Y/N]? __
```

13. Press Y

The screen displays:

COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN

14. The new volume is converted to the CP/M format through the CPMUTIL program.

Press X

The screen displays:

EXECUTE WHAT FILE? _

15. Type CPMBOOT:CPMUTIL

The screen displays:

CPMUTIL [1.4]: CORVUS APPLE CP/M UTILIT
©COPYRIGHT 1981, 1982, 1983 CORVUS SY

VALID OPTIONS ARE:

D — CP/M DIRECTORY LISTING
I — INITIALIZE CP/M VOLUME
U — UPDATE CP/M SYSTEM FILE [SYSTEM.A
V — LIST CP/M VOLUME NAMES
X — TRANSFER CP/M FILE
Z — INITIALIZE CP/M DIRECTORY

Q — QUIT

ENTER OPTION [<SPACE>, <OPTION>]: _

16. Press I

The screen displays:

ENTER CP/M VOLUME NAME: _

17. Enter the name of the new volume which will be converted to the CP/M format, followed by **RETURN** . For example:

Type CPM1 **RETURN**

The screen displays:

CP/M BLOCK ALLOCATION SIZE DEFINITION (N
ALLOCATION SIZE [1,2,4,8,16]: _

18. Many factors must be considered in the selection of a volume's block allocation or cluster size. The cluster is the fundamental unit used in addressing files in CP/M. To optimize disk storage capacity, cluster size should be as small as possible. But to optimize disk access efficiency, cluster size should be as large as possible.

The trade-off between disk capacity and access efficiency is not the only factor which must be considered in the selection of cluster size. Also of importance is the size of the allocation table. The Corvus version of Apple CP/M reserves approximately 4400 bits of memory for the allocation table. Each volume mounted requires approximately 320 bits plus one bit for each cluster allocated to the volume. For instance, if a volume had a length of 4000K bytes (4 megabytes) and a cluster size of 2K bytes, 2320 bits would be required in the allocation table [320 bits for the volume itself and 2000 bits due to the relationship between length and cluster size (4000K / 2K = 2000)].

In the selection of the cluster size for a volume, begin with a rule of thumb:

Volumes which will consist mainly of small files should be configured with small cluster sizes;
volumes which will consist mainly of large files should be configured with large cluster sizes.

Select a desirable cluster size and then determine if the allocation table can support the desired selection. The following example is given to assist in the determination:

Suppose that a CP/M volume, such as CPMSYS, has a length of 512 blocks and a cluster size of 2K. One block is equivalent to 512 bytes. Converting the length of the volume from blocks to bytes, we find that the volume has a

length of 262144 bytes (i.e., 512 blocks x 512 bytes/block = 262144) or 256K bytes (remember 1K = 1024). Since the volume was configured with a 2K cluster size, the number of bits required for this volume in the allocation table due to the relationship between length and cluster size is 128 bits (256K / 2K = 128). Since the volume when mounted automatically requires 320 bits in the allocation table, the total number of bits required by this volume is 448 (320 + 128 = 448).

The allocation table must be able to support all CP/M volumes mounted (up to five CP/M volumes can be mounted). If the addition of the volume being initialized with the desired cluster size causes the capacity of the allocation table to be exceeded, select a larger cluster size and determine if the new selection is feasible. If the addition of the volume being initialized with the desired cluster size does not cause the capacity of the allocation table to be exceeded, enter the desired cluster (or block allocation) size, followed by **RETURN**. For example:

Type 4 **RETURN**

The screen displays:

```
NUMBER OF CP/M DIRECTORY ENTRIES DEFINIT
NUMBER OF ENTRIES [512 MAX]: _
```

- 19.** Given a sufficient number of allocation blocks, a volume can hold up to 512 directory entries. By choosing a number of directory entries less than the maximum of 512, the user can increase access time. However, since most volumes seem to run out of available directory entries before running out of disk space, simply select the maximum.

Type 512 **RETURN**

The screen displays:

```
CP/M VOLUME PROCESSING COMPLETE . . .
```

- 20.** For future reference, note down the block allocation size chosen for each volume.

- 21.** Once a CP/M volume is initialized, its directory must be zeroed.

Press Z

The screen displays:

ENTER CP/M VOLUME NAME: ___

- 22.** The name of the volume just initialized appears as the default volume to be zeroed. Therefore:

Press

The screen displays:

ZERO DIRECTORY ON VOLUME? [Y/N]: ___

- 23.** **Press Y**

The screen first displays:

ZEROING DIRECTORY ON VOLUME
.....
.....

The screen then displays:

CP/M VOLUME INITIALIZATION COMPLETE

- 24.** With the CP/M volume created, exit the CPMUTIL program.

Press Q

The screen displays:

COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN

Other CP/M volumes can be created in the same manner: a Pascal volume is first created using the Pascal VMGR program; the volume is then initialized and zeroed using the Pascal CPMUTIL program.

Activating a CP/M Volume

1. Once CP/M volumes are created, they must be activated through the mounting process. Up to five CP/M volumes can be mounted at any one time.

Press X

The screen displays:

```
EXECUTE WHAT FILE? _
```

2. **Type VMGR**

The screen displays:

```
VMGR: Q L[ST N[EW R[MVE W[PROT M[NT U[NM
```

3. **Press M**

The screen displays:

```
MOUNT: ENTER VOLUME NAME: _
```

4. Up to five CP/M volumes can be active at any one time; one of the volumes must be CPMSYS. Determine up to four other CP/M volumes which will be active. Enter the name of one of these volumes, followed by .
For example:

Type CPM1

The screen displays:

```
MOUNT CPM1: ON UNIT # _
```

5. Units number 5, 9, 10 and 11 are available for mounting. Note that if a Corvus volume is mounted on unit #9, a diskette drive cannot be accessed. Enter an available mounting unit, followed by . For example:

Type 11

If the volume was not already mounted, the screen displays:

```
CPM1: MOUNTED
```

6. Mount other CP/M volumes on other available unit keeping in mind the limitations of the allocation table as explained in the "Creating a CP/M Volume" section of Chapter 3.

7. When all desired volumes have been mounted, exit the VMGR program.

Press Q

The screen displays:

CHANGE DEFAULT MOUNT TABLE (Y/N):

8. **Press Y**

The screen displays:

COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN

Booting CP/M

All components are now in place to boot and use CP/M.

1. **Press X**

The screen displays:

EXECUTE WHAT FILE?

2. **Type CPMBOOT:CPMBOOT** RETURN

The screen displays:

READY TO BOOT CP/M? (Y/N):

3. **Press Y**

The screen displays:

APPLE] [CP/M -- 56K V 2.22 OF 01-07-83

©1979 DIGITAL RESEARCH
©1980 MICROSOFT
©1983 CORVUS SYSTEMS

VOLUME CPMSYS MOUNTED ON A:
VOLUME CPM1 MOUNTED ON B:

A>

SECTION THREE

Multi-User System

This section is designed for users of a Corvus disk system with multiple Apple II computers and Constellation software. If only one Apple II is being used, go back to Section Two which addresses users of a single Apple II with single-user software.



CONSTRUCTING THE CP/M BOOT AND CP/M SYSTEM VOLUMES

4

In order for any Apple II to access CP/M on a Corvus disk, a Pascal program must be executed. This Pascal program boots (starts up) CP/M and activates a CP/M system volume which mounts up to four other CP/M volumes. This chapter is designed to instruct the user in the creation of a Pascal volume which contains the Pascal files to boot CP/M and in the creation of a CP/M volume in which the CP/M operating system files reside. These two volumes will be shared by all CP/M users on the network.

Creating CPMBOOT and CPMSYS

1. When the Apple II is powered on, the screen displays:

```
CORVUS  
CONSTELLATION
```

```
  *  
 *  *  
 *  *  
 *  *
```

```
PLEASE ENTER YOUR NAME [3.2]: ___
```

2. Log on as the system manager.

Type SMGR

The screen displays:

```
COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN
```

```
WELCOME SYS, TO APPLE II PASCAL 1.1  
BASED ON UCSD PASCAL II.1  
CURRENT DATE IS 13-JAN-83
```

```
©APPLE COMPUTER INC. 1979, 1980  
©U.C. REGENTS 1979
```

3. Press X

The screen displays:

EXECUTE WHAT FILE? __

4. Type VMGR

The screen displays:

SYSTEM MANAGER: Q L(ST N(EW R(MVE W(PROT

5. Press N

The screen displays:

NEW VOLUME: ENTER VOLUME NAME: __

6. Type CPMBOOT

The screen displays:

ENTER LENGTH (BLOCKS): __

7. Type 256

The VMGR program finds the first available 256 block space and displays something like the following:

ENTER CORVUS DRIVE # (1..1): 1

8. Press

The screen displays something like the following:

ENTER ADDRESS (BLOCKS): 1032 1544

9. Press

The volume is added and the cursor returns to the VMGR command line:

SYSTEM MANAGER: Q L(ST N(EW R(MVE W(PROT

10. Press N

The screen displays:

NEW VOLUME: ENTER VOLUME NAME: __

11. Type CPMSYS

The screen displays:

ENTER LENGTH (BLOCKS):

12. The size of CPMSYS (CP/M drive A:) is variable but is suggested to be 512 blocks in length.

Type 512

The VMGR program finds the first available 512 block space and displays something like the following:

ENTER CORVUS DRIVE # [1..1]: 1

13. Press

The screen displays something like the following:

ENTER ADDRESS (BLOCKS): 1288 1800

14. Press

The volume is added and the cursor returns to the VMGR command line:

SYSTEM MANAGER: Q L(ST N(EW R(MVE W(PROT

15. Mount both volumes for the system manager.

Press S

The screen displays:

ENTER USER ID:

16. Type SMGR

The screen displays:

CURRENTLY MANAGING USER SMGR [# 1]
SUPERVISOR: Q L(IST R(EMOVE A(DD W(PROT

17. Press I

The system manager is granted access to all volumes and the cursor returns to the supervisor command line:

CURRENTLY MANAGING USER SMGR [# 1]
SUPERVISOR: Q L(IST R(EMOVE A(DD W(PROT

18. Press M

The screen displays:

MOUNT: ENTER VOLUME NAME: __

19. Type CPMBOOT

The screen displays:

MOUNT CPMBOOT: ON UNIT # __

20. Type 5

The screen displays:

CPMBOOT: MOUNTED

21. Press M

The screen displays:

MOUNT: ENTER VOLUME NAME: __

22. Type CPMSYS

The screen displays:

MOUNT CPMSYS: ON UNIT # __

23. In order to boot CP/M, the CPMSYS volume must be mounted on unit #12.

Type 12

The screen displays:

CPMSYS: MOUNTED

24. With both volumes allocated and mounted, quit the VMGR program.

Press Q

The screen displays:

SYSTEM MANAGER: Q L{ST N{EW R{MVE W{PROT

25. Press Q

The screen displays:

COMMAND: E{DIT, R{UN, F{ILE, C{OMP, L{IN

Copying Files to CPMBOOT

A diskette containing Pascal files was supplied in the Corvus Apple CP/M package. Copy these files to the CPMBOOT volume.

1. Place the APPLE II CP/M UTILITIES—PASCAL 1.1 diskette into the diskette drive.
2. **Press F**

The screen displays:

```
filer: G, S, N, L, R, C, T, D, Q [1.1]__
```

3. **Press T**

The screen displays:

```
TRANSFER ? __
```

4. **Type #9:=, #5:\$**

The screen displays:

```
CSCPM: CPMBOOT.CODE
--> CPMBOOT:CPMBOOT.CODE
CSCPM: CPMUTILCODE
--> CPMBOOT:CPMUTILCODE
CSCPM: UTILDATA
--> CPMBOOT:UTILDATA
```

5. Make CPMBOOT a bootable Pascal volume by copying four Pascal system files from the SYS volume to CPMBOOT.

Press T

The screen displays:

```
TRANSFER ? __
```

6. **Type SYS:SYSTEM.?,CPMBOOT:\$**

The screen will display each SYSTEM file in the SYS volume one at a time. **Press Y** in response to:

```
TRANSFER SYSTEM.APPLE ?
TRANSFER SYSTEM.PASCAL ?
TRANSFER SYSTEM.MISCINFO ?
TRANSFER SYSTEM.LIBRARY ?
```

Press N in response to every other question.

Creating the CP/M System File

1. When the CP/M system file (SYSTEM.APPLECPM) is created, the file is written to the volume which is prefixed. Since the system file should reside in CPMBOOT, prefix CPMBOOT. From the filer command line:

Press P

The screen displays:

PREFIX TITLES BY ? _

2. **Type CPMBOOT:**

The screen displays:

PREFIX IS CPMBOOT:

3. Quit the filer.

Press Q

The screen displays:

COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN

4. **Press X**

The screen displays:

EXECUTE WHAT FILE? _

5. Type CPMUTIL [RETURN]

The screen displays:

CPMUTIL [1.4]: CORVUS APPLE CP/M UTILIT
©COPYRIGHT 1981, 1982, 1983 CORVUS SY

VALID OPTIONS ARE:

D — CP/M DIRECTORY LISTING
I — INITIALIZE CP/M VOLUME
U — UPDATE CP/M SYSTEM FILE (SYSTEM.A
V — LIST CP/M VOLUME NAMES
X — TRANSFER CP/M FILE
Z — INITIALIZE CP/M DIRECTORY

Q — QUIT

ENTER OPTION [<SPACE>, <OPTION>]: _

6. Press U

The screen displays:

CPMUTIL [1.4]: UPDATE CP/M SYSTEM FILE
©COPYRIGHT 1981, 1982, 1983 CORVUS SY

PLACE YOUR MICROSOFT LICENSED CP/M
SYSTEM DISKETTE (16 SECTOR) IN
UNIT #9.

ARE YOU READY TO PROCEED? [Y/N]: _

7. Place the MicroSoft CP/M diskette in the diskette drive.

8. Press Y

The screen first displays:

COPYING CP/M TO SYSTEM FILE
.....

The screen then displays:

PASCAL

PLACE YOUR CORVUS SYSTEMS SUPPLIED
CP/M DISKETTE IN UNIT #9.

ARE YOU READY TO PROCEED? [Y/N]: _

9. Place the APPLE II CP/M UTILITIES—CP/M 2.2 diskette from Corvus in the diskette drive.

THEN CP/M

10. Press Y

The screen first displays:

COPYING CORVUS BOOT TO SYSTEM FILE
.....

The screen then displays:

PLACE YOUR CORVUS SYSTEMS SUPPLIED
CP/M DISKETTE IN UNIT #9.

ARE YOU READY TO PROCEED? [Y/N]: _

11. Press Y

The screen first displays:

COPYING CORVUS BIOS TO SYSTEM FILE
.....

The screen then displays:

CP/M SYSTEM FILE UPDATE COMPLETE

Initializing CPMSYS

The CPMSYS volume will contain the Corvus operating system files. In order for Corvus files to reside in CPMSYS, CPMSYS must be initialized for Corvus.

1. Press I

The screen displays:

ENTER CP/M VOLUME NAME: _

2. Type CPMSYS

The screen displays:

CP/M BLOCK ALLOCATION SIZE DEFINITION (N)
ALLOCATION SIZE [1,2,4,8,16]: 2

3. Press

The screen displays:

NUMBER OF CP/M DIRECTORY ENTRIES DEFINIT
NUMBER OF ENTRIES [512 MAX]: 128

4. Press

The screen displays:

CP/M VOLUME PROCESSING COMPLETE

5. Press Z

The screen displays:

ENTER CP/M VOLUME NAME: CPMSYS

6. Press

The screen displays:

ZERO CP/M DIRECTORY ON VOLUME? [Y/N]: _

7. Press Y

The screen first displays:

ZEROING DIRECTORY ON VOLUME
.....

The screen then displays:

CP/M VOLUME INITIALIZATION COMPLETE

8. With CPMSYS initialized, exit the CPMUTIL program.

Press Q

The screen displays:

```
COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN
```

Copying Files to CPMSYS

1. In order to copy CP/M operating system files to CPMSYS, CP/M must be booted.

Press X

The screen displays:

```
EXECUTE WHAT FILE? _
```

2. Type CPMBOOT

The screen displays:

```
APPLE ][ CP/M -- 56K V 2.22 OF 01-07-83
```

```
  °1979 DIGITAL RESEARCH
  °1980 MICROSOFT
  °1983 CORVUS SYSTEMS
```

```
MOUNT?
```

```
A>
```

3. Place the MicroSoft CP/M diskette in the diskette drive.

4. Type `C:PIP A:=C: *.*`

The screen displays:

```
COPYING —
FORMAT.COM
COPY.COM
MBASIC.COM
GBASIC.COM
CONFIGIO.BAS
PIP.COM
STAT.COM
ED.COM
ASM.COM
DDT.COM
LOAD.COM
RW13.COM
APDOS.COM
SUBMIT.COM
XSUB.COM
DUMP.ASM
DUMP.COM
DOWNLOAD.COM
CPM60.COM
```

A> _

5. Place the APPLE III CP/M UTILITIES—CP/M 2.2 diskette from Corvus in the diskette drive.
6. Type `PIP A:=C: *.COM`

The screen displays:

```
COPYING —
MOUNT.COM
REBOOT.COM
ASIO.COM
COPY.COM
FORMAT.COM
APDOS.COM
```

A> _

Three MicroSoft files were replaced: COPY.COM, FORMAT.COM and APDOS.COM; all three of these programs work with either a floppy based Apple CP/M system or a Corvus Apple CP/M system. MOUNT.COM is

used to mount CP/M volumes other than CPMSYS during the CP/M boot process. REBOOT.COM allows the user to boot from CP/M back to the Constellation request for user name.

7. **Type** PIP A:CONFIGIO.BAS=C: CSCONFIG.BAS **RETURN**

The Corvus replacement file (which works only on a Corvus Apple CP/M system) for CONFIGIO.BAS is copied and the screen displays:

A> _

The Pascal CP/M boot volume (CPMBOOT) and the CP/M system volume (CPMSYS) have been constructed. CP/M areas may now be created for network users. To return to the Constellation request for the entry of a logon name,

Type REBOOT **RETURN**

CREATING CP/M VOLUMES FOR NETWORK USERS

5

As the SYSTEM MANAGER'S GUIDE FOR THE APPLE II states, the Corvus disk is divided into Pascal volume areas for the purpose of avoiding the possibility of multiple disk writes to a common area. The CP/M environment is no different in this regard from the Pascal environment; only one user should have write access to any one CP/M volume.

This chapter is designed to instruct the system manager in the creation of CP/M volumes for users, the assignment of volumes to users, and the granting of access to CP/M to network users.

Creating a CP/M Volume

The creation of a CP/M volume is a two step process. First the volume space is allocated by the creation of a Pascal volume. The Pascal volume is then initialized for CP/M and zeroed.

1. Log on as the system manager.

Type **SMGR**

The screen displays:

```
COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN
```

2. Press X

The screen displays:

```
EXECUTE WHAT FILE? _
```

3. Type **VMGR**

The screen displays:

```
SYSTEM MANAGER: Q L[ST N[EW R[MVE W[PROT
```

4. Press N

The screen displays:

NEW VOLUME: ENTER VOLUME NAME: __

5. Enter a name for the volume being created. For example:

Type CPM1

The screen displays:

ENTER LENGTH (BLOCKS):

6. In order to work in CP/M, the volume can be no larger than 8 megabytes (16,384 blocks). Enter the desired size of the volume, followed by . For example:

Type 2048

The screen displays something like the following:

ENTER CORVUS DRIVE # (1..1): 1

7. Press

The screen displays something like the following:

ENTER ADDRESS (BLOCKS): 4800 23/2

8. Press

The volume is added and the cursor returns to the system manager command line:

SYSTEM MANAGER: Q L(ST N(EW R(MVE W(PROT

9. Grant the system manager access to the new volume.

Press S

The screen displays:

ENTER USER ID: __

10. Type SMGR

The screen displays:

CURRENTLY MANAGING USER SMGR [# 1]
SUPERVISOR: Q L(IST R(EMOVE A(DD W(PROT

11. Press A

The screen displays:

NEW VOLUME: ENTER VOLUME NAME: __

12. Enter the name of the new volume, followed by
For example:

Type CPM1

The system manager is granted access to the volume and the cursor returns to the supervisor command line:

CURRENTLY MANAGING USER SMGR [# 1]
SUPERVISOR: Q L(IST R(EMOVE A(DD W(ROT

13. Mount the volume for the system manager.

Press M

The screen displays:

MOUNT: ENTER VOLUME NAME: __

14. Enter the name of the new volume, followed by
For example:

Type CPM1

The screen displays:

MOUNT CPM1: ON UNIT # __

15. Type 10

The screen displays:

CPM1: MOUNTED

16. Quit the VMGR program.

Press Q

The screen displays:

SYSTEM MANAGER: Q L(IST N(EW R(MVE W(ROT

17. Press Q

The screen displays:

COMMAND: E(DIT, R(UN, F(ILE, C(OMP, L(IN

18. The new volume is converted to the CP/M format through the CPMUTIL program.

Press X

The screen displays:

EXECUTE WHAT FILE? __

19. **Type CPMBOOT:CPMUTIL** **[RETURN]**

The screen displays:

CPMUTIL [1.4]: CORVUS APPLE CP/M UTILIT
©COPYRIGHT 1981, 1982, 1983 CORVUS SY

VALID OPTIONS ARE:

D — CP/M DIRECTORY LISTING
I — INITIALIZE CP/M VOLUME
U — UPDATE CP/M SYSTEM FILE (SYSTEM.A
V — LIST CP/M VOLUME NAMES
X — TRANSFER CP/M FILE
Z — INITIALIZE CP/M DIRECTORY

Q — QUIT

ENTER OPTION [<SPACE>, <OPTION>]: __

20. **Press I**

The screen displays:

ENTER CP/M VOLUME NAME: __

21. Enter the name of the new volume which will be converted to the CP/M format, followed by **[RETURN]**. For example:

Type CPM1 **[RETURN]**

The screen displays:

CP/M BLOCK ALLOCATION SIZE DEFINITION (N
ALLOCATION SIZE [1,2,4,8,16]: __

22. Many factors must be considered in the selection of a volume's block allocation or cluster size. The cluster is the fundamental unit used in addressing files in CP/M. To optimize disk storage capacity, cluster size should be as small as possible. But to optimize disk access efficiency, cluster size should be as large as possible.

The trade-off between disk capacity and access efficiency is not the only factor which must be considered in the selection of cluster size. Also of importance is the size of the allocation table. The Corvus version of Apple CP/M reserves approximately 4400 bits of memory for the allocation table. Each volume mounted requires approximately 320 bits plus one bit for each cluster allocated to the volume. For instance, if a volume had a length of 4000K bytes (4 megabytes) and a cluster size of 2K bytes, 2320 bits would be required in the allocation table [320 bits for the volume itself and 2000 bits due to the relationship between length and cluster size (~~400K~~ / 2K = 2000)].

In the selection of the cluster size for a volume, begin with a rule of thumb:

Volumes which will consist mainly of small files should be configured with small cluster sizes;
volumes which will consist mainly of large files should be configured with large cluster sizes.

Select a desirable cluster size and then determine if the allocation table can support the desired selection. The following example is given to assist in the determination:

Suppose that a CP/M volume, such as CPMSYS, has a length of 512 blocks and a cluster size of 2K. One block is equivalent to 512 bytes. Converting the length of the volume from blocks to bytes, we find that the volume has a length of 262144 bytes (i.e., 512 blocks x 512 bytes/block = 262144) or 256K bytes (remember 1K = 1024). Since the volume was configured with a 2K cluster size, the number of bits required for this volume in the allocation table due to the relationship between length and cluster size is 128 bits (256K / 2K = 128). Since the volume when mounted automatically requires 320 bits in the allocation table, the total number of bits required by this volume is 448 (320 + 128 = 448).

The allocation table must be able to support all CP/M volumes mounted for each respective user (up to five CP/M volumes can be mounted). If the addition of the volume being initialized with the desired cluster size causes the capacity of the allocation table to be exceeded for the desired user(s), select a larger cluster size and determine if the new selection is feasible. If the addition of the volume being initialized with the desired cluster size does not cause the capacity of the allocation table to be exceeded, enter the desired cluster (or block allocation) size, followed by **RETURN** . For example:

Type 4 **RETURN**

The screen displays:

NUMBER OF CP/M DIRECTORY ENTRIES DEFINIT
NUMBER OF ENTRIES [512 MAX]: __

- 23.** Given a sufficient number of allocation blocks, a volume can hold up to 512 directory entries. By choosing a number of directory entries less than the maximum of 512, the user can increase access time. However, since most volumes seem to run out of available directory entries before running out of disk space, simply select the maximum.

Type 512 **RETURN**

The screen displays:

CP/M VOLUME PROCESSING COMPLETE

- 24.** For future reference, note down the block allocation size for each volume.
- 25.** Once a CP/M volume is initialized, its directory must be zeroed.

Press Z

The screen displays:

ENTER CP/M VOLUME NAME: __

26. The name of the volume just initialized appears as the default volume to be zeroed. Therefore:

Press **RETURN**

The screen displays:

ZERO DIRECTORY ON VOLUME? [Y/N]: __

27. Press Y

The screen first displays:

ZEROING DIRECTORY ON VOLUME
.....
.....

The screen then displays:

CP/M VOLUME INITIALIZATION COMPLETE....

28. With the CP/M volume created, exit the CPMUTIL program.

Press Q

The screen displays:

COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN

Other CP/M volumes can be created in the same manner: a Pascal volume is first created using the Pascal VMGR program; the volume is then initialized and zeroed using the Pascal CPMUTIL program.

Granting Users Access to CP/M

All the components are now available to create CP/M users on the network. The CPMBOOT and CPMSYS volumes have been created to allow booting into CP/M, and CP/M volumes have been created for use by network users once CP/M is booted.

1. Press X

The screen displays:

EXECUTE WHAT FILE? __

2. Type VMGR RETURN

The screen displays:

SYSTEM MANAGER: Q L{ST N{EW R{MVE W{PROT

- 3.** Since the volumes CPMBOOT and CPMSYS will best be shared by all network users of CP/M, the volumes should be write protected to protect against the possibility of data loss.

Press W

The screen displays:

PROTECT: ENTER VOLUME NAME: __

4. Type CPMBOOT RETURN

The screen displays:

CPMBOOT: NOW WRITE PROTECTED "*"

5. Press W

The screen displays:

PROTECT: ENTER VOLUME NAME: __

6. Type CPMSYS RETURN

The screen displays:

CPMSYS: NOW WRITE PROTECTED

- 7.** To activate a CP/M user, begin by creating a user name:

Press U

The screen displays:

USER MANAGER: Q{UIT L{IST A{DD R{EMOVE:

8. Press A

The screen displays:

ENTER USER ID:

9. Enter a four character user name, followed by **RETURN** .
For example:

Type JOHN **RETURN**

The screen displays:

```
ENTER PASSWORD (2 CHARS MAX)
OR TYPE <CR> FOR NO PASSWORD: _
```

10. Press **RETURN**

The screen displays:

```
ENTER BASICS HOME VOLUME (0-0): _
```

11. Press **RETURN**

The screen displays:

```
DEFAULT: P(ASCAL OR B(ASCIS? P
```

12. Press **RETURN**

The user is added and the cursor returns to the user manager command line:

```
USER MANAGER: Q(UIT L(IST A(DD R(EMOVE:
```

13. Press Q

The screen displays:

```
SYSTEM MANAGER: Q L(ST N(EW R(MVE W(PROT
```

14. Supervise the user just created.

Press S

The screen displays:

```
ENTER USER ID: _
```

15. Enter the name of the new user, followed by **RETURN** . For
For example:

Type JOHN **RETURN**

The screen displays:

```
CURRENTLY MANAGING USER JOHN [# 2]
SUPERVISOR: Q L(IST R(EMOVE A(DD W(PROT
```

16. Press A

The screen displays:

```
NEW VOLUME: ENTER VOLUME NAME: _
```

17. Type CPMBOOT

The volume is added and the cursor returns to the supervisor command line:

```
CURRENTLY MANAGING USER JOHN [# 2]
SUPERVISOR: Q L[IST R[EMOVE A[DD W[PROT
```

18. Press A

The screen displays:

```
NEW VOLUME: ENTER VOLUME NAME: _
```

19. Type CPMSYS

The volume is added and the cursor returns to the supervisor command line:

```
CURRENTLY MANAGING USER JOHN [# 2]
SUPERVISOR: Q L[IST R[EMOVE A[DD W[PROT
```

- 20.** The two volumes essential to each CP/M network user have been added to the user. Now grant the user CP/M volume(s) with which to work. Remember that only one user should have write access to any one volume.

Press A

The screen displays:

```
NEW VOLUME: ENTER VOLUME NAME: _
```

- 21.** Enter the name of the volume to be granted to the user, followed by . For example:

Type CPM1

The volume is added and the cursor returns to the supervisor command line:

```
CURRENTLY MANAGING USER JOHN [# 2]
SUPERVISOR: Q L[IST R[EMOVE A[DD W[PROT
```

- 22. Grant access to any other volume desired in a similar manner.
- 23. Activate the volumes which the user has been granted access.

Press M

The screen displays:

MOUNT: ENTER VOLUME NAME: __

- 24. Type CPMBOOT

The screen displays:

MOUNT CPMBOOT: ON UNIT # __

- 25. CPMBOOT is the Pascal boot volume and must be mounted on unit #4.

Type 4

The screen displays:

```

*****
*
*   WARNING -- THE VOLUME ON
*   #4 MUST HAVE SYSTEM.PASCAL
*   AND SYSTEM.MISCINFO OTHERWISE
*   IT MAY NOT BE POSSIBLE TO
*   RESTART THE SYSTEM...
*
*****

```

CONTINUE? __

- 26. Press Y

The screen displays:

CPMBOOT: MOUNTED

- 27. Press M

The screen displays:

MOUNT: ENTER VOLUME NAME: __

28. Type CPMSYS

The screen displays:

MOUNT CPMSYS: ON UNIT # __

29. CPMSYS must be mounted on unit #12 for each CP/M network user.

Type 12

The screen displays:

CPMSYS: MOUNTED

30. Units number 5, 9, 10 and 11 are available for mounting of other CP/M volumes. Note that if a Corvus volume is mounted on unit #9 for a user, that user will be unable to use a diskette drive. Mount other CP/M volumes on the available units.

Press M

The screen displays:

MOUNT: ENTER VOLUME NAME: __

31. Enter the name of the CP/M volume to be mounted by the user, followed by **. For example:**

Type CPM1

The screen displays:

MOUNT CPM1: ON UNIT # __

32. Enter an available mounting unit, followed by **. For example:**

Type 11

The screen displays:

CPM1: MOUNTED

33. Mount other CP/M volumes on other available units keeping in mind the limitations of the allocation table as explained in the "Creating a CP/M Volume" section of Chapter 5.

- 34.** When all desired volumes have been granted and activated for this user:

Press Q

The screen displays:

SYSTEM MANAGER: Q L{ST N{EW R{MVE W{PROT

- 35.** Other CP/M users may be activated in the same manner. Once all CP/M users have been activated:

Press Q

The screen displays:

COMMAND: E{DIT, R{UN, F{ILE, C{OMP, L{IN

- 36.** Return to the Constellation log-on message.

Press H

The screen displays:

C O R V U S
C O N S T E L L A T I O N

 *
 *
 * *
 *

PLEASE ENTER YOUR NAME [3.2]: ___

Booting CP/M

Users may now access CP/M and all volumes activated for them.

1. To boot a user into CP/M, log on as a user who has access to CP/M. For example:

Type JOHN

The screen displays:

```
COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN
```

```
WELCOME CPMBOOT, TO APPLE II PASCAL 1.1 .  
BASED ON UCSD PASCAL II.1  
CURRENT DATE IS 13-JAN-83
```

```
°APPLE COMPUTER INC. 1979, 1980  
°U.C. REGENTS 1979
```

2. Press X

The screen displays:

```
EXECUTE WHAT FILE? _
```

3. Type CPMBOOT:CPMBOOT

The screen displays:

```
APPLE ][ CP/M -- 56K V 2.22 OF 01-07-83
```

```
°1979 DIGITAL RESEARCH  
°1980 MICROSOFT  
°1983 CORVUS SYSTEMS
```

```
VOLUME CPMSYS MOUNTED ON A: (READ ONLY)  
VOLUME CPM1 MOUNTED ON B:
```

```
A> _
```

Automatic Boot into CP/M

Users can be made to automatically boot into CP/M without having to execute the CPMBOOT themselves.

1. From the Constellation log-on message, log on as the system manager.

Type SMGR

The screen displays:

```
COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN
```

2. Press F

The screen displays:

```
FILE: G, S, N, L, R, C, T, D, Q [1.1] __
```

3. Press C

The screen displays:

```
CHANGE ? __
```

4. Type CPMBOOT:CPMBOOT.CODE

The screen displays:

```
CHANGE TO WHAT ? __
```

5. Type CPMBOOT:SYSTEM.STARTUP

The screen displays:

```
CPMBOOT:CPMBOOT.CODE  
--> SYSTEM.STARTUP
```

6. Press Q

The screen displays:

```
COMMAND: E[DIT, R[UN, F[ILE, C[OMP, L[IN
```

All CP/M network users who have CPMBOOT mounted on unit #4 will automatically boot into CP/M after entering their log-on name.

Users who have the CPMBOOT volume mounted on a unit other than unit #4 will be required to execute the

program "CPMBOOT:SYSTEM.STARTUP:" (notice the period after the word STARTUP) in order to access CP/M. If a CP/M application (or any CP/M command line) is to be run automatically, use the CCONFIG.BAS (renamed to CONFIGIO.BAS); specify an action such as DIR using option #5 and write the configuration block using option #4.



SHARING A PRINTER

6

In order to share a printer among Apple IIs in a Corvus network, a common area of the disk is set aside called the pipe area. Into this pipe area, any computer may place a file by using a process known as spooling. Once files are in the pipe area, the files may be removed from the pipe area and printed by a dedicated printing device (computer or printer server) using a process called despooling.

Corvus provides a spooling program in the Pascal environment. This spooling program is used to take files from a user's area and place the files directly in the pipe area. Corvus does not provide such a spooling program in the Apple CP/M environment. Therefore, in order to share a printer when using CP/M, files must be transferred to the Pascal environment (see Chapter 7) and subsequently spooled from a Pascal volume to the pipe area.

Furthermore, each network user should have his own Pascal volume to which to spool to from CP/M. Should two users have a common Pascal volume which is used as an intermediate step to the pipe area, the possibility exists that both users could transfer (i.e., write) a CP/M file to the same Pascal volume at the same time. This could mean data loss or distortion. Only in the case of the pipe area does the disk system handle the possibility of simultaneously writing to a common area on the disk.



SECTION FOUR

Utilities

Corvus Systems' Apple CP/M product is based upon the Pascal operating system. This provides the user with the opportunity to mix Pascal, CP/M and DOS operating systems as desired. Since the disk system used with Apple CP/M is based upon Pascal, all Pascal utilities such as the Mirror program and the Diagnostic program are applicable from Pascal and have not been duplicated in CP/M. Refer to Corvus Systems' DISK SYSTEM USER GUIDE or the SYSTEM MANAGER'S GUIDE FOR THE APPLE II for explanation of Pascal utilities.

Corvus Systems does supply some utility programs which are applicable only in relation to the Apple CP/M environment. This section is designed to describe these utilities. Note that a further explanation of CP/M files from Corvus is contained in a DOC file (INDEX.DOC) on the CP/M format disk from Corvus; use the TYPE command in CP/M to view this file.



Viewing CP/M from Pascal

A utility is provided which permits the viewing of CP/M volumes mounted and the contents of CP/M volumes. The utility program resides in the CPMBOOT volume and is called CPMUTIL.

1. To view CP/M volumes mounted, start from the Pascal command line.

Press X

The screen displays:

```
EXECUTE WHAT FILE? _
```

2. Type CPMBOOT:CPMUTIL

The screen displays:

```
CPMUTIL [1.4 ']: CORVUS APPLE CP/M UTILIT
©COPYRIGHT 1981, 1982, 1983 CORVUS SY
```

VALID OPTIONS ARE:

```
D — CP/M DIRECTORY LISTING
I — INITIALIZE CP/M VOLUME
U — UPDATE CP/M SYSTEM FILE [SYSTEM.A
V — LIST CP/M VOLUME NAMES
X — TRANSFER CP/M FILE
Z — INITIALIZE CP/M DIRECTORY
```

```
Q — QUIT
```

```
ENTER OPTION [<SPACE>, <OPTIONS>]: _
```

3. Press V

The screen displays something like the following:

VOLUME	DRIVE	BLOCK	LENGTH
CPMSYS	1	1288	512
CPM1	1	1800	2048

The name of the volume is followed by the drive on which it resides, its starting disk address and the size of the volume in terms of Pascal blocks.

4. Once the names of the volumes are known, the CP/M directory can be viewed.

Press D

The screen displays:

ENTER CP/M VOLUME NAME:

5. Enter the name of a mounted CP/M volume, followed by **[RETURN]**. For example:

Type CPMSYS **[RETURN]**

The screen displays something like the following:

APDOS	.COM	2K	: DDT	.COM	6K	:
ASIO	.COM	2K	: DOWNLOAD.COM	2K	:	
ASM	.COM	8K	: DUMP	.ASM	6K	:
CONFIGIO.BAS		10K	: DUMP	.COM	2K	:
COPY	.COM	2K	: ED	.COM	8K	:
CPM56	.COM	12K	: FORMAT	.COM	4K	:

The files contained in the CP/M volume are listed along with the amount of space each file requires and the total space consumed by all files. The chances are great that the smallest space consumed by any one file matches the cluster size for that particular volume (the file sizes are rounded up to the nearest whole cluster size).

6. Other CP/M volumes may be viewed in a similar manner. Once all viewing of CP/M volumes has been done from Pascal, exit the CPMUTIL program.

Press Q

The screen displays the Pascal command line.

Transferring CP/M Files to Pascal for Printing

- Transferring CP/M files to the Pascal environment is very useful, especially in printing and in the sharing of a printer in a network environment.
1. To transfer files from CP/M to Pascal, start from the Pascal command line.

Press X

The screen displays:

EXECUTE WHAT FILE? __

2. Type CPMBOOT:CPMUTIL

The screen displays:

CPMUTIL [1.4]: CORVUS APPLE CP/M UTILIT
°COPYRIGHT 1981, 1982, 1983 CORVUS SY

VALID OPTIONS ARE:

D — CP/M DIRECTORY LISTING
I — INITIALIZE CP/M VOLUME
U — UPDATE CP/M SYSTEM FILE (SYSTEM.A
V — LIST CP/M VOLUME NAMES
X — TRANSFER CP/M FILE
Z — INITIALIZE CP/M DIRECTORY

Q — QUIT

ENTER OPTION [<SPACE>, <OPTIONS>]: __

3. **Press X**

The screen displays:

ENTER CP/M VOLUME NAME: __

4. Enter the name of the volume which contains the file to be transferred from CP/M to Pascal, followed by **RETURN** .
For example:

Type CPMSYS **RETURN**

The screen displays:

ENTER CP/M FILE NAME TO TRANSFER: __

5. Enter the name of the file to be transferred, followed by **RETURN** . For example:

Type JOHN.DOC **RETURN**

The screen displays:

OUTPUT FILE NAME MAY BE ONE OF THE FOLLO

CONSOLE:
PRINTER:
SPOOL:
<FILE NAME>

ENTER OUTPUT FILE NAME: __

6. The SPOOL option has not yet been implemented. Choose to output the file either to the console, to a local printer, or to a file name. Enter the output name, followed by **RETURN** . For example, if the output desired was to a file, the user would enter the name of the Pascal volume and a desired file name in the form:

Type PSCLVOL:JOHN.TEXT **RETURN**

The file is output and the screen displays:

ENTER OPTION [<SPACE>, <OPTION>]: __

The CP/M file which is now in the Pascal format can now be spooled to the pipe area for printing if this is desired.

UPGRADING TO OMNINET

A

Corvus Systems produced a product for the Apple II under CP/M from November 1981 to January 1983 which only worked over flat cable (single disk or multiplexer systems), not Omninet. The present system supports both flat cable and Omninet. Some users will wish to upgrade their existing flat cable system to Omninet. This may be done without any data loss by following the steps below.

1. From all CP/M areas of the disk, remove the following files:

MOUNT.COM
COPY.COM
FORMAT.COM
APDOS.COM
CBIOS.COM
CBOOT16.COM
CSPATCH.BAS
CSCONFIG.BAS
CONFIGIO.BAS
REBOOT.COM
CONFIGIO.DTA

To remove a file, use the erase command of CP/M.
For example:

Type ERA MOUNT.COM

Especially important is the removal of any CONFIGIO.DTA file. Any existing CONFIGIO.DTA file will contain addresses which are incompatible with the new software from Corvus; failure to remove the existing file will result in the loss of the ability to boot CP/M.

2. Copy the COM files from the Corvus-supplied CP/M format diskette to the CPMSYS volume (volume A:). To copy the COM files, use the PIP command. For example:

Type PIP A:=C:*.COM

3. From the Corvus-supplied CP/M format diskette, copy the file CCONFIG.BAS to CPMSYS calling the file CONFIGIO.BAS.

Type PIP A:CONFIGIO.BAS=C: CCONFIG.BAS RETURN

The new CONFIGIO.BAS can be used in the future to add in other peripheral devices.

4. From the Pascal area of the disk, remove the following files:

CPMBOOT.CODE [possibly renamed SYSTEM.STARTUP]
CPMUTIL.CODE
SYSTEM.APPLECPM

Use the Pascal filer to remove these files.

5. From the Pascal filer, use the K(RUNCH command to compress the files in the volume which contained the SYSTEM.APPLECPM file (CPMBOOT). Twenty-seven contiguous blocks are required for this file.
6. From the Corvus-supplied Pascal format diskette, copy all the files from the diskette to the CPMBOOT volume. Use the Pascal filer to transfer all files.
7. With twenty-seven contiguous free blocks in the CPMBOOT volume, and the prefix set to CPMBOOT, execute the CPMUTIL program and select the "U" option to recreate the SYSTEM.APPLECPM file. The two diskettes used during the creation of SYSTEM.APPLECPM are the CP/M operating system diskette from MicroSoft and the Corvus-supplied CP/M format diskette.
8. Execute CPMBOOT.CODE to boot into CP/M. The boot into CP/M should cause no problems. If a mount error is encountered when the last Corvus volume is being mounted, the allocation table in memory has been overloaded. The available space in the allocation table shrunk approximately 400 bits during the upgrade to Omninet. If the allocation table had already been stretched to near its limit, a mount error may be encountered.

This problem may be remedied in one of two ways. One way is to remove any diskette drive from the Apple when using the configuration which causes a mount error; if a diskette drive is not present, approximately 400 bits are released in the allocation table for use by Corvus volumes. If the diskette drive is essential, the block allocation size of one of the Corvus volumes must be increased.

To increase block allocation size of a volume, one must be able to boot CP/M so as to remove all files from the volume and reinitialize the volume. To circumvent the mount error, limit the CP/M volumes mounted to only CPMSYS and the volume whose block allocation will be changed. Boot into CP/M and save all files in the volume whose block allocation size will be changed. Once all files are saved, reinitialize the volume with a larger block allocation size and zero its directory using the CPMUTIL program. After reinitialization, files can be placed back in the volume. The original mount configuration can then be reproduced and CP/M booted without any mount error.

