

# PLAN 4000™

File Server  
Apple II CP/M User's Guide

**NESTAR**

---

NESTAR SYSTEMS, INCORPORATED

PLAN 4000 (TM)

FILE SERVER

APPLE // CP/M  
USER'S GUIDE

## DISCLAIMER OF WARRANTIES

The information in this document has been carefully reviewed and is believed to be reliable; nevertheless, Nestar Systems, Incorporated makes no warranties, either express or implied, with respect to this manual or with respect to the software described in this manual, its quality, performance, merchantability, or fitness for any particular purpose. The entire risk as to its quality and performance is with the buyer. The software herein is transferred "AS IS".

Nestar Systems, Incorporated, reserves the right to make changes to any products described herein to improve their functioning or design. Nestar programs are licensed products whose use is defined in the Nestar System Software License Agreement. Server Programs usually require a separate license for each machine on which they run.

In no event will Nestar Systems, Incorporated be liable for direct, indirect, incidental, or consequential damages at law or in equity resulting from any defect in the software, even if Nestar Systems, Incorporated has been advised of the possibility of such damages. Some states do not allow the exclusion or limitation of implied warranties or liability for incidental or consequential damages, so the above limitation or exclusion may not apply to you.

The Regents of the University of California, Apple Computer, Inc. and International Business Machines, Inc., make no warranties, either express or implied, regarding the computer software programs described herein, their merchantability or their fitness for any particular purpose. UCSD, UCSD Pascal, UCSD p-System are all trademarks of The Regents of the University of California. CP/M is a registered trademark of Digital Research, Inc. Z-80 is a registered trademark of Zilog, Inc. Softcard is a trademark of Microsoft Consumer Products.

This document is copyrighted and all rights are reserved. This document may not, in whole or part, be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form without prior consent, in writing, from Nestar Systems, Incorporated.

Copyright 1981, 1982, 1983 by Nestar Systems, Incorporated  
2585 E. Bayshore, Palo Alto, California, 94303  
(415) 493-2223 Telex 171420 Nestar PLA

Publication number SC40-0503-0  
All rights reserved.

## How to Use This Guide

This guide provides a description of those PLAN 4000 system functions that are specific to the Apple // CP/M environment.

When familiarizing yourself with the PLAN 4000 system, read first the General Information Manual.

For information pertaining to your network's file servers, which allow you to share hard disk storage with other network users, read the File Server User's Manual. A bibliography of PLAN 4000 system manuals and guides appears at the end of this guide.

The material in this document applies to Version 2.0 of the File Server software.

We welcome criticisms and suggestions. Forms for reporting program errors, documentation errors and inadequacies are provided at the back of this manual.



## Contents

Disclaimer .....	ii
How To Use This Guide .....	iii
Contents .....	v
Chapter 1 Starting Up	
1.0 Introduction.....	1-1
1.1 Booting CP/M Virtual Volumes.....	1-3
1.2 Creating Virtual CP/M Diskettes: CREATE.COM .....	1-4
1.3 Transferring Files To And From Real 5.25" Diskettes .....	1-7
1.4 Formatting Real Minifloppies: REALFMT.COM .....	1-8
Chapter 2 Using the Network	
2.1 The Network Command Program:NET.COM..	2-1
2.2 Placing a Bootable System on Virtual Volumes:COPYSYS.COM.....	2-10
2.3 Technical Note on Volume Tracks.....	2-11
2.4 Automatic Startup: TURNKEY.COM.....	2-14
2.5 Using A Terminal Instead Of A Console:NCONFIG.BAS.....	2-18
2.6 Helpful Hints to the Microsoft CPM User.....	2-18
2.7 Multiple File Servers and Multiple Networks.....	2-18
Chapter 3 Programming	
3.0 Using Network Commands in a Program..	3-1

## CONTENTS

3.1	Nestar Network Interface Routines to Pascal MT+ Programs.....	3-1
3.2	A Sample Program .....	3-7
3.3	Nestar Network Interface Routines to Z-80 Assembly Programs .....	3-10
3.4	Reading the Station Number from a Program.....	3-15

## Chapter 4 Utilities

4.1	SETPROFILE.....	4-1
-----	-----------------	-----

## Appendices

A	Error Messages.....	A-1
B	The BOOT Program.....	B-1
C	File Server Commands.....	C-1

## Index

## Bibliography

## Reader Comment Form

## Chapter 1

## Starting Up

1.0 Introduction

This guide assumes that you are familiar with the Apple // microcomputer and with CP/M.

The PLAN 4000 system allows Nestar users to execute CP/M 2.20 software at their stations, and to use network facilities to store data, print CP/M text files, and share data with other users.

Each Apple // user station running CP/M must have a Z-80 card installed, and have 64K bytes of memory. Three 80-column boards are supported: ALS Smarterm, M&R Sup'r'term, and Videx Videoterm. Their use is optional but recommended. A local 5.25" disk drive is optional and can be used to read and write data in standard Microsoft CP/M format.

The CP/M operating system runs on the network just as it does on a standalone microcomputer. However, there are extensions, which will be covered in this guide:

Virtual diskettes of variable size (Chapter 1)

Virtual and real disk drives (Chapter 2)

Issuing file server commands with the NET program (Chapter 2)

Issuing file server commands within a user's program (Chapter 3)



## STARTUP

Using the Nestar BOOT program (Appendix B), the user can specify a virtual CP/M volume to boot from. The CP/M operating system is loaded from the system tracks of the volume, and CP/M is initialized. The booted volume uses drive A: and the system is ready for use. (Normally, you will also have the shared CP/M library volume /MAIN/LIB/APPLE2/CPM accessed as H:.)

By using the Nestar NET program, described in Chapter 5 of the File Server User's Manual and Chapter 2 below, additional virtual volumes can be mounted on drives B: through H:. Each such volume can contain as much as 8 Megabytes of storage. The volumes can be used exclusively by a user (similar to real diskettes) or can be shared simultaneously by several users (usage, access, and protection are discussed in Chapter 3 of the File Server User's Manual).

Additional volumes can be dynamically created on the shared hard disk units, initialized by the user, and deleted when no longer needed. In order for a user to create additional volumes, he or she must be authorized to allocate space on the hard disk.

Real minifloppy disks can be used only if the controller card is plugged into slot 4 of the user station. After the utility program SETREAL is executed, drive 1 of slot 4 becomes drive E:, and drive 2 becomes F:. If drives E: and F: are needed once again for virtual diskettes, the utility program SETVIRT is used. Once SETREAL is executed, real diskettes can be formatted by use of the program REALFMT.

All of the standard CP/M utility programs will work without change on the Nestar CP/M system. They include PIP, STAT, ED, ASM, and DDT. None

of the standard Microsoft utilities will work, since they assume the use of real 5.25" diskettes.

In addition, most CP/M application programs that can be used on the Apple 56K CP/M system will work on the Nestar CP/M system. These programs will work correctly without changes if they do not require dynamic disk changes during program execution.

### 1.1 Booting CP/M Virtual Volumes

At power on, your station will display the Nestar logo and prompt

VOLUME TO BOOT?

As described in the File Server User's Manual, the network allows you to share hard disk space with other users. Hard disk space is divided into "virtual volumes", which are files formatted to resemble real diskettes.

Instead of inserting a real diskette at startup, you type in the "pathname" (the hard disk file name) of a virtual volume that is formatted to look like a CP/M diskette. The CP/M operating system will be loaded into your machine, just as happens when you boot a real diskette from a local minidisk drive.

Just as the network uses virtual volumes, it uses virtual drives. These are discussed in the File Server User's Manual and in Chapter 2 of this guide. To use a virtual volume, you must "mount" it on (that is, insert it into) a virtual drive.

Volumes are created, mounted, and otherwise

## STARTUP

handled by executing a program called NET and issuing commands from it. Just as PIP manipulates files within a diskette, real or virtual, the NET program manipulates virtual volumes and the drives they are mounted on.

In response to the "VOLUME TO BOOT?" prompt, enter the pathname of a virtual CP/M volume, and press <Return>. The Boot program will recognize that a CP/M disk is to be booted, and will mount the volume for READ/WRITE Update use on A:. A: is file server drive 1. (CP/M and file server drives are discussed in Chapter 2). Your boot volume should contain NET.COM, giving you access to the file server command program.

Most networks use a shared library volume. If such a volume exists, it is a good idea to use NET.COM to mount it, after booting, on drive 8 (H:) for READ/ONLY use:

```
MOUNT /MAIN/LIB/APPLE2/CPM,D8
```

It is possible to configure your boot volume so that the shared library volume is automatically mounted at boot time. Details are provided in Section 2.6.

### 1.2 Creating Virtual CP/M Diskettes: CREATE.COM

The program CREATE.COM creates bootable CP/M disks of variable size (from 32K bytes to approximately 8M bytes.)

To use CREATE.COM, boot a virtual CP/M volume containing the latest version of the CP/M operating system distributed by Nestar. If CREATE.COM exists on this volume, enter

```
CREATE <RETURN>
```

If the shared CP/M library volume is mounted on drive 8, then enter

```
H:CREATE <RETURN>
```

Otherwise mount on one of drives B: through F: or H: a virtual volume containing CREATE.COM and then issue the command:

```
B:CREATE <RETURN>
```

(here assuming the volume is on drive B). The program will prompt you for the pathname of the volume to be created, by displaying the following on the screen:

```
PLEASE ENTER THE PATHNAME OF THE VOLUME  
TO BE CREATED  
:
```

Network passwords are supported and are entered in the normal way when specifying the pathname for a new volume:

```
/MAIN/USERS/SMITH:PASSWORD/1
```

Note that passwords are not set on volumes being created. The PROTECT command, discussed in Chapter 3 of the File Server User's Manual, is used to set passwords on new volumes after they have been created. However, a password may have to be given for one or more of the directories or subdirectories that will contain the new volume, if these directories have passwords set on them.

After you supply a pathname, you will see the list of volumes sizes from which you must select:

## STARTUP

- |         |          |
|---------|----------|
| 0. 32K  | 5. 1024K |
| 1. 64K  | 6. 2048K |
| 2. 128K | 7. 4096K |
| 3. 256K | 8. 6144K |
| 4. 512K | 9. 8080K |

and the prompt

WHICH SIZE DO YOU WANT (0-9)?

After you respond to the prompt, the program summarizes your selection and asks you for verification. For example,

THE FOLLOWING VOLUME WILL BE CREATED:  
/MAIN/USERS/SMITH/CPM1,SIZE=512K

Once the creation process is complete, the program will prompt for the pathname of another volume to be created.

If you do not want to create another volume at this time, simply press <RETURN>.

Table 1 in Chapter 2 shows, for each of the volume sizes the actual contents of the DPB (Disk Parameter Block) that is placed within track 0, sector 0 of the virtual volumes created using CREATE.COM.

This program will leave the newly created volume mounted RW on drive G: You may then use PIP.COM to transfer files to the new volume.

### 1.3 Transferring Files To And From Real 5.25" Diskettes

Nestar CP/M is designed to enable the user to have mounted simultaneously 8 virtual CP/M volumes. Occasionally, users may wish to use real 5.25" diskettes (for example, to transfer CP/M files from 5.25" floppy diskettes to shared network storage, or from network storage to 5.25" diskettes).

The Nestar CP/M utility SETREAL.COM makes such usage possible, by temporarily making available to the operating system the software that allows the user to read and write to real minifloppy drives in addition to virtual volumes.

This software is positioned in the memory of your workstation in an area that is usually reserved for application programs, reducing the amount of memory available to user programs. However, PIP.COM does function correctly in the reduced user program space. (Other programs may not.)

SETREAL.COM resides on the shared CP/M library volume. After running SETREAL.COM you can use drives E and F as real minifloppy drives. The process for transferring CP/M files between virtual volumes and real diskettes is as follows:

1. Make sure that a floppy controller is in slot 4 of your workstation.
2. Run SETREAL.COM.
3. Use NET.COM to mount any necessary virtual volumes (do not mount them on drives 5 or 6, corresponding to CP/M drives E: and F:).

## STARTUP

4. Insert the necessary real diskette in the drive.
5. Use PIP.COM to accomplish the file transfer.

(E pertains to slot 4, drive 1; F pertains to slot 4, drive 2).

After all necessary file transfers have been done, run SETVIRT.COM to restore the original status of drives E and F, so that they are available for use with virtual volumes, and freeing up the memory referred to above.

### 1.4 Formatting Real Minifloppies: REALFMT.COM

To physically format real minifloppies, first use SETREAL.COM to set up drives E and F for use with real floppy drives; then insert a floppy disk in one of the drives and run REALFMT.COM, specifying E or F, as appropriate.

## Chapter 2

## Using the Network

2.1 The Network Command Program: NET.COM

The NET program is an interactive CP/M program supplied by Nestar, which allows a user to enter file server commands at the keyboard. NET is generally made available as a COM file in the default library volume. If NET is not found there, the system manager will know where it is installed.

Network file server commands are discussed in the File Server User's Manual.

The NET program sends each command, as entered, to the file server (except for the local commands described below). The file server executes the command. If there is an error, a numeric error code and an error message will be displayed. A complete list of error messages is found in Appendix A.

NET then redisplay on the user station screen its prompt (:) for another file server command to be entered. The cycle repeats until "Q" <return> or <esc><return> is entered; then control returns to the CP/M command level.

Network commands are discussed in Chapter 5 of the File Server User's Manual, with the exception of certain "local" commands, which are discussed below.

The following printout shows a sample session. User responses are shown in lower case to distinguish them from information displayed by CP/M and NET.



## THE NETWORK

(Commands can be entered in upper or lower case, screen display will actually include upper and lower case characters.)

```
A>h:net
```

```
Enter Network Command:
```

```
: mount lunch,d3,rw
109,ROOT DIR NOT SPECIFIED; NO DEFAULT

: set dir /main/users
```

[No message in response to a command indicates that the command was successfully executed.]

```
: show dir
/MAN/USERS

: mount lunch,d3,rw

: q (return)
```

```
A>
```

In this example, a user runs the NET program, which allows him or her to send commands to the file server. The user wishes to mount a virtual volume for use on the network. This volume, a portion of one of the networks' shared hard disks will be of type "C", formatted to resemble a real Apple // CP/M diskette.

The user does not enter the volume's full pathname, perhaps assuming that a part of the pathname will be added by a previously set default directory.

No such default "partial" pathname has been set, however, and an error message is returned. The

user then sets a default partial pathname, /MAIN/USERS, for future convenience, and asks that it be displayed ("SHOW DIR"). The user then mounts the desired volume and quits the NET program. Net commands are discussed in detail in the File Server User's Manual.

In addition to the commands that it sends to the file server, NET responds to a number of local commands that it executes itself. These commands are concerned with displaying the drive status (real or virtual) and network interface card slot number associated with each CP/M drive.

Remember that CP/M commands manipulate files within volumes (diskettes), real or virtual. Network commands (although they are issued from within the CP/M environment and are in that sense CP/M commands, too) manipulate the CP/M volumes themselves, not the files within them. For example, the MOUNT command "inserts" part of a network hard disk, formatted to look like a CP/M volume, into an imaginary drive for your use.

Network pathnames identify the files on network hard disks formatted to imitate real diskettes.

Commands available in the CP/M environment are:

CREATE*	SET A:	SHOW PROTECTION
DELETE	SET DIR	SHOW STATION
HELP	SET FS SLOT	SHOW TIME
LIST	SET FS STN	SHOW TYPE(S)
LOCK	SHOW DIR	SHOW VERSION
MOUNT	SHOW DRIVES	SHOW VOLS
OFF	SHOW INFO	STAMP TIME
PROTECT	SHOW LOCKS	UNLOCK
RENAME	SHOW MOUNTS	UNMOUNT

## THE NETWORK

\* CREATE should not be used to create CP/M virtual volumes. Use the CREATE.COM program instead.

The simplest way to issue a single Network command is to precede it with the word NET. For example,

```
A>NET LIST /MAIN
```

"NET" causes execution of the program NET.COM, which interprets the string that follows "NET", (in this case, "LIST /MAIN"), as a Network command. After the Network command is issued, the CP/M command prompt again appears.

Multiple commands can be issued in a single line like this:

```
A> NET SET DIR //USERS/LJS; LIST, NESTED;  
UNMOUNT ALL
```

To enter multiple commands one at a time, simply type

```
NET <RETURN>
```

which causes the prompt ':' to appear. After all Network commands have been entered and processed, type Q or QUIT to exit from the NET.COM program.

It is also possible to create a CP/M textfile that contains multiple Network commands. Use any editor available under CP/M to create such a textfile. If a file named "EXAMPLE.TXT" containing Network commands exists on the logged in volume, typing

```
NET EXAMPLE.TXT
```

will cause execution of all such commands.

Note that if commands are entered from a text file, no error checking is done. All commands in the file will be executed even if errors occur.

In cases where the user types "NET" followed by a single word, the word following "NET" first is assumed to be a filename. If no such file exists then the word is interpreted as a Network command. For example, if the user enters NET TIMESTAMP, the system will attempt to open a CP/M file called TIMESTAMP that would be expected to contain Network commands. If no such file exists, the system will send "TIMESTAMP" as a command to the network.

There is a direct correspondence between CP/M names for drives and the way drives are referenced when issuing network commands:

<u>CP/M</u>	<u>NETWORK</u>
A	D1
B	D2
C	D3
D	D4
E	D5
F	D6
G	D7
H	D8

### 2.1.1 SHOW DRIVES

This command displays the status of all the CP/M drives. The information displayed consists of the following:

## THE NETWORK

- the drive name.
- the slot and station of a file server for virtual drives
- the slot and the word "REAL" for real floppies
- the corresponding file server name for the drive (e.g. B: is D2)

The SHOW DRIVES display has the following format:

<u>DRIVE</u>	<u>STATUS</u>	
A:	SLOT=6	STN=\$FE D1
B:	SLOT=6	STN=\$FE D2
C:	SLOT=6	STN=\$FE D3
D:	SLOT=6	STN=\$FE D4
E:	SLOT=6	STN=\$FE D5
F:	SLOT=6	STN=\$FE D6
G:	SLOT=6	STN=\$FE D7
H:	SLOT=6	STN=\$FE D8
FS	SLOT=6	STN=\$FE

In this example, all drives have been set virtual to the file server station \$FE on the network accessed by the card in Slot 6.

### 2.1.2 SHOW FS

This command displays the default "virtual channel" (consisting of a network card slot number and file server station number) to which file server commands are currently being sent.

### 2.1.3 SET X:[,X:,...][VIRTUAL][SLOT n][STN \$nn]

This command sets the drive(s) virtual to the file server given by the slot/stn address. If VIRTUAL is specified instead of slot/station, the drive is set virtual to the current file

server channel. You cannot set a drive REAL with this command. You must use the SETREAL utility to do that.

Drive names in the range A: to H: are available. For example,

```
:SET C:,F: SLOT 5 STN $FD
:SHOW DRIVES
```

<u>DRIVE</u>	<u>STATUS</u>	
A:	SLOT=6	STN=\$FE D1
B:	SLOT=6	STN=\$FE D2
C:	SLOT=5	STN=\$FD D3
D:	SLOT=6	STN=\$FE D4
E:	SLOT=6	STN=\$FE D5
F:	SLOT=5	STN=\$FD D6
G:	SLOT=6	STN=\$FE D7
H:	SLOT=6	STN=\$FE D8
FS	SLOT=6	STN=\$FE

```
:SET C:,F: VIRTUAL
:SHOW DRIVES
```

<u>DRIVE</u>	<u>STATUS</u>	
A:	SLOT=6	STN=\$FE D1
B:	SLOT=6	STN=\$FE D2
C:	SLOT=6	STN=\$FE D3
D:	SLOT=6	STN=\$FE D4
E:	SLOT=6	STN=\$FE D5
F:	SLOT=6	STN=\$FE D6
G:	SLOT=6	STN=\$FE D7
H:	SLOT=6	STN=\$FE D8
FS	SLOT=6	STN=\$FE

In this example the user has set drives C: and F: virtual to the current file server channel. Here, a user station has used SET DRIVES to change drives C: and F: at his station virtual to the file server at slot 5, stn \$FD.

## THE NETWORK

### 2.1.4 SET FS [SLOT n] [STN \$nn]

Sets the default "virtual channel" for file server commands issued by NET or by subsequently run programs to the values specified. The initial default file server channel is the slot booted from (usually slot 6) and station \$FE.

### 2.1.5 NOECHO

Commands from a file (initiated by %filename) are usually displayed when they are executed; NOECHO suppresses this.

### 2.1.6 OFF

The OFF command initializes your user station: unmounts all MOUNTed files, unlocks all locks, resets any default directory and private or group passwords. OFF BRUNS the BOOT program.

In order to increase overall system efficiency, the OFF command should be given whenever a user is through using his or her Apple. This frees the memory and other resources assigned to the user station.

Giving this file server command is equivalent to turning power off and on at the workstation. Note that when the power is turned off at a user station, all file server virtual volumes that are mounted remain mounted. Locks remain held and default directory, if any, remains set. If files are mounted EXC RW, for example, they will not be available to other users. It is the OFF command (which is automatically issued by the Network BOOT program) that unmounts all volumes. Thus, in order to free memory space and leave

volumes available to other stations, it is necessary to use the OFF command, or to turn the machine off and on again to unmount volumes.

### 2.1.7 SPOOL TO/SPOOL OFF

The following local commands allow users to redirect command responses to a text file or local printer:

```
SPOOL TO device name|file name
SPOOL OFF
```

where device name may be LST: and file name is [x:]filename.txt (x designates the drive on which a CP/M virtual volume is mounted. If no drive is specified, the current disk is assumed).

SPOOL TO specifies the device or file to which all responses will be routed. The redirection will continue until SPOOL OFF is issued. If the specified file already exists or is the same as the current spool file, the user will be prompted to overwrite it. To determine the current spool file, simply enter SPOOL TO without a destination.

When spooling to a file, the file will be properly closed after any of the following:

1. SPOOL OFF
2. SPOOL TO some other file or device
3. QUIT from NET. (Whatever has already been written will be saved.)

NOTE: NET does not detect out of disk space condition when writing to a CP/M volume. The file name will always be created in the directory, but its contents may be empty or



## THE NETWORK

partial depending upon the amount of space available.

### 2.1.8 Other NET Inputs

The NET program also accepts the following inputs:

; <anystring>     Ignored as a comment.

PRINT <anystring>     Displays the text on the console.

command;command;...     Multiple file server commands are allowed on the same input line if they are separated by a semi colon.

%filename             Causes commands to be read in from the Pascal text filename specified.

### 2.2 Placing a Bootable System On Virtual Volumes: COPYSYS.COM

This program enables the user to make a virtual CP/M volume bootable, or to update an existing bootable CP/M volume. COPYSYS.COM uses the system on the virtual volume mounted on drive A as the source for this transfer process.

To use the program, boot a CP/M volume containing the latest version of the NCPM operating system. IF COPYSYS.COM exists on this volume, simply enter

COPYSYS <RETURN>

If the shared CP/M library volume is mounted on

drive 8, enter

H:COPYSYS <RETURN>

Otherwise, mount a volume containing COPYSYS.COM, on any available drive (except G, drive 7).

Type COPYSYS to begin the system-transfer process. If COPYSYS.COM is not on the logged-in volume, precede the name of the program by the name of the appropriate drive. For example,

C:COPYSYS <RETURN>

if the volume is mounted on drive 3. The program will prompt the user for the pathname of the CP/M virtual volume on which the operating system tracks are to be replaced.

Network passwords are supported and are entered in the normal way when specifying the pathname of the destination volume:

/MAIN/USERS/SMITH:PASSWORD/1:PASSWORD

Once the transfer process is complete, the program will unmount the updated volume and prompt for the pathname of another volume to be updated.

If you do not wish to update another volume at this time, simply press <RETURN>.

### 2.3 Technical Note On Volume Tracks

The Nestar implementation of CP/M uses volumes having 32 128-byte sectors per track. Tracks 0, 1 and 2 are reserved for the operating system. The first 6 bytes of track 0 of virtual volumes

## THE NETWORK

created using CREATE.COM contain the Nestar CP/M signature ("NCPM", followed by a version number). The Nestar BOOT program checks the signature version number to ensure compatibility between the BOOT program and the operating system contained on the virtual volume being booted. For example, NCPM02 is compatible with Nestar BOOT 1.2 or later.

The following table shows for each of the volume sizes, the actual contents of the DPB (Disk Parameter Block) that is placed within track 0, sector 0 of the virtual volumes created using CREATE.COM. (See Section 1.2).

The DPB (Disk Parameter Block) starts in byte 16 of track 0 and takes up 120 bytes.

Table 1  
(All numbers are in decimal)

	<u>32K</u>	<u>64K</u>	<u>128K</u>	<u>256K</u>	<u>512K</u>	<u>1024K</u>	<u>2048K</u>	<u>4096K</u>	<u>8192</u>	<u>16384</u>	<u>8080K</u>
Block Size (Bytes)	1024	1024	1024	2048	2048	2048	4096	8192		16384	16384
Sectors Per Track (SPT)	32	32	32	32	32	32	32	32	32	32	32
Block Shift Factor (BSH)	3	3	3	4	4	4	5	6		7	7
Block Mask (BLM)	7	7	7	15	15	15	31	63		127	127
EXTENT MASK (EXM)	0	0	0	1	1	0	1	3		7	7
Total Storage (BLK SIZE UNITS (DSM))	32	64	128	128	256	512	512	512		384	505
# of Directory Entries (DRM)	48	48	48	128	128	128	128	256		256	256
Reserved Directory Blocks (ALO,AL1)	2	2	2	2	2	2	1	1		1	1
Directory Chk Vector (CKS)	48	48	48	48	48	48	48	48		48	48

4/1/83

2-13

## THE NETWORK

### 2.4 Automatic Startup: TURNKEY.COM

Use of the Network SETPROFILE utility program (Chapter 4) allows you to autoboot a CP/M volume at power on.

Whether you autoboot or not, you can have network commands and CP/M commands issued automatically when you boot a volume.

When booting, CP/M will look for a single command in a special location on the volume. To place the command there, use the program TURNKEY.COM (discussed in the following section).

If the single command at startup is

SUBMIT filename

where filename is the name of a file ending in .SUB, all the CP/M commands listed in EXAMPLE will be executed in turn. In this way, you can execute as many commands at startup as you like, automatically, by listing them in the .SUB file. Any CP/M editor can be used to create a .SUB text file of CP/M commands. Placing commands in a .SUB file is discussed further in Section 2.4.2 below.

#### 2.4.1 TURNKEY.COM

The program TURNKEY.COM predefines a CP/M command that is automatically executed when a CP/M virtual volume is booted.

To use the program, boot a CP/M volume. If TURNKEY.COM exists on this volume, simply enter

TURNKEY <RETURN>

If the shared CP/M library volume is mounted on drive 8, enter

```
H:TURNKEY <RETURN>
```

Otherwise, mount a volume containing TURNKEY.COM on any available drive (except G, drive 7).

Type TURNKEY to begin the process. If TURNKEY is not on the logged in volume, precede the name of the program by the name of the appropriate drive. For example,

```
C:TURNKEY <RETURN>
```

if the volume is mounted on drive 3. The program will prompt the user for the network pathname of the CP/M virtual volume on which a CP/M command is to be predefined.

Network passwords are supported and are entered in the normal way when specifying the pathname of the destination volume:

```
/MAIN/USERS/SMITH:PASSWORD/1:PASSWORD
```

The program then displays the currently set "turnkey" command and allows the user to specify whether or not the command should be altered. If so, the program asks the user for the desired CP/M command (<RETURN> clears the existing predefined command).

Once the TURNKEY process is complete, the program will unmount the updated volume and prompt for the pathname of another volume to be updated. If you don't wish to update another volume at this time, simply press <RETURN>.

Any legitimate CP/M command can be specified, for example:

## THE NETWORK

```
DIR B:  
STAT A:*.*
```

or

```
SUBMIT ACCTPAY
```

### 2.4.2 SUBMIT.COM

If the single startup command placed on your volume by TURNKEY is

```
SUBMIT filename
```

where filename.SUB is a file containing a list of commands, those commands will be executed automatically at startup.

To create this SUBMIT file, use any available editor under CP/M. The suffix of the filename must be SUB. An example of the contents of a SUB file:

```
NET MOUNT /MAIN/USERS/DOE/DATA1,D2,RW,EXC  
AP
```

This example consists of two separate CP/M statements:

```
NET MOUNT /MAIN/USERS/DOE/DATA1,D2,RW,EXC
```

and

```
AP
```

The virtual volume /MAIN/USERS/DOE/DATA is mounted on drive 2 for Read/Write Exclusive usage (access and usage commands are discussed in Chapter 4 of the File Server User's Manual). Next, the program named AP is run.

To send multiple commands to the network,

separate the commands by a semicolon. For example,

```
NET LOCK KEY1; LOCK KEY2; LOCK KEY3
```

As can be seen, using SETPROFILE, TURNKEY, SUBMIT and NET, it is possible to create a complete turnkey system (that is, one that will execute the desired applications program at power on). To review the steps:

1. Use the SETPROFILE utility program, described in Chapter 4, to configure your system to autoboot the desired virtual CP/M volume at power on.
2. Create the virtual CP/M volume to be booted using CREATE.COM, and place on it the files

```
NET.COM
SUBMIT.COM
example.SUB
applications.COM
```

where "applications.com" is the name of the applications program to be autorun, and "example.SUB" is the name of the file into which you will place your startup commands.

3. Use TURNKEY.COM to place the turnkey command "SUBMIT example" on the CP/M virtual volume to be booted.
4. Use a CP/M editor to place the command

```
applications
```

in the example.SUB file (that is, the command to run the desired applications program), together with any necessary NET commands.



## THE NETWORK

### 2.5 Using a Terminal Instead of a Console: NCONFIG.BAS.

NCONFIG.BAS is a modification of the CONFIG.BAS, which allows the user to configure the Nestar CP/M operating environment with respect to the specific console hardware being used.

It is possible for users to configure their CP/M system for an external terminal and/or redefine keyboard characters, and then permanently save such changes. For a detailed explanation of how to use this program, see Volume II of the Microsoft CP/M Manual, Page 5-16.

### 2.6 Helpful Hints to the Microsoft CP/M User

1. Don't use the Microsoft Utility FORMAT.COM to format virtual volumes.
2. When using Nestar CP/M, don't use any Microsoft supplied programs except those on the shared CP/M library volume /MAIN/LIB/APPLE2/CPM.

### 2.7 Multiple File Servers

PLAN 4000 systems may have more than one file server on the same network. In addition, user stations may be attached to more than one network.

A user station identifies file servers by the number of the slot containing the network interface card for the network that the file server is attached to, and by the station number for the file server on that network.

User stations have two kinds of communications

with file servers: users may issue commands to the file server, and may issue I/O requests for virtual drives. A user station may be configured so that it has virtual disks mounted on a number of different file servers at the same time. The user can then access any combination of these virtual disks, just as if they were real disks, regardless of what actual file server station they are stored on.

The commands SET FS and SET DRIVES allow the user to configure his or her 'drives' to correspond to virtual disks on various file servers. These commands can set drives A:-H: to be real or virtual, to define which file server the drives are connected to, and to set a default "virtual channel" that will be used when file server commands are issued.

There are many interesting and complex system configurations that can be constructed using multiple file servers, but they are all built upon the same basic primitive operations. As an example, suppose that it is necessary to manually transfer a file within a CP/M volume from one file server to another on the same network.

Assume that, in addition to the primary file server on station \$FE, the system manager has installed another file server as station \$FD. The following procedure will transfer a file called "XREF.TXT" from CP/M volume "/MAIN/USERS/LJS/1" on the primary file server (\$FE) to the CP/M volume "/MAIN/ARCHIVE/CVOLS" on the second file server (\$FD):

1. Boot a CP/M volume from the primary (\$FE) file server.

## THE NETWORK

2. From the command level of the CP/M system, run the NET program. Issue the following commands:

```
SET DRIVE C: VIRTUAL
(set C: virtual to $FE)
```

```
MOUNT /MAIN/USERS/LJS/1,D3
(mount the source volume)
```

```
SET FS STATION $FD
(change default file server)
```

```
MOUNT /MAIN/ARCHIVE/CVOLS,D4,UPD
(Mount the destination volume on file server
$FD)
```

```
SET DRIVE D: VIRTUAL
(Sets D: virtual to the default file server,
which is now station $FD)
```

```
SET FS STATION $FE
(Restore the default file server for
future commands)
```

```
QUIT
(Exit from NET)
```

You can use the "SHOW DRIVES" command to see the status of drives and the file server command channel.

3. Use PIP.COM to copy from C: to D:

```
PIP D:=C:XREF.TXT
```

The file will be copied from the \$FE file server to the \$FD file server.

This example is "manual" in the sense that the commands are typed interactively. The same

operations can be performed from within a program by using the CMDUNIT unit provided with the system to issue the commands, and then using CP/M I/O of any kind to transfer the data. Other interesting additions, such as using symbolic or indirect names instead of the file server station numbers, can be added at the same time.



## Chapter 3

## Programming

3.0 Using Network Commands In A Program

The use of Network commands within programs used in the CP/M environment is currently supported for two languages: Pascal MT+ and Z-80 Assembly language.

In Pascal MT+, use the routines in NWLIB.ERL (documented in this chapter).

In Z-80 Assembly language, use the routines in NWRTRS.REL (documented in Section 3.4).

3.1 Nestar Network Interface Routines to Pascal MT+ Programs

Nestar provides Pascal MT+ "modules" that allow the Pascal MT+ user to write programs that issue commands to the file server. The module library distributed is called

NWLIB.ERL

and contains the following modules:

CMDUNIT - a Pascal MT+ module that allows programs to issue file server or local commands (i.e., any command accepted by the NET utility program). In fact, this is the unit that the NET utility program uses. This unit requires the module NETUNIT, also contained NWLIB.ERL.

NETUNIT - a Pascal Mt+ module that allows programs to issue commands to servers on the network (local commands are NOT accepted here)

## PROGRAMMING

and optionally gets responses back for processing by the program.

Programs using procedures contained within these modules need appropriate type and external procedure declarations. The shared CP/M library volume contains four text files that can be included in Pascal MT+ programs:

NETUNIT.TYP - contains several type declarations required in programs that use procedures from NETUNIT.

NETUNIT.FNS - contains external procedure declarations required in programs that use procedures from NETUNIT.

CMDUNIT.TYP - contains several type declarations required in programs that use procedures from CMDUNIT.

CMDUNIT.FNS - contains external procedure declarations required in programs that use procedures from NETUNIT.

Programs using procedures from either module need to be linked with NWLIB.ERL. When specifying files to be linked it is necessary for the last two specified files to be NWLIB.ERL and PASLIB.ERL. The order of linking is also important. NWLIB.ERL must appear before PASLIB.ERL. For example:

```
LINKMT PROGNAME, NWLIB/S,PASLIB/S
```

### 3.1.1 CMDUNIT

If the user wants to execute file server or local commands (just as the NET utility program does), then the Pascal Mt+ procedure CMD or

CMDLOOP in CMDUNIT should be used.

The CMD procedure has the form:

```
CMD (command, options)
```

where:

COMMAND is a string variable whose value is the file server command or local command to be executed.

OPTIONS is an integer variable which must be set to:

- 0 - don't echo command if error.
- 1 - do echo command if error.

Examples:

```
CMD('show mounts',0);
CMD('show drives',0);
CMD('mount /main/A,D2',1);
```

For programs in which the user enters file server or local commands from the keyboard until the user types QUIT or <escape>, the CMDLOOP procedure is provided. It has the form:

```
CMDLOOP (PROMPT);
```

where:

PROMPT is the string variable whose value is the prompt to be issued to the user.

Examples:

```
CMDLOOP(' : ');
CMDLOOP('FS command or QUIT: ');
```



## PROGRAMMING

### 3.1.2 NETUNIT

NETUNIT consists of three procedures: NFSCMD, NFSCMD0, NFSCMD1. To execute a file server command and get the return code back for evaluation by the program, use the NFSCMD procedure. The procedure has the form:

```
RC := NFSCMD (CHAN, CMD, RSP);
```

where:

RC is an integer representing the "return code" sent back by the file server (see Appendix A for a list of return codes and their meanings). A return code of 0 means no errors.

CHAN is pointer to a data record that describes a slot/station address that the command be sent to.

CMD is a string variable whose value is the file server command to be executed.

RSP is a string "VAR" variable whose value is set to the last response line sent back by the file server. Intermediate response lines are automatically displayed on the screen. If the command has been executed successfully, then the last response is usually "OK". Otherwise, the last response contains the error message text.

If CHAN = NIL, the command will be sent to the current default file server slot/stn, otherwise it will be sent to the file server represented

by CHAN. All intermediate response lines are written to the screen.

Note: The NFSCMD procedure may wait an arbitrarily long time for the network to become available so that the command can be sent to the file server. This wait may be inappropriate if the program needs to check for other events frequently (such as key presses). For this reason, there is also a NFSCMD0 procedure. The procedure has the form:

```
RC := NFSCMD0 (CHAN, CMD,RSP);
```

which is identical to NFSCMD, except that the procedure will not retry if the network is not immediately available. The calling program should retry (and check for other events). For example:

```
repeat
```

```
RC := NFSCMD0 (CHAN,CMD,RSP);
```

```
..check other events here..
```

```
until RC <> 98; (*repeat until not network
error (busy)*)
```

To execute a file server command and get all the responses back for evaluation, (including those usually displayed on the screen without program intervention), use the NFSCMD1 procedure. The procedure has the form:

```
RC := NFSCMD1 (CHAN, CMD,RSP,NEWCMDFLAG,DONE);
```

where:

RC is an integer representing the "return code" sent back by the file server.

## PROGRAMMING

CHAN is a data record that describes a slot/station address that the command is to be sent to.

CMD is a string variable whose value is the file server command to be executed when NEWCMDFLAG is set to TRUE. When NEWCMDFLAG is set to false it is ignored.

RSP is a string "VAR" variable whose value is set to the next (or first) response line sent back by the file server.

NEWCMDFLAG is a boolean variable whose value is TRUE when a command is initially sent to the file server. It is FALSE on successive calls which get the next response lines.

DONE is a boolean "VAR" variable. Its initial value is ignored and it is set to TRUE if this is the last response line and FALSE if there are more response lines.

CHAN is of type CHANNELTYP which is

```
CHANNELTYP = Packed Record
Slot: 0..255
STN: 0..255
PORT:INTEGER
END;
```

For example, a program fragment might contain:

```

CMD := 'file server command';
RC := NFSCMD1 (CHAN,CMD,RSP,TRUE,DONE);
WHILE NOT DONE DO BEGIN
    RC := NFSCMD1(CHAN,CMD,RSP,FALSE,DONE);
END;

```

### 3.2 A Sample Program

The following program, MININET, demonstrates the use of NFSCMD to send commands to the file server with a Pascal MT + program. The MININET program will get an input line from the user and send it to the file server for execution.

MININET differs from NET in the following ways:

1. Both the code number and reply returned by the file server are displayed on the console.
2. The commands referring to the user's own drives (SHOW DRIVES, SHOW SLOT, SET STATION and SET DRIVE) are not available in MININET. They are executed by the NET program, using CMDUNIT, not by the file server.

To send a command to a different server than the current default, define a variable of TYPE CHANNELTYP with the desired Slot and Station # and pass a pointer to it (instead of NIL) as a parameter to NFSCMD.

## PROGRAMMING

```
PROGRAM MININET;
  TYPE
    (*$I NWLIB.TYP *)

  VAR
    RC: INTEGER;
    CMD,REPLY: STRING;
    (*$I NWLIB.FNS *)

  BEGIN
    WRITELN ('Mini Command Program');
    REPEAT
      WRITE ('FS COMMAND? ');
      READLN (CMD);
      IF LENGTH (CMD) <> 0 THEN BEGIN
        RC := NFSCMD (NIL,CMD,REPLY);
        (* Send command to
           default FS *)
        WRITELN (RC,',',',',REPLY)
        END;
      (*All done if nothing typed*)
    UNTIL LENGTH (CMD) = 0;
    WRITELN ('Ciao.')
```

END.

A sample execution of the MININET program :

```
Mini Command Program
FS COMMAND? show date
DATE IS 03/10/81
0,OK
FS COMMAND? foò
1,ILLEGAL COMMAND
FS COMMAND?
Ciao.
```

Any programs written by the user that include routines from NWLIB.ERL need the appropriate external declarations, which are shown in the following examples.

```
external function nfscmd (chan:channeltyp;
cmd:string; var rsp: string): integer;
```

```
external function nfscmd0 (chan:channeltyp;
cmd: string; var rsp: string): integer;
```

```
(* NFSCMD and NFSCMD0 send FS commands to the *)
(* FS command channel represented by CHAN, or *)
(* the current default if CHAN = NIL *)
(* *)
(* NFSCMD retries if there is a network error *)
(* (such as "bus busy"), and NFSCMD0 does not. *)
(* *)
(* Returns final line of response in RSP and *)
(* the FS return code in function result *)
(* (e.g. RSP = "OK" and NFSCMD = 0. Any *)
(* intermediate response lines are displayed *)
(* on the screen. *)
```

```
external function nfscmd1 (chan : channeltyp;
cmd:string; var rsp: string; timel: boolean; var
thru: boolean): integer
```

```
(* NFSCMD1 is used to intercept ALL FS *)
(* response lines rather than allowing *)
(* intermediate responses to be *)
(* displayed on the screen. NFSCMD1 is called *)
(* once for each line of response. TIME1 *)
(* each line of response. TIME1 should be true *)
(* for the first call and DONE will be set *)
(* true when the last response line as been *)
(* received. When DONE = true code. *)
```

```
external procedure chaninfo (drvnum: integer;
var chan: channeltyp);
```

## PROGRAMMING

(\* CHANINFO returns information about the virtual channel connection information or the specified CP/M drive number (DRVNUM) (1-8). If DRVNUM=0 then the file server channel connection information is returned.)

If DRVNUM < 0 or the requested drive is real, then slot/stn/port = 0/0/0 are returned

external procedure chanset (drvnum: integer;  
chan: channeltyp);

(\* CHANSET sets the specified CP/M drive 1-8 or file server if drvnum=0 virtual channel connection to the channel specified. THIS PROCEDURE IS TO BE USED FOR VIRTUAL DRIVES ONLY. It will NOT change a virtual drive to real or vice versa.)

### 3.3 Nestar Network Interface Routines to Z-80 Assembler Programs

The following routines allow Z-80 programmers to send commands to a file server and receive back the responses. These routines are contained in the file NWRTRS.REL distributed as part of Nestar CP/M support. NWRTRS.REL should be linked with any programs that call any of these routines.

NCMD0 Sends a command to a file server. (This routine will NOT retry if the network is unavailable.)

Calling convention:

(NOTE:REGISTERS ARE NOT SAVED)

Stack on entry: return address  
                  pointer to RESP string  
                  pointer to CMD string

Stack on exit: function value

The resulting function value will be:

0 if the command was successfully sent to the file server.

> 0 if the transmission was unsuccessful but retry is possible

< 0 if the transmission was unsuccessful and retry is impossible (e.g. user-abort)

NREAD Reads the response from the previously issued file server command.

Calling convention:(NOTE:REGISTERS ARE NOT SAVED)

Stack on entry: return address  
pointer to RESP string

Stack on exit: function value

The resulting function value will be:

0 if reception was successful and the RESP is not the last line of the response

-1 if reception was successful and the RESP is the the last line of the response OR the user has aborted

> 0 if a retryable error has occurred

NCHAN Sets the current file server channel to the slot/stn values contained in register pair BC. Returns the previous value in registers DE.



## PROGRAMMING

Entry conditions:

Register B contains desired slot #

Register C contains desired stn #

Exit conditions:

Register D contains previous slot #

Register E contains previous stn #

Note that the previous channel information is returned for use in later restoring the default state.

Details about using the network routines described above:

\* Z-80 programs that call these routines need to have external declarations

```
EXT      NCMDO,NREAD,NCHAN
```

\* The strings (CMD and RESP) are "Pascal-like" strings; that is the first byte contains the length of the string. The user is responsible for allocating a large enough string to hold the response. (80 characters is sufficient to handle present file server response lines.)

Flow of a program that issues a file server command and receives the related response.

```
ext      ncmd0,nread
```

```
start:           ; set up stack as  
                 ; indicated above
```

```
call ncmd0
```

```
case return value ; on stack
```

```
> 0 : if you want to retry  
      then go to start else quit
```

```

< 0 : quit      ; user abort

= 0 :           ; successful transmission
                ; so read file server response

end case

repeat          ; set up stack as indicated
                ; above

    call nread
    process RESP ; by sending to the console
                ; if desired

until return
value = -1      ; last line of response
                ; (or user abort)

end

```

The following is a listing of a Z-80 program that sends the command "SHOW MOUNTS" to the file server and then reads the response and sends it to the console.

A Sample program:

```

ext      ncmd0,nread
;
bdos     equ      5      ; these 2 lines are only
                        ; necessary so that
constf   equ      2      ; info can be sent to
                        ; the console, if the
;          return message is not
;          to be displayed then
;          there's no need to
                        ; define these constants
        ld      hl,cmd  ; starting address of
                        ; network command
        push    hl
        ld      hl,resp ; network routine

```

PROGRAMMING

```

                                indicates result here
    push    hl
;
retry: call    ncmd0    ; send the message to the
                                network
    pop     hl    ; check function value
                                (0=success,>0 if
                                ; unsuccessful but retry
                                ; possible and
                                ; <0 if unsuccessful and
                                ; retry not possible

    ld     a,1
    cp     0
    jp     z,ok    ; here wish to retry if
                                not successful

    ld     hl,cmd
    push   hl
    ld     hl,resp
    push   hl
    jp     retry
ok:    ld     hl,resp ; set up stack for call
                                to read response

    push   hl
;
readit:call   nread    ; read a line of the
                                response
    call   prline    ; display response
                                line of the screen

    pop    hl
    ld    a,1
    cp    255    ; check if this line
                                is last line of
                                response

    jp    z,check
    ld    hl,resp ; set up stack before
                                network call to get
                                the next line of the
                                response

;
    push   hl

```

```

                jp      readit
;
check:  jp      0      ; after displaying
                ;     entire message, stop

prline: ld      hl,resp
        ld      a,(hl) ; get length
        or      a
        ret     z
        ld      b,a
        ld      c,0
        inc     hl
loop:   push    bc
        push    hl
        ld      e,(hl) ; get char
        ld      c,consf ; put function number
                ;     in c reg
        call    bdos
        pop     hl
        inc     hl
        pop     bc
        djnz   loop    ; loop until through
        ld      e,10   ; carriage return
        ld      c,consf
        call    bdos
        ret

cmd:    db      11
        db      ^SHOW MOUNTS
resp:   ds      255
        end

```

### 3.4 Reading the Station Number From a Program

It may be useful to read the station number (1 to 255) from within a program. To obtain the station number, issue to the file server the command "SHOW STATION" and read the corresponding response, parsing it to obtain the station number.

## PROGRAMMING

Using Pascal, follow the examples given in the previous sections, using one of the procedures in the NETUNIT unit to issue the command "SHOW STATION". The response string will have the form

```
STATION IS $nn
```

By parsing this string, you can obtain the station number (in hexadecimal form).

The station number can be obtained in decimal form from any Pascal program that uses the unit NETUNIT. When such a program is executed, part of the initialization process for the NETUNIT unit is the loading of the station address of each network interface card into an array called MYSTN (MYSTN: ARRAY [0..7] OF INTEGER). Thus, if the NIC in a user's station is in slot 6, the address of the NIC can be found in MYSTN [6].

A value of 0 in the MYSTN array for a particular slot indicates that the slot does not contain a network interface card.

## Chapter 4

## Additional Utilities

4.1 SETPROFILE

The BOOT program supports station dependent profiles (virtual volumes containing boot defaults for your station). Each station can have its own autoboot defaults, which are invoked when the station is powered on. If a profile record is not present for a particular station, a systemwide default profile is used. The system manager sets these defaults using SETPROFILE.

The profile records are file server binary (T=B) files, each 2 blocks long (size=2.B). The record /MAIN/SYSTEM/PROFILE/\$nn is used when station \$nn is powered on. If a station's profile is not present in /MAIN/SYSTEM/PROFILE, the profile for a default (/MAIN/SYSTEM/PROFILE/\$00) is used by BOOT. Therefore, /MAIN/SYSTEM/PROFILE/\$00 must be present. The default (\$00) profile distributed with the system can also be changed using SETPROFILE.

4.1.1 How To Use SETPROFILE

To use SETPROFILE, boot the virtual volume /MAIN/SYSTEM/SETPROFILE. The program will be executed automatically.

SETPROFILE will display the number of the station being used and will ask for the number of the station for which a profile is to be set.

When modifying a profile, a password may be specified for the profile by entering a colon

## UTILITIES

(:) and the password after the \$nn station number.

The program then prompts for each allowed default:

```
Boot volume: /MAIN/?
Boot automatically: NO?
Pascal access rights: RW,UPD?
DOS access rights: RW,UPD?
Library volume: /MAIN/LIB/APPLE2/UCSD/PASCAL
Station name: Virginia?
```

If no profile has already been set for the indicated station, the prompts display the defaults set in the system \$00 profile (shown in the example above), which is used if no individual station profile exists. Otherwise, the prompts list those defaults currently set in the station.

When configuring a station's profile for a Pascal boot volume, ignore the lines labeled:

```
DOS access rights
Pascal access rights
Library volume
```

Supplying a station name is optional. Such information is very useful if the station for which the profile record is being configured is a server station (i.e., file server or print server).

When the defaults have been entered, the program displays a summary and asks

```
OK to update profile (Y/N)?
```

Enter Y to accept the defaults, or N to re-enter the defaults.

## UTILITIES

When you choose to exit the SETPROFILE utility program, the network logo will appear on the screen. Power your machine off and back on to get the "Volume to Boot?" prompt./





## Appendix A

## Error and Information Messages

When the file server receives a file server command from a user station, it executes the command, if possible, and, in any case, returns two variables:

- return code - an integer between 0 and 200
- return message, such as OK, ILLEGAL COMMAND, or TYPE=APPLE // CP/M

Messages are of several types:

- information, such as OK, IN USE, TYPE=BINARY
- user errors such as syntax errors or attempting to access a Network file without the necessary access rights
- system errors such as memory full or disk full; these should be reported to the system manager.

In this list, messages are classified as:

general syntax

pertaining to a specific command

system errors

file system errors.

## ERRORS

### General Syntax (0-19)

0,OK

(Not an error.) The command was syntactically correct and was executed without error.

#### 1,ILLEGAL COMMAND

The command verb cannot be recognized, or cannot be executed from this user station operating system environment. The command verb is the first word of the command, and must be separated from the rest of the command with one or more blanks.

#### 2,NAME PARAMETER REQUIRED

The first parameter of the command must be a non-null pathname.

#### 3,UNRECOGNIZED PARAMETER

A keyword parameter was not recognized. Check the spelling carefully, and make sure that it is properly separated from the previous and following items with commas.

#### 4,ILLEGAL DRIVE NUMBER

A drive number must be specified with "D" followed by an integer in the range 1 to 8. Example: "D4".

#### 5,ILLEGAL STATION NUMBER

A station number must be specified as a two-digit hexadecimal number preceded with \$, in the range \$1 to \$FE. Example: "\$2D".

## 7,PARAMETER APPEARS TWICE

A keyword parameter appears more than once in a single command. There can only be one occurrence of a keyword parameter, even if multiple occurrences have the same value.

## 8,ILLEGAL TYPE PARAMETER

The "T=" value is not one of the legal volume types. It must be one of the following:

B (binary)	D (Apple // DOS)
P (Apple // Pascal)	Y (directory)
S (system)	C (Apple // CP/M)
3 (Apple /// SOS)	I (IBM PC DOS)
U (IBM PC p-SYSTEM PASCAL)	T (text)

Example: "T=P"

## 9,COMMAND TOO LONG

A file server command must be no longer than 80 characters. In unusual cases where this is a problem, long commands can often be shortened by using a default directory, or by assigning access rights in a subsequent PROTECT command.

## 10,PARAMETER TOO LONG

The new name given as the second parameter of the RENAME command must be no more than 15 characters long. Remember that RENAME changes only the last name in the sequence of names which constitute a pathname. If you wish to change the name of a directory, give the pathname of the directory itself as the first parameter of RENAME.

## ERRORS

### 11,ILLEGAL PROTECTION PARAMETER

The value of the PUBACC, GRPACC, or PRVACC protection item is incorrect. The value must be some combination of the letters RWECD (read, write, erase, create, and delete), or may be null. For example, "GRPACC=RW" or "PUBACC=".

### 12,NO STATION CMD; USE \$NN PREFIX

The "station" command has been removed. Use "\$nn <command>" where nn is the station number on whose behalf you wish to issue the command (file server console only).

### 13,ILLEGAL NUMBER (NEGATIVE OR TOO BIG)

The number was less than 0 or bigger than 32767. Number may be specified in decimal, or in hexadecimal preceeded by \$. Examples: "42", "\$1A3".

### 19,HELP FILE NOT FOUND

There is no HELP file for the word used as an operand of the HELP command. Use the HELP command with any parameters to see what the possible HELP parameters are. (The system manager has the option of removing all HELP files to save space.)

### Create (20-25)

### 20,TYPE PARAMETER REQUIRED (T=)

The type parameter was missing. Example: "T=D".

21,SIZE OUT OF RANGE (<0B OR >32752B)

The value of the SIZE parameter was negative or greater than 32752 blocks. Each block is 512 bytes. Other units that can be specified are C (characters), S (256-byte sectors), and K (1024 bytes). If the units are omitted, B (512-byte blocks) is assumed. Examples: "SIZE=280", "SIZE=2000S".

23,SIZE PARAMETER REQUIRED WITH T=B, =T

The SIZE parameter must be specified to create a binary volume. The size may be an overestimate of the size of the data to be BSAVED into the volume, but it must not be less.

24,SIZE OUT OF RANGE (<1C OR >48K)

The limits on the size of a binary (T=B) file are between 1C (one byte) and 48K (49152 bytes) regardless of the units used in the specification.

Delete (25-29)

29,CURRENTLY MOUNTED OR DEFAULT DIR

You cannot delete a volume which is currently mounted by any station, or which is the default directory (see the SET DIR command) of any station.

Mount (30-34)

30,DRIVE REQUIRED

You must specify what drive the volume is to be mounted on. Example: "D4".

## ERRORS

### 31,IN USE

The volume you asked to mount is in use by another station. You are therefore denied exclusive use of that volume.

### 32,IN EXC USE

The volume you asked to mount is in exclusive use by another station. You are therefore denied any use of the volume.

### 34,RW NOT ALLOWED ON DIRECTORIES

You are not allowed to mount a directory (T=Y) volume for write access.

### Unmount (35-39)

#### 35,DRIVE OR "ALL" REQUIRED

You must specify a drive number or "ALL" on the UNMOUNT command. Examples: "UNMOUNT D1", "UNMOUNT ALL".

#### 36,NOT CURRENTLY MOUNTED

The drive number specified in the UNMOUNT command does not have any virtual volume mounted on it by the file server.

### Lock (40-44)

#### 40,ILLEGAL LOCK NAME

A lock name must be 1 to 15 characters long.

41, IN USE

The lock name specified is in use by another station. You are therefore denied exclusive use of the lock.

42, IN EXC USE

The lock name specified is in exclusive use by another station. You are therefore denied any use of the lock.

Unlock (45-49)

45, NOT HELD

The lock name specified is not currently held by your station.

BSAVE, BRUN, BLOAD (50-55)

50, CMD NOT ALLOWED FROM THIS STATION

The BSAVE/BLOAD/BRUN commands may only be executed from an Apple // user station.

51, NOT BINARY

The pathname identifies a volume which is not binary (T=B). Only binary volumes can be used for BSAVE, BLOAD, or BRUN commands.

52, NOT PREVIOUSLY SAVED

The binary volume was created but has never had any data written into it using the BSAVE command. It can not not be used with BLOAD or BRUN until it has been BSAVED into.



## ERRORS

### 53, FROM PARAMETER REQUIRED

For BSAVE, the FROM parameter, which specifies the memory area from which data is to be taken, must be provided. Example: "FROM=\$1000".

### 54, SIZE PARAMETER REQUIRED

For BSAVE, you must provide the SIZE parameter on the BSAVE command to indicate how much data is to be saved. This value must be less than or equal to the size of the volume specified on the original CREATE command. Example: "SIZE=256.C".

### 55, FILE WAS THERE; REP NOT SPECIFIED

Data has already been saved in the binary volume. To replace that data, you must specify "REPLACE" as a parameter in the BSAVE command.

### Set/List (56-58)

### 57, FILE IS NOT A DIRECTORY

The pathname given in a SET DIR command identifies a volume which is not a directory (T=Y).

### 58, USE: SET TIME [YYMMDD][,HH[MM]]

If the date parameter was supplied, it was incomplete or contained invalid fields. If the time of day parameter was supplied, it contained invalid fields.

Show (59-69)

59,TYPE=SYSTEM

(Not an error.) The volume mounted on the drive for which you did a "SHOW TYPE" is a system volume (T=S).

60,SHOW OPTION NOT RECOGNIZED

The operand of a "SHOW" command was not recognized. Check the spelling and make sure there are no extraneous items in the command.

61,DRIVE REQUIRED

For the "SHOW TYPE" command you must specify the drive number on which the volume is mounted. Example: "SHOW TYPE D8".

62,NOT CURRENTLY MOUNTED

The drive number specified has no volume mounted on it by the file server.

63,TYPE=APPLE // CP/M

(Not an error.) The volume mounted on the drive for which you did a "SHOW TYPE" is an Apple // CP/M volume. (T=C).

64,NO DEFAULT DIRECTORY SET

(Not necessarily an error.) This response to the "SHOW DIR" command indicates that there is no default directory established for this station by the file server.

## ERRORS

65,TYPE=APPLE // PASCAL

(Not an error.) The volume mounted on the drive for which you did a "SHOW TYPE" is an Apple // Pascal volume (T=P).

66,TYPE=APPLE // DOS

(Not an error.) The volume mounted on the drive for which you did a "SHOW TYPE" is an Apple // DOS volume (T=D).

67,TYPE=BINARY

(Not an error.) The volume mounted on the drive for which you did a "SHOW TYPE" is a binary volume (T=B).

68,TYPE=DIRECTORY

(Not an error.) The volume mounted on the drive for which you did a "SHOW TYPE" is a directory (T=Y).

69,UNKNOWN TYPE

The volume mounted on the drive for which you did a "SHOW TYPE" is not a standard volume type.

70,yymmddhhmmssw

(Not an error.) Returns date and time information in encoded form. For example, the FS command `TIMESTAMP` returns the current year, month, day, hour, minute, second, and day of the week in the form 70,8104301859381 (that is, 6:59 P.M., Sunday, April 30, 1981).

71,--t--tt--t-t----

(Not an error.) Returns types of virtual disks currently mounted on drives 1-16 (Y, P, D, B, T, C, 3, I, U). The system responds to the FS command SHOW TYPES using this format.

72,TODAY IS DD-MON-YYYY HH:MM:SS

(Not an error.) This is the response to the SHOW TIME command.

73,TYPE=TEXT

(Not an error.) The volume mounted on the drive for which you did the SHOW TYPE is a text volume (T=T).

74,TYPE=Apple /// SOS

(Not an error.) The volume mounted on the drive for which you did the SHOW TYPE is an Apple /// SOS volume (T=3).

75,TYPE=IBM PC DOS

(Not an error.) The volume mounted on the drive for which you did the SHOW TYPE is an IBM PC DOS volume (T=I).

76,TYPE=IBM PC P-SYSTEM PASCAL

(Not an error.) The volume mounted on the drive for which you did a "SHOW TYPE" is an IBM PC p-SYSTEM PASCAL volume (T=U).

## ERRORS

### Local Commands (90-92)

90,DRIVE(S) REQUIRED (LOCAL COMMAND)

A drive is required for this command. Example:

"SET B VIRT".

91,DRIVE NUMBER CANNOT BE USED

There are 8 drives (also called "volumes") in CP/M.

### System Errors (94-99)

94,NOT CONNECTED

This is a network error that indicates that the connection to another station has been terminated prematurely.

95,UNRECOGNIZABLE NETWORK RESPONSE

The last response message from file server did not contain a numeric error code, as expected. This may indicate incorrect logic in the use of NETUNIT procedures from within Pascal MT+ programs.

96,NO NETWORK CARD IN SLOT

The slot number specified does not have a Nestar network interface card installed, or the card is defective.

97,FILE SERVER MEMORY FULL

The file server has no space left for tables needed to complete your request. This does NOT

refer to memory space in the user station.

#### 98, NETWORK ERROR

The network routines were unable to complete the transaction. The error may be transient; see the description of NETUNIT for more information. This error does not occur from most user level programs, such as NET.

#### 99, USER ABORT

The network abort key <CTRL><SHIFT>-N was pressed while a network transaction was queued up or in progress. The transaction was aborted.

#### File System Errors (100-140)

##### 101, END OF FILE OR RECORD OUT OF RANGE

An attempt was made to read a block or sector of a volume which is outside the legal range for that volume.

##### 102, FILE NOT FOUND

The volume specified by the pathname was not found, or one of the directories in the pathname was not found. Check the spelling of each filename in the pathname. If the name does not begin with a slash, check that the current default directory is the correct one.

##### 103, BAD DELIMITER IN PATHNAME

A delimiter other than "/" or ":" was found in a pathname. Make sure that you have not omitted a comma separating the pathname from other operands in the command.

## ERRORS

### 104, FILE NAME OR PASSWORD TOO BIG

A single filename (the part between slashes in a pathname), or password (the part after a colon in a pathname) is longer than the maximum of 15 characters.

### 105, NO ACCESS FOR READ TO DIRECTORY

You have been denied read access to a directory which is part of the specified pathname.

### 106, NON DIRECTORY FOUND IN PATHNAME

One of the names in the pathname (other than the last name) identifies a volume which is not a directory (T=Y). Only the last thing in a pathname can be other than a directory.

### 107, END OF PATHNAME IS A DIRECTORY

The pathname specifies a directory (T=Y) in a context where a non-directory volume is required.

### 109, ROOT DIR NOT SPECIFIED NO DEFAULT

The specified pathname does not begin with a slash, and there is no default directory recorded for this station by the file server. If you wish to completely specify the pathname, begin with a slash and the name or number of the disk unit. If you wish to use the current default directory, do not begin the pathname with a slash. You may use the "SHOW DIR" command to find out the current default directory, and the "SET DIR" command to establish one.

110,NO ACCESS FOR READ

You have been denied read access to the volume specified by the pathname, or to a directory along the path.

111,NO ACCESS FOR WRITE

You have been denied write access to the volume specified by the pathname.

112,NO ACCESS FOR APPEND (not yet implemented)

You have been denied append access to the volume specified by the pathname.

113,NO ACCESS FOR ERASE

You have been denied erase access to the volume specified by the pathname. Erase access is necessary to delete the file.

114,NO ACCESS FOR CREATE

You have been denied access to create or rename an entry in one of the directories specified in the pathname.

115,NO ACCESS FOR DELETE

You have been denied access to delete or rename an entry in one of the directories specified in the pathname.



## ERRORS

### 116,CANT DELETE NON-EMPTY DIRECTORY

The pathname specified in a DELETE command identifies a directory, and that directory is not empty, that is, it still points to other volumes. Only empty directories can be deleted by a single file server DELETE command.

### 117,FILE SERVER MEMORY FULL

The file server has no space left for tables needed to complete your request. This does NOT refer to memory space in the user station.

### 118,DISK FULL

There is not enough contiguous space left on the disk unit to create the volume. The LIST command when used to display the root directory will give information about the space available on a disk unit. Example: "LIST /MAIN".

### 119,DIRECTORY FULL

There is not enough space left to create more entries in the directory, and the directory cannot be expanded. Directories are automatically expanded as necessary to accomodate new entries.

### 120,INTERNAL ERROR

An internal error has been detected by the file server. Additional information is written on the console of the file server. That information and the circumstances surrounding the error should be transmitted to your support organization for diagnosis. The file server should be restarted as soon as practical.

## 121, UNINITIALIZED DISK

The disk unit has not been initialized. All disks must be formatted and initialized using the file server FORMAT DISK utility; see the File Server Installation and Operation Manual.

## 122, WRONG SOFTWARE VERSION

The disk format is not compatible with version of the file server currently running. (This error cannot occur with any file servers so far released.)

## 123, FILE ALREADY EXISTS

The file you have asked to create, or the new name used in a RENAME command, already exists in the directory.

## 124, DISK I/O ERROR, SUBCODES x,y

A hardware I/O error was detected. The details of the error are described in the subcodes; see the table of I/O errors for more information.

## 125, VERIFY FAILED (BAD MEMORY)

All disk write operations are verified by reading back the recorded data and comparing it to the data stored in memory. This error indicates that the disk data did not compare correctly. It sometimes indicates a memory error in the file server, and not a disk error.

## 128, BAD UNIT NUMBER IN PATHNAME

The first item after the initial slash in a pathname is a number, but it is not in the legal range for unit numbers (1 to 4).

## ERRORS

### 130,NEED PRIVATE PASSWORD FOR PROTECT

In order to execute the PROTECT command for any volume, the private password must be specified in the pathname or as a default private password. The password must be specified whenever the volume has a non-null private password, regardless of the access rights currently assigned to the volume.

### 131,UNIT NAME NOT FOUND

The name after the initial slash of a pathname is not the name of a disk unit currently recognized by the file server. You can also use the unit number in place of a name, if you wish.

### 133,DISK NOT READY

The disk unit specified is not ready. The one minute warmup period after initial power up may not have elapsed. It may also indicate a controller or disk drive failure.

## Appendix B

## The BOOT Program

B.1 Description

The BOOT program is a standard part of the file server, and provides a means for users to load CP/M. It is automatically loaded and run when an Apple with the autostart ROM and a Nestar network interface card is powered up. If an Apple disk controller is in a higher slot than the network card, however, the Apple will boot from the local disk.

The BOOT program is a machine language program that executes in the memory area \$800 to \$3FFF. It has been provided as a BSAVED virtual Network file named /MAIN/BOOTS/APPLE2/BOOT. This section describes the action of BOOT as distributed by Nestar. You should consult your System Manager to see if any local modifications have been made to the version on your file server.

BOOT is brought into a user station's memory and executed whenever the Apple Autostart ROM (present on Apple // Plus, Apple // e and Apple // with Language Card or Integer machines which have upgraded by installing the ROM) recognizes a power on condition. On machines which do not have the Autostart ROM, you must explicitly enter

Cn00G (n is the slot in which a Nestar network interface card is installed)

in response to the Apple // Monitor prompt ("\*"). Entering PR#6 or 6<ctrl>P will NOT cause the BOOT program to be run. The Network interface card differs from Apple Disk II

## BOOT

controllers in this respect; an Apple disk controller will boot whenever any character is printed to the slot they are plugged into.

When a user station is powered up, BOOT will automatically unmount all disks in use by that station, free any locks held, and reset any default directory or passwords. This also happens when the OFF file server command is issued. It is strongly recommended that this be done by every user who is finished using an Apple on the system. This gives a clear indication to others that the station is not in use, and also frees up resources other stations may need.

### B.2 Operation of BOOT

BOOT will display on the Apple screen the Nestar logo, followed by:

```
PLAN 4000 BOOT X.X  
STATION ADDRESS $NN  
SLOT N    SERVER $TT
```

VOLUME TO BOOT: /MAIN/

where NN is your station address (in hex, from 00 to 7F), and N and \$TT are the SLOT and Server numbers that communications are directed to. You should place a sticker with the station number on each user station, and you should observe that the number shown on the screen agrees. If not, please consult your System Manager.

NOTE: The BOOT program recognizes several Apple compatible serial or communications cards (MnR, Videx, and ALS) installed in slot 3, and directs its I/O to them automatically. Whenever I/O is

being directed to the slot 3 device, the message

(I/O BEING DIRECTED TO SLOT 3 DEVICE)

is displayed on the standard Apple video output as an indication to the user.

A user may disable the automatic recognition of a slot 3 terminal-like card by pressing the space bar down between the time that the BOOT program is downloading and begins running. If this is done, the standard Apple video output and keyboard input will be used regardless of a card in slot 3.

The user may now enter the volume name of a CP/M disk he wishes to load his system from. This name may be up to 40 characters long, including the prefix. A default prefix is displayed on the screen (shown above as /MAIN). The user may backspace and edit this prefix exactly as if he had typed it himself, or type <Ctrl>-X to delete the entire line.

You should note that use of the file server does not in any way modify the minimum features necessary to load and execute CP/M. Any errors you would get from these standard systems will still be reflected in the system. For example, you cannot boot a CP/M system into a machine which does not have 64K RAM.

After you have entered the name of the volume you wish to boot, the BOOT program attempts to locate that volume, and issue a MOUNT command for drive 1. If successful, the type of the disk is checked. The volume is mounted read/write, update.

## BOOT

### B.2.1 Booting CP/M Virtual Volumes

When booting a CP/M volume, the boot program first checks for 64K of RAM and asks for another volume if not present. It also checks for a Z-80 card, which can be in any slot.

The CP/M bootstrap is then read from the correct area of the selected volume and executed. If automatic execution of a command has been set by the TURNKEY program, it will occur after the boot process has finished.

### B.2.2 Autobooting at the Individual Station

The BOOT program can be tailored to the needs of individual stations. Using the utility SETPROFILE, the System Manager can install a profile for any station. The profile will specify which volume is to be booted for the station, and whether the boot is to be automatic. Individual users can install station profiles themselves using SETPROFILE if they have the access rights necessary to do so.

If no profile has been set for a station, BOOT will use the defaults set by the System Manager in the system \$00 profile.

If <esc> is pressed on the Apple keyboard while the BOOT program is downloading, the station dependent profile is ignored and the default profile is used. This is useful if a station is set up to autoboot a particular volume but you wish to interrupt the autoboot process and boot a different volume.

## Appendix C

## Quick Reference List - File Server Commands

CREATE pathname,type [,size][,sectors]  
 [,protection][,drive][,usage]

- creates and optionally mounts a new virtual disk

DELETE pathname

- deletes a virtual disk from system

HELP [command name] or ? [command name]

- displays list of commands or syntax of specified command

LIST [pathname] [,VERBOSE] [,NESTED]

- lists entries in default or specified directory

LOCK lockname [,usage]

- locks "lockname" for exclusive (EXC) or shared (SHR) use
- Default: EXC

MOUNT pathname, drive [,usage]

- establishes correspondence between a virtual disk and drive number

OFF

- initializes user station and downloads BOOT software



## COMMAND LIST

PROTECT [pathname] [protection]

- modifies passwords or access rights for a virtual disk or directory

RENAME oldpathname, newname

- renames specified FS file

SET DIR pathname

- sets default directory

SET [GRPPW=password] [PRVPW=password]

- sets default group or private password

SHOW DATE

- displays date as MM/DD/YY

SHOW INFO

- displays information about a virtual volume

SHOW DIR

- displays name of current default directory

SHOW LOCK [lockname]

- lists all stations using specified lockname

SHOW [ALL] LOCKS

- displays all locks set at own station or held in file server

SHOW [ALL] MOUNTS [pathname]

- gives information on virtual disks mounted on the file server

SHOW PROTECTION [pathname]

- displays group, private and public access rights for virtual disk or directory addressed by pathname

SHOW STATION

- displays own station number

SHOW TYPE Dd

- displays type of virtual disk mounted on drive d

SHOW TYPES

- displays types of virtual disks mounted on drives 1-8

SHOW VOL S

- displays names of system disk units currently operational

TIMESTAMP

- returns encoded form of the current date and time

UNLOCK lockname or UNLOCK ALL

- releases locked usage on a lockname or on all locknames currently held

UNMOUNT Dd or UNMOUNT ALL

- cancels previous mount(s)

## COMMAND LIST

### Parameters

access rights: set of letters from RWECD (read, write, erase, create, and delete)

drive: either Dd, where d=number or between 1-8 (eg D2) or a letter, A: - H: (the latter for certain local commands)

filepath: name[:password] [/filepath]

lockname: name of lock (same restrictions as name)

name: name of disk unit, directory, or virtual disk. (1-15 characters; no commas, control characters, slashes, colons, returns or unprintable characters; imbedded blanks ok; first character any ok character)

number: if decimal: between -32768 and 32767, inclusive; if hex: between \$0 and \$FFFF, inclusive

password: a secret word used to gain access to protected volumes. Same restrictions as name. except control characters allowed.

pathname: /unitname/filepath or filepath (80 characters max. An initial slash indicates first field is a unit name; no initial slash indicates current default directory is to be prefixed to pathname.

protection: protect item [,protection]

protect item:

,GRPPW=password

,PRVPW=password

,PUBACC=access rights (Default: R)

,GRPACC=access rights (Default: PUBACC)

,PRVACC=access rights (Default: varies)

size: SIZE=number [.size-unit]

size-unit:

C: character----(1 byte)  
 S: sector----(256 bytes)  
 B: block----(512 bytes)  
 blank: block--(512 bytes)  
 K: -----(1024 bytes)

type:

T=B (binary)                    T=P (Apple // Pascal)  
 T=C (Apple // CP/M)    T=S (system)  
 T=D (Apple // DOS)    T=T (text)  
 T=I (IBM PC DOS)        T=3 (Apple /// SOS)  
 T=Y (directory)  
 T=U (IBM PC p-SYSTEM PASCAL)

unitname: 1, 2, 3 or 4 [:password] or name  
 [:password]

usage: EXC(exclusive), SHR(shared), or  
 UPD(update) RO(Read/Only) or RW(Read/Write)

### Local NET Commands

SHOW DRIVES

SHOW FS

SET DRIVE[S] n[,n,...] VIRTUAL [SLOT n][STN \$nn]

SET FS [SLOT n] [STN \$nn]

SPOOL TO device name/file name

SPOOL OFF

### Other NET Inputs

drive: 1-8

drive-status: REAL or VIRTUAL; drives 5,6  
 (E: and F:) can also be REAL

slot: default virtual slot



## INDEX

### A

automatic startup 2-14, B-4

### B

bibliography BB-1  
blocks 2-13  
BOOT program 1-2, B-1  
bootable virtual volumes 2-10  
booting CP/M 1-3

### C

CHAN 3-4  
CMD 3-4  
CMDUNIT 3-1, 3-2  
command;command 2-10  
command list C-1  
controller card, real disk 1-2  
copying diskettes 1-7  
COPYSYS.COM 2-10  
CP/M 2.20 1-1  
CP/M utilities 1-2  
CREATE.COM 1-4  
creating virtual diskettes 1-4

## INDEX

### D

DPB (Disk Parameter Block) 2-12  
default pathnames 2-2  
directories 2-13  
disclaimer ii  
drive status 2-6  
drives 2-5

### E

error messages 2-1, A-1  
extensions to CP/M 1-1

### F

file server, multiple 2-18  
formatting real diskettes 1-8

### I

interface card 2-3  
interface routines 3-1  
issuing network commands 2-1

## INDEX

### L

library volume 1-2, 2-1

### M

/MAIN/LIB/APPLE2/CPM 1-2, 1-4, 2-18, B-1  
microsoft utilities 1-3  
MT+ 3-1  
multiple file servers 2-18  
multiple network commands 2-4

### N

NCONFIG.BAS 2-18  
NET program 1-2, 2-1ff  
    inputs 2-10  
NET.COM 2-1  
NETUNIT 3-1, 3-4  
network command program 2-1ff  
network commands 2-1, 2-3, 3-1, C-1  
network interface card 2-3  
network interface routines 3-10  
NOECHO 2-8  
NWLIB.ERL 3-1  
NWRTRS.REL 3-1



INDEX

O

OFF 2-8

P

password 2-11  
PRINT 2-10  
programming 3-1  
PROTECT 1-5

R

RC 3-4  
reading station numbers 3-15  
real diskettes 1-7, 1-8  
REALFMT.COM 1-2, 1-7  
RSP 3-4

S

sectors 2-13  
SET FS 2-8  
SET X: 2-6  
SETPROFILE 3-1  
SETREAL 1-2, 1-7  
SETVIRT 1-2, 1-8  
shared library volume 1-2

## INDEX

### SHOW

- DRIVES 2-5
- FS 2-6
- STATION 3-15
- size of virtual volumes 1-6
- SLOT n 2-6
- SPOOL 2-9
- starting up 1-1, 2-14
- station number 3-15
- STN \$nn 2-6
- SUBMIT 2-14, 2-16

### T

- TIMESTAMP 2-5
- tracks, volume 2-11
- transferring files 1-7
- TURNKEY.COM 2-14

### U

- using the network 2-1
  - from a program 3-1
- utilities
  - CP/M 1-2
  - Microsoft 1-3
  - network 4-1

## INDEX

### V

virtual volumes 1-3, 2-10  
VIRTUAL 2-6  
Volume to Boot 1-2, 1-3  
volume tracks 2-11

### Z

Z-80 assembler programs 3-1, 3-10

### Other

; <anystring> 2-10  
% filename 2-10

## BIBLIOGRAPHY

## PLAN 4000 PUBLICATIONS

General Information Manual	GA40-0100
PLAN 4000 Physical Planning and Installation Manual	GA40-0101
File Server User's Manual	SC40-0200
File Server Apple // Pascal User's Guide	SC40-0501
File Server Apple // DOS User's Guide	SC40-0502
File Server Apple // CP/M User's Guide	SC40-0503
File Server Apple /// SOS User's Guide	SC40-0504
File Server IBM PC DOS User's Guide	SC40-0505
File Server IBM PC UCSD p-System User's Guide	SC40-0506
File Server Installation and Operation Manual	SC40-0300
PLAN 4000 System Service Manual	LA40-0401
Print Server User's Manual	SC40-0201
Print Server Installation and Operation Manual	SC40-0301
Messenger User's Manual	SH40-0204
Messenger Installation and Operation Manual	SH40-0304



## Reader Comment Form

This manual is one in a series that describes the use of the PLAN 4000 system.

You are encouraged to use this form to communicate to Nestar any problems or suggestions associated with the system. We would like your comments on improving the system itself, as well as on this documentation. Possible topics for comment are: clarity, accuracy, completeness, organization, coding, retrieval and legibility.

No postage stamp is necessary if mailed within the U.S.A.

Nestar installation location:

Submitter's name :

Address :

Description of problem or suggestion:

Please mail this form to :

Nestar Systems, Incorporated  
2585 E. Bayshore Road  
Palo Alto, California 94303  
Attn: PUBLICATIONS DEPT.



No Postage  
Necessary  
If Mailed  
In The  
United States

**BUSINESS REPLY CARD**

First Class

Permit No. 239

Palo Alto, CA

POSTAGE WILL BE PAID BY ADDRESSEE



**NESTAR** SYSTEMS  
INCORPORATED

2585 East Bayshore Road  
Palo Alto, California 94303

-----  
Fold here

Please do not staple

Tape

## Reader Comment Form

This manual is one in a series that describes the use of the PLAN 4000 system.

You are encouraged to use this form to communicate to Nestar any problems or suggestions associated with the system. We would like your comments on improving the system itself, as well as on this documentation. Possible topics for comment are: clarity, accuracy, completeness, organization, coding, retrieval and legibility.

No postage stamp is necessary if mailed within the U.S.A.

Nestar installation location:

Submitter's name :

Address :

Description of problem or suggestion:

Please mail this form to :

Nestar Systems, Incorporated  
2585 E. Bayshore Road  
Palo Alto, California 94303  
Attn: PUBLICATIONS DEPT.





No Postage  
Necessary  
If Mailed  
in The  
United States

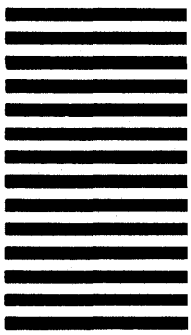
**BUSINESS REPLY CARD**

First Class      Permit No. 239      Palo Alto, CA

POSTAGE WILL BE PAID BY ADDRESSEE

**NESTAR** SYSTEMS  
INCORPORATED

2585 East Bayshore Road  
Palo Alto, California 94303



Fold here

Please do not staple

Tape