# PLAN 4000™

## File Server
## Apple /// SOS User's Guide

NESTAR

SC40-0504

NESTAR SYSTEMS, INCORPORATED

# PLAN 4000 (TM)

## FILE SERVER

## APPLE /// SOS
## 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 and Apple Computer, 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.

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, Inc.
2585 E. Bayshore, Palo Alto, California, 94303
(415) 493-2223 Telex 171420 Nestar PLA

Publication number SC40-0504-0
All rights reserved.

## How to Use This Guide

This guide is designed to provide a description of those PLAN 4000 network functions that are specific to the Apple /// SOS 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, or 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 Starting Up..... 1-1
1.2 Network Devices..... 1-1
1.3 A Boot Diskette for Network Use..... 1-2
1.4 Booting Your Apple /// Workstation... 1-4

Chapter 2 Using the Network

2.0 Shared Disk Organization: Virtual Volume Names..... 2-1
2.1 Virtual Diskettes of Variable Size... 2-2
2.2 File Server Commands:The NET Program. 2-4
2.3 Creating Virtual Diskettes..... 2-7
2.4 Using Virtual Diskettes in SOS..... 2-8
2.5 Using Virtual Drives..... 2-10
2.6 Local NET Commands..... 2-11
2.7 Other NET Inputs and Commands..... 2-14
2.8 Multiple File Servers and Multiple Networks..... 2-15
2.9 Network Virtual Spooled Printer..... 2-18
2.10 Running Programs in Protected Environments..... 2-19
2.11 Capturing Apple /// Basic Files As ASCII Text Files..... 2-19

Chapter 3 Programming

3.1 Using File Server Commands Within A

| | | |
|---|---|---|
| | Pascal Program | 3-1 |
| 3.2 | A Sample Program | 3-7 |
| 3.3 | The SOS Basic Environment | 3-8 |
| 3.4 | Apple // Compatibility | 3-9 |
| 3.5 | Reading a Station Number from Within a Program | 3-9 |
| 3.6 | The Nestar CVAL Convention | 3-10 |
| 3.7 | The SOS Network Drivers: Advanced Device Information | 3-14 |
| 3.8 | Device Configuration Block | 3-15 |
| 3.9 | Device Driver Calls | 3-18 |
| 3.10 | The .NMSG Device Driver Calls | 3-19 |
| 3.11 | The .N1 ... .N11 Device Driver Calls. | 3-20 |
| 3.12 | Device Identification Codes | 3-22 |

Chapter 4 Utility Programs

| | | |
|---|---|---|
| 4.0 | Network Utility Programs | 4-1 |
| 4.1 | STARTUP | 4-2 |
| 4.2 | TREEWALK | 4-7 |

Appendices

| | | |
|---|---|---|
| A | Error and Information Messages | A-1 |
| B | File Server Commands | B-1 |

Index

Bibliography

Reader Comment Form

# Chapter 1

# Starting Up

## 1.0 Introduction

This guide assumes that you are familiar with the Apple /// machine, with SOS, and with the PLAN 4000 network as described in the General Information Manual and the File Server User's Manual.

## 1.1 Starting Up

Apple /// users boot by inserting a minidiskette in their built-in minidisk drive. The diskette is formatted for Apple SOS, and will load the interpreter and operating system that it contains (Pascal, Visicalc (R), PFS (R), Business Basic, etc.).

PLAN 4000 Apple /// Network Interface cards will not work in Apple // DOS emulation mode.

## 1.2. Network Devices

Under SOS, each peripheral device is controlled by software called a device driver. The SOS.DRIVER file on a SOS boot diskette must contain a driver for each physical device that you will be using (i.e., console, printer, up to 4 floppy disks). Real floppy disks have SOS device names .D1 - .D4.

The PLAN 4000 system includes device driver software for various network devices.

Three network character devices exist:

| | |
|---|---|
| .NCMD | for communication with the file server |
| .NMSG | for user station to user station communication |
| .PRINTER | for virtual printer support |

Eleven block structured devices exist:

.N1 -.N11 ("virtual" devices)

Virtual devices allow access to volumes that reside on a system disk connected to a (shared) file server station.

In order for the user to have access to such devices, the related device driver software needs to be contained in the SOS.DRIVER file along with the device drivers for the physical devices being used.

## 1.3 A Boot Diskette for Network Use

The PLAN 4000 system includes two boot diskettes, one with a Pascal interpreter, the other with a Business Basic interpreter. Obtain from your system manager a copy of one or both of these master network boot diskettes. (Henceforth, "boot diskette" will refer to your personal copy of one of the master network boot diskettes).

The SOS.DRIVER file on the boot diskette contains the console driver (.CONSOLE) and the driver software to handle 3 network character devices (.NCMD, .NMSG and .PRINTER), as well as 11 block structured network devices (.N1 - .N11). SOS.DRIVER is set up for 2 local drives and for the network interface card in slot 2. If

this meets your requirements, no reconfiguration is necessary. Simply boot the diskette.

The Pascal boot diskette has been configured so that the shared library volume //LIB/APPLE3/SOS is automatically mounted. (Network virtual volumes and naming conventions for them are discussed in Chapter 2 of the File Server User's Manual. The shared library volume contains, in one location on a network hard disk, text, data, and codefiles for use by all network workstations). If you are using Business Basic, you can use the NET program on the BASIC boot diskette to mount the shared library volume. (The NET program is discussed in Section 2.2. Concepts such as "mounting" virtual volumes are discussed in Chapter 5 of the File Server User's Manual).

If you wish to add other device drivers, such as .SILENTYPE, .RS232 or .PROFILE, to the SOS.DRIVER file on your boot diskette, you can use the System Configuration Program (SCP) on the Apple /// System Utilities diskette to do so. If you wish to make a single code file containing ONLY the network drivers, use SCP to read into memory the SOS.DRIVER file from your network boot diskette. Delete all other drivers (including .CONSOLE) and generate a new system with a filename other than SOS.DRIVER (e.g., NETWORK.DRIVER).

The network driver software includes device drivers for 11 block devices, called virtual drives. Note that only the first five (.N1 - .N5) are active. The asterisk following some drivers indicates that they are inactive.

You may use the "Edit Driver Parameters" section of the SCP to change the number of active

network virtual disks, to inactivate the network .PRINTER device, or to change its name. Note that if you want access to both a local printer and the network spooled printer, you must change the name of at least one of them.

Note that in the Pascal environment, disks are searched in order, from the highest numbered unit to the lowest. If you wish to have standard system programs such as the Editor and Compiler found on local disks (the Profile, for example), the network drivers should appear BEFORE the local disks in the SCP driver list. You can change the order in the SCP driver list by changing the sequence in which driver files are read from the disk. If multiple copies are found, the one on the lowest is used.

## 1.4 Booting Your Apple /// Workstation

In order to use your Apple /// workstation with the network, you must have a network interface card inserted in your machine (System Physical Planning and Installation Manual, Chapter 3). You also need a boot diskette containing network device drivers. As discussed in Section 1.3 this is available from your system manager.

When you boot a diskette whose SOS.DRIVER file contains the network drivers, you are connected to the network whose card is in the slot specified during system generation (SCP).

If the network is unavailable when you boot, the boot process will wait. If you wish to use your Apple /// without access to the network, press the <CTRL> and <Open Apple> keys simultaneously and the network drivers will be disabled. If the network subsequently becomes available, you will

have to reboot to access the network drives.

If you try to use a network interface card other than the Apple /// Network Interface Card, or if you are using an expired test version of the network drivers, the boot process will terminate with a System Error $01.

# Chapter 2

# Using the Network

## 2.0 Shared Disk Organization: Virtual Volume Names

The PLAN 4000 system and SOS use similar disk organization and filenaming conventions. It is important to keep in mind from the outset the distinction between the two.

Network users share mass storage by using portions of network shared disks called "virtual diskettes" or "virtual volumes". These virtual volumes are formatted for use in various operating systems.

Network names refer to these shared network disks and to the shared virtual volumes in them (the "outsides" of virtual volumes). See Figure 1. Network names are used when issuing network (or "file server") commands via the NET program (Section 2.2), to create, mount, rename, or otherwise manipulate whole virtual volumes. Conventions for assigning virtual volume names ("pathnames") are discussed in detail in Chapter 2 of the File Server User's Manual.

SOS names refer to the nested directories and files within virtual volumes and within real, local diskettes and hard disks. You should give SOS names when using SOS facilities such as the F(iler or Editor to manipulate the contents of virtual or real diskettes (volumes).

Note also that, as with the Apple // Pascal operating system, a SOS volume can be specified by its Pascal volume name (EXAMPLE: instead of /EXAMPLE). A SOS volume can also be specified by

Pascal unit number (e.g., #3:) if no nested subdirectories are involved. In the same way, the SOS device name for the volume can be used.

Finally, virtual volumes are referenced using network drive numbers when network commands are being issued (e.g., UNMOUNT D3). The relationship between network drive numbers, SOS device numbers, and Pascal unit numbers is discussed in Section 2.5.

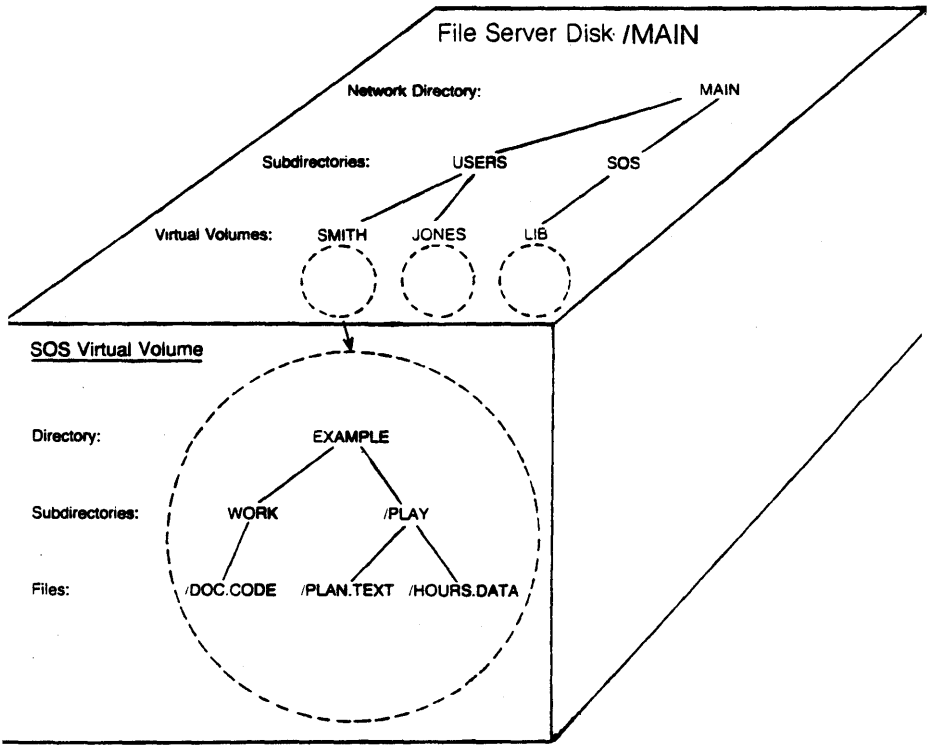
## 2.1 Virtual Diskettes Of Variable Size

Shared disk storage on the network is implemented by the use of "virtual volumes". You, as a network user, have the option of creating volumes that, at your workstation, appear to be real diskettes of variable size, formatted for use in the SOS Basic or Pascal environments. These volumes are in reality portions of your network's shared disks.

When virtual volumes are "mounted" on a "virtual drive" for use, they look like SOS minidiskettes (though not necessarily the same size as real diskettes). Their directories and files are arranged inside according to SOS pathnaming conventions. Virtual volumes are mounted using the NET program's MOUNT command. The NET program is discussed in Section 2.2.

Apple /// users create virtual diskettes of type 3. These SOS formatted diskettes can be used in the Apple /// Pascal, Business Basic, Visicalc ///, PFS ///, or other applications.

Figure 1




/MAIN is a real Network Hard Disk.

/EXAMPLE is a virtual SOS Volume.
SOS File /EXAMPLE/WORK/DOC.CODE is
found in Network Volume /MAIN/USERS/SMITH.

Virtual disks can be any size from 10 to 32767 blocks. They should be created as type "3". Access and usage protection for virtual disks is described in Chapter 3 of the File Server User's Manual. To create a virtual volume from the SOS environment, follow the procedure in Section 2.3. The Apple /// Pascal user can also access Apple // type Pascal virtual disks.

NOTE: SOS may impose additional constraints on the size (minimum and maximum) of its volumes (see Section 2.3).

## 2.2 File Server Commands: The NET Program

Virtual disks are created, "mounted", renamed, deleted, and otherwise manipulated using the network NET program.

> Remember that SOS commands manipulate the files within your virtual volumes (which are themselves files on a shared hard disk), while network (file server) commands manipulate the volumes themselves.
>
> This can be confusing, since the network commands are issued from within SOS (via the NET program), and since the network disk volumes and the files within them use similar naming conventions.
>
> The relationship between network drive numbers, SOS device numbers, and Pascal unit numbers is discussed in Section 2.5.

The NET program is an interactive Business Basic or Pascal program supplied by the network manufacturer, which allows a user to enter file server commands at the keyboard. In the Pascal environment, NET is generally made available as an executable file in the default library volume, which should be mounted at startup on device .N1 (drive 1) by a command in the Startcmd file on your boot diskette (Section 4.1). If NET is not found on the library volume, the system manager will know where it is installed.

The NET program sends each command, as entered, to the file server (except for the local commands described below that are available in the Pascal NET program). 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 redisplays on the user station screen its prompt (:) for another file server command to be entered. The cycle repeats until Q <Return> is entered; then control returns to the operating system command level.

The following printout shows a sample Pascal session. User responses are shown in lower case to distinguish them from information displayed by Pascal and NET. (Actually, commands can be entered in either upper or lower case, and output from Pascal on an Apple /// is upper and lower case.)

```
COMMAND:E(DIT,R(UN,F(ILE,C(OMP,L(INK,X(ECUTE,
x
EXECUTE WHAT FILE? .n1/net
ENTER NETWORK COMMAND

: create lunch,t=3
109,ROOT DIR NOT SPECIFIED; NO DEFAULT

: set dir /main/pascal
```

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

```
: show dir
/MAIN/PASCAL

:create lunch,t=3

:q <return>
COMMAND:E(DIT,R(UN,F(ILE,C(OMP,L(INK,X(ECUTE
```

In this example, a user executes the NET program, which allows him (or her) to send commands to the file server. The user wishes to create a virtual volume for use on the network. This volume, a portion of one of the network's shared hard disks, will be of type "3", formatted to resemble a real SOS diskette (and since no size is given, by default the same size as a real diskette).

The user does not enter the volume's full pathname, perhaps assuming that a part of the pathname will be added by a default, set at startup by a "SET DIR" command.

No such default "partial" pathname has been set, however, and an error message is returned. The user then sets a default partial pathname, /MAIN/PASCAL, for future convenience, and asks that it be displayed ("SHOW DIR"). The user then

creates the desired volume and quits the NET program. NET commands are discussed in detail in the File Server User's Manual.

## 2.3 Creating Virtual Diskettes

Size is an optional parameter when CREATING a SOS virtual diskette. If no size is specified, each SOS virtual diskette is the size of a real minidisk, i.e., 280 blocks (each 512 bytes long).

Size may be specified with the CREATE command using the parameter:

```
[,SIZE=Nb]
```

where N is the number of 512 byte blocks. The maximum size is limited by the size of the disk unit on which the virtual diskette will be stored and by limitations in the SOS operating system. Minimum size (256 blocks) is limited by SOS. The number of blocks for a SOS virtual diskette must be:

```
>256          (minimum)
<=32767       (maximum for system disk)
```

NOTE: The system also allows size to be specified in units of:

```
C       (characters------1 byte each)
S       (sectors------256 bytes each)
B       (blocks-------512 bytes each)
blank   (blocks-------512 bytes each)
K       (kilo bytes--1024 bytes each)
```

To create a 1000 block SOS disk and mount it on drive 1 (that is, on device .n1), do the following (drives are discussed in Section

2.5):

```
CREATE /MAIN/DOE/SOSDISK,T=3,SIZE=1000B,D2,UPD
```

To have SOS initialize the directory of the volume, you must use the Apple /// Utility Program. Do this by X(ecuting /LIB/UTILS or .n1/UTILS from the Pascal command line; or, place the Apple /// Utilities diskette in your second disk drive and X(ecute .d2/SYSTEM.STARTUP. (including a "." after "STARTUP").

When the Utility menu comes up, select "Device handling commmands". From the next menu, select "F" for Format. Enter the device number to be formatted (.n1 in the example above) and the SOS pathname for the virtual volume. The Network volume

```
/MAIN/DOE/SOSDISK
```

might be named /SOSDISK, for example, or it could be named /DISK1. There is no need to use the same name as part of the network volume name and the SOS pathname, but such a strategy is often convenient.

## 2.4 Using Virtual Diskettes In SOS

Suppose that, as a brand new user, you want to write new Pascal programs or run existing ones on the network. What must you do to get started?

In general, you (or the system manager) must:

Boot an existing SOS diskette that gives you access to the NET program.

CREATE a SOS virtual disk.

MOUNT it on the file server drive 2 or 3 for RW access (drive 1 contains the shared library volume).

Format its directory using the Apple /// Utilities program, Device handling section, Format subsection (see Apple /// Owner's Guide, p. 88).

If desired, add a NET command to your Pascal boot diskette Startcmd.Text (Section 4.1), to mount the new volume at each startup.

Use Utilities program (File handling section, Copy files subsection) to copy files from a real disk inserted in a minidisk attached to the user station, to the new virtual volume if desired. (See Apple /// Owner's Guide, p. 73).

Use the Editor, Compiler, and Linker to create, compile, and link Pascal programs, just as on a standalone Apple ///.

For example, say that an educator has a set of arithmetic courses which he previously ran on a standalone Apple ///. Now he wants to present these same courses on the network.

Let's assume that he is authorized to allocate space on the shared disk /MAIN, in the directory COURSES. He wants to CREATE a virtual disk called ARITHMETIC on it. He would give the CREATE command:

```
CREATE /MAIN/COURSES/ARITHMETIC,T=3,D2,RW
```

(Assume that no protection of the new virtual volume is desired and that the size of a real diskette is satisfactory. CREATE is used here to

mount as well as create the virtual disk.)

Then using the SOS Utilities program, he would format the directory on the virtual disk, and transfer files from the real disk to his virtual one.

## 2.5 Using Virtual Drives

In SOS, you can refer to your local hard disks and diskette drives, real and virtual, by their SOS device names or Pascal unit numbers. The correspondence of device name to unit number will vary according to how the SOS.DRIVER file on your boot diskette is configured. The display in Section 2.6.1 shows a typical configuration.

When issuing network (file server) commands via the NET program, a "drive number", rather than a device name or unit number, must be specified. Devices .N1 through .N11 correspond to drives 1-11.

Drive n = SOS device .Nn

If a volume is mounted on SOS device .N3, for example, it is referenced in a network command by "D3":

UNMOUNT D3

NOTE: When Pascal first comes up, it checks all units above number 128 and marks each one off-line if no type=3 (SOS formatted) virtual disk is mounted there. For this reason, disks mounted after the boot process can only be accessed and used by rebooting SOS (with no "UNMOUNT ALL" command in your Startcmd.Text). Note that this is characteristic of the current (1.0) of Pascal and is subject to change by

Apple in subsequent releases.

SOS will not unmount disks previously mounted, at power off or during the boot process following power on, unless explicitly ordered to do so with a NET UNMOUNT ALL command in your boot diskette Startcmd.Text, or issued from the NET program. Use of the UNMOUNT ALL command in Startcmd.Text prohibits access to virtual volumes mounted above unit 128. This results because, as described earlier, when SOS first boots, it checks drives for volumes. If a drive above Pascal unit 128 is empty, it is "written off" until the machine is rebooted. For this reason, volumes to be used on drives above unit 128 must be mounted, after which the system must be rebooted so that SOS can discover the volumes. Using UNMOUNT ALL would defeat such a strategy.

## 2.6 Local NET Commands

In addition to the commands that it sends to the file server, the Pascal version of NET responds to a number of local commands that it executes itself. These commands are concerned with changing and displaying the drive status and network interface card slot number associated with each Pascal virtual drive (.N1 through .N11) and the file server command channel.

### 2.6.1 SHOW DRIVES

This command displays the status of all the Pascal units. The information displayed consists of the following:

- the Pascal unit number.

- SOS device name
- unit type (real or virtual disk, message or command channel)
- number of blocks on device (disks only).
- "virtual channel" for network devices (i.e., the slot of the network card and station number of the file server.)
- network drive number

The SHOW DRIVES display has the following format:

```
UNIT   NAME     TYPE    BLK
  1   CONSOLE:
  2   CONSOLE:
  4   .D1       RDISK   280.B
  5   .D2       RDISK   280.B
  9   .PROFILE  RDISK  9728.B
 10   .N1       VDISK           SLOT=2, STN=$FE, D1
 11   .N2       VDISK           SLOT=2, STN=$FE, D2
 12   .N3       VDISK   560.B   SLOT=2, STN=$FE, D3
128   .NCMD     VCMD            SLOT=2, STN=$FE
129   .NMSG     VMSG            SLOT=2, STN=$FE
130   .N4       VDISK           SLOT=2, STN=$FE, D4
131   .N5       VDISK           SLOT=2, STN=$FE, D5
132   .N6       VDISK           SLOT=2, STN=$FE, D6
133   .N7       VDISK           SLOT=2, STN=$FE, D7
134   .N8       VDISK           SLOT=2, STN=$FE, D8
135   .N9       VDISK           SLOT=2, STN=$FE, D9
```

In this example, the user has a virtual volume mounted on drive 3 (unit 12, device .N3). The file server station number is $FE. The SHOW DRIVES command does not list SOS or network names for mounted volumes.

### 2.6.2 SHOW FS

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

```
FS COMMAND CHANNEL IS:
SLOT=2,STN=$FE
```

### 2.6.3 SET .Nn[,.Nn,...][,VIRTUAL][,SLOT n][,STN $nn]

This command can be used to allow access to virtual volumes mounted at more than one file server, or more than one network. See Section 2.8 for more details.

If a drive is set VIRTUAL without specifying a slot or station, I/O will be directed to the same file server used by the command channel.

### 2.6.4 SET FS[,SLOT n][,STN $nn]

Sets the default "virtual command 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 specified in SOS.DRIVER and station $FE.

### 2.6.5 SPOOL TO/SPOOL OFF

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

where device name may be device name [.PRINTER

or PRINTER:] and file name may be [.Dn/] filename or [.Nn/] filename (where n is a unit number, and filename is appended with the suffix .text, if it is not already specified and the last character is not a period).

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 one 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.)
4. WRITE ERROR

### 2.6.6 NOECHO

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

## 2.7 Other NET Inputs and Commands

In the pascal environment, 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. |

## 2.8 Multiple File Servers And Multiple Networks

PLAN 4000 systems may have more than one file server on the same network. Multiple file servers are accessible to user stations operating in the SOS environment. 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 of 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 volumes. A user station may be configured so that it has virtual volumes mounted on a number of different file servers at the same time. The SOS system can then be used to transparently 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 DRIVES and SET FS discussed above allow the user to configure his or her SOS

drives so that virtual volumes can be accessed from multiple file servers and multiple networks. SET DRIVES allows the user to specify which slot (network) and file server each drive will refer to, and SET FS allows the user to mount volumes for the specified file server on those drives.

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 SOS 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 on station $FD. The following procedure will transfer a file called "XREF.TEXT" from the SOS volume with FS pathname volume "/MAIN/USERS/SMITH/1" on the primary file server ($FE) to the SOS volume "/MAIN/ARCHIVE/PVOLS" on the second file server ($FD):

1. Boot a Pascal volume.

2. From the command level of the Pascal system, X(ecute the NET program. Issue the following commands:

```
MOUNT /MAIN/USERS/SMITH/1,D2
SET .N2 VIRTUAL
```

   (Mount the source volume at station $FE, drive 2. corresponds to SOS device .N2)

```
SET FS STN $FD
```

```
(Change default file server)

     SET .N3 STN $FD

(Set destination drive to STN $FD)

     MOUNT /MAIN/ARCHIVE/PVOLS,D3,UPD

     SET FS STN $FE

(Restore the default file server for future
commands)
```

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

```
     QUIT

     (Exit from NET)
```

3. Use "F" to go to the Pascal filer, and T(ransfer .N2/XREF.TEXT to .N3:

```
     .N2/XREF.TEXT,.N3/$
```

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 NETUNIT unit (Section 3.0) provided with the system to issue the commands, and then using Pascal 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.

## 2.9 Network Virtual Spooled Printer

The network virtual spooled printer is a character device that will accept text and write it to a file server volume. A print server can then print the text from this volume. Any number of stations can be generating such volumes simultaneously, and one or more print servers can be servicing the queues of volumes waiting to be printed. See the Print Server Installation and Operation Manual and Print Server User's Manual for more information about print servers.

The virtual printer device is distributed with the device name .PRINTER, but can be changed when the drivers are configured, to avoid conflict with the same name used for a locally attached printer.

Whatever the name, the virtual printer is used just like a local printer, by specifying the device name when you are asked for the name of an output device. For example, you can specify the virtual .PRINTER as the listing file for the Pascal compiler. Or, to get a listing of a text file, you can ask the F(iler to transfer the file to the virtual .PRINTER device.

The virtual printer device accumulates characters in a character buffer which it writes, when full, to a volume it has created in the //SYSTEM/QUEUE/NEW directory on the file server. When the printer device is closed by SOS, the volume is unmounted and thus freed to be printed when a print server is available.

(Opening and closing the printer device is generally performed automatically by the language interpreter and SOS, and usually will not be of concern. However, in the case of some

low level I/O access, such as that by UNITWRITE in Pascal, the device may not be closed. In such cases, an explicit SOS CLOSE must be programmed).

## 2.10 Running Programs In Protected Environments

Applications programs which completely control their environment, such as VISICALC, may be used with the network virtual disk support provided that the required MOUNTS have been sent to the file server before the program is started. If necessary, this may be done by first booting a Pascal or Basic environment SOS disk and issuing the commands using NET, a STARTCMD file, or a Hello program, and then booting the application diskette.

## 2.11 Capturing Apple /// Basic Files As ASCII Text Files

In order to have the network print server print a Business Basic program you must save the BASIC program as an ASCII text file, then you must issue a print request for this text file. The process for saving tokenized BASIC programs as text files is the following:

1. Load or type the BASIC program into memory.

2. Type 'EXEC CAPTURE', prepending CAPTURE with the proper pathname if it is not on your prefix volume. (e.g. 'EXEC /LIB/CAPTURE if on the shared library volume).

A few cautions:

1. Do not 'SAVE' your program after capturing it. The EXEC adds lines to your program. If

you must save it, type 'DEL Ø' before saving.

2. You cannot capture line Ø. This is used by EXEC. If you have used this number, you MUST renumber your program if you want that line printed.

   The CAPTURE program is available from the shared SOS library volume (/MAIN/LIB/APPLE3/SOS).

# Chapter 3

# Programming

## 3.1 Using File Server Commands Within A Pascal Program

NESTAR provides Pascal "units" that allow the Pascal user to write programs that issue commands to the file server. The unit library distributed is called

NETWORK.LIBRARY

and it contains the following units:

CMDUNIT - a Pascal regular unit 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 unit NETUNIT, also contained in NETWORK.LIBRARY.

NETUNIT - a Pascal regular unit that allows programs to issue commands to the file server (local commands are NOT accepted here) and optionally gets responses back for processing by the program. In addition, NETUNIT contains routines that allow direct station-to-station communication.

The contents of NETWORK.LIBRARY may be installed in SYSTEM.LIBRARY at your local installation. If not, the Pascal program must use the $U option to specify the location of the unit library to the compiler. During linking, the same library name must also be given.

A program using CMDUNIT and/or NETUNIT must have the following "USES" in the source of the program:

```
USES (*$U network-library-name*) NETUNIT,CMDUNIT;
```

Note the order: NETUNIT must come before CMDUNIT for the declarations to compile without errors.

If the program uses only NETUNIT, then "USES" in the source of the program can be simplified to:

```
USES (*$U network-library-name*) NETUNIT;
```

### 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 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,D1; MOUNT /MAIN/B,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: ');
```

The following program, COMMAND, demonstrates the use of CMDLOOP to execute file server commands. This is, in fact, the complete source listing of the NET utility program:

```
PROGRAM COMMAND;

USES (*$U /LIB/NETWORK.LIBRARY *),NETUNIT,CMDUNIT;

BEGIN
   CMDLOOP(': ')
END.
```

### 3.1.2 NETUNIT

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 (NIL,COMMAND,RESPONSE);
```

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.

NIL — is a "virtual channel" pointer. Specify NIL for the default (and perhaps only) file server.

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

RESPONSE — is a string "VAR" variable whose value is set to the last response line sent back by the file server. If the command has been executed successfully, then the last response is usually "OK". Otherwise, the last response contains the error message text.

All intermediate response lines are written to the screen.

NOTE: The NFSCMD procedure may wait an arbitrarily long time for the command to be executed and the 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 (NIL,COMMAND,RESPONSE);
```

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 (NIL,COMMAND,RESPONSE);
             ...check other events here...

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

From Pascal, the NET program automatically issues the control 84 code when necessary to inform SOS of disk changes. When the NFSCMD procedures are used from NETUNIT, to mount virtual volumes, IT IS THE USER'S RESPONSIBILITY TO USE THE UNITSTATUS PROCEDURE OR ITS EQUIVALENT TO ISSUE THE NECESSARY CONTROL 84 OR CONTROL 85 OPERATIONS.

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 (to be typed on one line):

```
RC := NFSCMD1 (NIL,COMMAND,RESPONSE,NEWCMDFLAG,
              DONEFLAG);
```

where:

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

NIL — is a "virtual channel" pointer. Specify NIL for the default (and perhaps only) file server.

COMMAND — 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.

RESPONSE — 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.

DONEFLAG — 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.

For example, a program fragment might contain:

```
CMD := 'file server command';
RC := NFSCMD1 (NIL,CMD,RSP,TRUE,DONE);
WHILE NOT DONE DO BEGIN
RC := NFSCMD1(NIL,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 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, SET FS SLOT, SET FS STN, SET .N1) are not available in MININET. They are executed by the NET program, using CMDUNIT, not by the file server.

```
PROGRAM MININET;

USES (*$U /LIB/NETWORK.LIBRARY *) NETUNIT;

VAR
  RC: INTEGER;
  CMD,REPLY: STRING;

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 file server *)
      WRITELN (RC,',',REPLY)
      END
  UNTIL LENGTH (CMD) = 0;
                (*All done if nothing typed *)
  WRITELN ('Ciao.')
END.
```

A sample execution of the MININET program :

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

## 3.3 The SOS Basic Environment

BASIC programs can send commands to the file server using PRINT and INPUT statements to a file which has been opened to device ".NCMD". (Local commands, as described in sections 2.6 and 2.7 for the SOS Pascal environment, are not supported in the Basic environment.) To open the file, use

```
OPEN #1,".NCMD"
```

and issue a command to the file server with

```
PRINT #1;CMD$;
```

(It is important to include the trailing semicolon so that a carriage return is not sent).

File server responses must then be read using

```
INPUT #1;RESULT$
```

or network errors will result.

The first character of the result is a blank if it is not the last response, and is a plus if it is the final message from the file server. All lines should be read until the response with a plus is received.

## 3.4 Apple // Compatibility

The routines in NETWORK.LIBRARY have the same interface as routines supplied in the Apple // Network support. The only routine whose calling sequence has changed is FINDDRV, which now returns the "Dn" string to be used in file server commands as well as the integer volume number to be used as the first argument to UNITREAD and UNITWRITE.

NOTE: any existing Apple // programs which use these units must be recompiled - not just relinked - with the Apple /// version of NETWORK.LIBRARY.

The Pascal BUSSEND and BUSRCV procedure in the Apple /// NETUNIT unit are not limited to sending and receiving 256 bytes at a time, as they are on the Apple //.

## 3.5 Reading a Station Number From Within 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.

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.

## 3.6 The Nestar CVAL Convention

Apple /// Pascal allows one program to chain to another, and provides for a global string called CVAL to be passed as a parameter.

See Page 41 of the Apple /// Pascal Programmer's Manual, volume 2 (Apple Product #A3L003) for a discussion of chaining programs in the Apple /// Pascal environment. To use these procedures in the FS environment with the Nestar shared library, the line

```
USES CHAINSTUFF;
```

that immediately follows the Program heading must be replaced by

```
USES ($U /LIB/SYSTEM.LIBRARY*) CHAINSTUFF;
```

The Nestar definition of the CVAL variable allows it to be used both to specify a series of program to be executed, and to supply parameters to those programs. Programs which obey this

convention can thus be called as subroutines or be linked in a chain of consecutive program executions. Most Nestar utility programs obey this CVAL convention.

The general format of the CVAL string as a program begins execution is:

```
parm//program2, parm2//program3 ...
```

where "parm" is a parameter that is being passed to the current program. When it terminates, program1 is the next program to be executed, and it is passed the string starting with parm2.

For example, if the CVAL string has the following value when program ABC is executed

```
verbose//DEF,nosend
```

then program ABC will be executed with "verbose" as a parameter, after which program DEF will be executed with "nosend" as a parameter.

Complex CHAIN sequences may be implemented by programs which add to as well as remove names from the CVAL string. Two procedures that manipulate the CVAL string in accordance with this convention are shown here:

GETPARM (parm-string);
This procedure sets "parm-string" to the parm provided to this program. In addition, if a CHAIN program name was given then a SETCHAIN is done (for this reason, GETPARM should be called even if the invoking program doesn't expect/accept a parm). This procedure should only be called once per program since multiple calls will unstack multiple parm/program list entries.

SETPARM (parm-string, program-name-string);

This procedure sets the parm for the next program which will be executed. In addition, the program name of the program to be executed after the next program has completed can be specified (e.g, the program name could be the original program name to cause a "return" to the original program when the next program has completed). SETPARM always returns and multiple SETPARM calls are legal (to set up a list of programs to execute).

```
PROCEDURE GETPARM (VAR PARM:STRING):

VAR
  P: INTEGER;
  CVAL,PGM:STRING;

BEGIN
  GETCVAL (CVAL);
  P := POS ('//',CVAL);
  (*find the end of our parm*)
  IF P = 0 THEN BEGIN
    PARM := CVAL;
    CVAL := ''
  END
  ELSE BEGIN
    PARM := COPY (CVAL,1,P-1);
    DELETE (CVAL,1,P+1);
    P := POS (',',CVAL);
    IF P = 0 THEN BEGIN
      PGM := CVAL;
      CVAL := ''
    END
    ELSE BEGIN
      PGM := COPY (CVAL,1,P-1);
      DELETE (CVAL,1,P)
    END;
    IF PGM <> '' THEN SETCHAIN (PGM);
    (* XCTL pgm name *)
  END;
  SETCVAL (CVAL)
END;


PROCEDURE SETPARM (PARM,PGM:STRING);

VAR
  CVAL: STRING;

BEGIN
  GETCVAL (CVAL);
  SETCVAL (CONCAT (PARM,'//',PGM,',',CVAL))
END;
```

## 3.7 The SOS Network Drivers: Advanced Device Information

This section contains detailed information about the Apple /// network device drivers supplied by Nestar. General familiarity with SOS device drivers is assumed. This information is generally required for advanced programming applications only.

All the network devices are contained within a single device driver that can be configured for as many as 13 SOS devices. The device driver types are as follows:

1. .NCMD is a character device through which commands are sent to a file server, and responses received. There can be at most one .NCMD device. The Pascal routines NFSCMD, NFSCMD0, and NFSCMD1 in NETUNIT are implemented using the .NCMD device.

2. .NMSG is a character device which can be used to send and receive arbitrary blocks of data to or from another station. Although there can be at most one .NMSG device, any number of stations can be communicated to using it. The Pascal routines BUSSEND and BUSRCV in the NETUNIT unit are implemented using the .NMSG device.

3. .PRINTER is an output only character device that can be used to create spooled files to be printed by the print server.

4. .N1 through .N11 are block devices which represent virtual disks located on a fileserver. Although 11 such devices are assembled into the driver, only the first 5 are active by default. The others may be made

active by the SCP program when a system is generated, but there are various limits on the number of such devices imposed by SOS and the langauge interpreters. All the network block devices are "formatter" devices and may be used by the SOS Utility program to format virtual disks.

## 3.8 Device Configuration Block

All SOS devices are allowed to have a Device Configuration Block (DCB) that contains device dependent control and status information. The information in the DCB can be examined and modified by device calls described later. All the network devices have identical DCBs, whose format is as follows:

| Offset | Name | Length | Default | Description |
|---|---|---|---|---|
| 00 | MODE1 | 1 | 1 for NMSG<br>0 for others | Network connect persistence mode 0=try forever, 1=try briefly |
| 01 | MODE2 | 1 | 0 | Speaker click control 0=click, 1=no click |
| 02 | MODE3 | 1 | 0 | (Currently unused) |
| 03 | SLOT | 1 | 2 | Slot number of network card |
| 04 | STATION | 1 | $FE | Station number to connect to |
| 05 | PORT | 2 | 0 | Port within STATION (currently unused) |
| 07 | PASNUM | 1 | n | For block devices: Virtual drive # |
| 07 | MTYPE | 1 | | For .NMSG: Message type |
| 08 | NWERR | 1 | | Detailed network error code |
| 09 | BLKLEN | 2 | 0 | For block devices: virtual disk size |

The MODE1 flag controls whether the network drivers should wait forever to establish the initial connection to a remote station. For communicating with server stations it is usually set to "wait forever" mode, but for communicating with non-servers that may not be responsive for relatively long periods, it is best to set MODE1 to 1 to avoid excessive bus overhead. It is this flag that is used to effect the difference between NFSCMD0 and NFSCMD in NETUNIT.

The three fields SLOT, STATION, and PORT constitute the identification of a remote process called a CHANNEL in the NETUNIT documentation and interface.

The PASNUM field contains the virtual drive number which is sent to a fileserver when an I/O operation is requested. This number corresponds to the "Dn" parameter on the CREATE and MOUNT command. The virtual drive number initially corresponds to the SOS name of the device: .N1 is virtual drive 1, .N2 is virtual drive 2, and so on.

The MTYPE field is used, for the .NMSG driver, to communicate the type field of the message sent or received.

The NWERR field describes the last device-dependent error code returned to SOS, as follows:

| Code (hex) | Code (decimal) | Meaning |
|---|---|---|
| $30 | 48 | Checksum failure (more than 15 retries) |
| $31 | 49 | This station is not addressed. |
| $32 | 50 | User abort (CTRL-OpenApple) |
| $33 | 51 | Station address error |
| $34 | 52 | Timeout |
| $35 | 53 | Collision |
| $36 | 54 | Length error (received packet too big) |
| $37 | 55 | Packet sequence error from fileserver |
| $38 | 56 | Network busy |
| $39 | 57 | Incoming message is arriving |
| $3A | 58 | No longer connected |
| $3B | 59 | Already connected |
| $3C | 60 | Can't open virtual print volume |

## 3.9 Device Driver Calls

The network device drivers support all the primitive I/O operations as defined by SOS, including, as appropriate for the device type, D-INIT, D-READ, D-WRITE, D-STAT, D-CNTL, D-OPEN, and D-CLOSE.

The read and write calls are normally done through a language interpreter. In Pascal, UNITREAD and UNITWRITE are used (directly or indirectly), and in Basic INPUT and OUTPUT are used.

The status and control calls accept a code and data area, and may be called directly from Pascal using the UNITSTATUS procedure. See pages 211-213 of the Apple /// Pascal Programmer's Manual Volume 1 for details of

UNITSTATUS.

## 3.10 The .NMSG Device Driver Calls

The .NMSG driver sends or receives an arbitrary block of data to or from another station. Each write operation may result in multiple packets being transmitted as necessary. The receiving station must be executing a read operation on the .NMSG device to receive the message. If the receiving station attempts a write operation to .NMSG when a message is arriving, error 57 ("incoming packet is arriving") is returned, and the station should then do a read operation.

The CHANNEL area of the DCB is used to identify the station being communicated with. It should be set before a write operation and examined after a read operation.

The control and status calls for .NMSG are the same as for .NCMD, with the following additions for setting and examining the message length and type:

| Status code | Meaning |
|---|---|
| 83 | Return message type byte in data area |
| 84 | Return message length (two bytes) in data area |

| Control code | Meaning |
|---|---|
| 83 | Specify the message type byte for the next outgoing message. (The message length is specified by the length of the data in the write operation.) |

## 3.11 The .N1 ... .N11 Device Driver Calls

The network block devices respond to SOS block calls just like local block devices. The file server is indicated by the current CHANNEL in the DCB of the device, and is sent the virtual device number from the DCB as the identification of the virtual disk being read or written. The status and control calls are as follows:

| Status code | Meaning |
|---|---|
| 00 | Return the block device status byte. (Always 00 for network block devices.) |
| 01 | Return the DCB (as for .NCMD). |
| 81 | Same as 01. |
| 82 | Return the CHANNEL from the DCB. |
| 83 | Return the virtual drive number from the DCB. |
| 85 | Return the station address for this network card of this station. |

| Control code | Meaning |
|---|---|
| 00 | Reset the network interface card hardware, and set MODE1 and MODE2 to zero. |
| 01 | Store the DCB (as for .NCMD). |
| 81 | Store the DCB (as for .NCMD). |
| 82 | Store the CHANNEL (as for .NCMD) |
| 83 | Set the virtual drive number in the DCB. |

84 Set the disk change flag, read the descriptor of the virtual disk, and set MAXBLOCKS to tell SOS how big the disk is.

85 Set the disk change flag.

IMPORTANT NOTE: SOS must be informed whenever a virtual disk has been changed by a MOUNT or CREATE command, because certain directory and bitmap information is kept stored within SOS and would be incorrectly applied to the new disk. This is analogous to hardware for the local floppy disk which signals that the diskette has been changed.

Control operations with code 84 or 85 are used to inform the driver that it, in turn, is to inform SOS (using the "media changed" error 46) that the virtual disk has been changed. In addition, control code 84 causes the descriptor of the virtual disk to be read, and the MAXBLOCKS field of the SOS DIB to be updated so that SOS knows the new size of the block device. This is necessary so that a format operation will correctly initialize the directory structure.

From Pascal, the NET program automatically issues the control 84 code when necessary to inform SOS of disk changes. When the NFSCMD procedures are used from NETUNIT, to mount virtual volumes, IT IS THE USER'S RESPONSIBILITY TO USE THE UNITSTATUS PROCEDURE OR ITS EQUIVALENT TO ISSUE THE NECESSARY CONTROL 84 OR CONTROL 85 OPERATIONS.

Note that there are several problems with the way that the Apple Pascal system handles the

"media changed" error returned by your block device drivers. Specifically,

1. Under some conditions, UNITREAD and UNITWRITE may return the "media changed" error. If so, the operation should be retried. The media changed error is IORESULT 46, not documented in A3L0003 version of the Pascal Programmer's manual.

2. The Pascal system does not use the media changed error to invalidate its stored copy of an Apple II format directory. Errors that operations such as RESET may use the old directory even after a new disk has been mounted and disk change signalled.

## 3.12 Device Identification Codes

The manufacturer ID assigned to Nestar by Apple is $0022. The devices types and subtypes of the various drivers are as follows:

| DEVICE | TYPE | SUBTYPE |
|---|---|---|
| .NCMD | $65 | $01 |
| .NMSG | $65 | $02 |
| .PRINTER | $41 | $04 |
| .N1...N11 | $F2 | $01 |

# Chapter 4

# Additional Utilities

## 4.0 Network Utility Programs

Additional network utility programs available to the Apple /// user are:

STARTUP (Section 4.1)

TREEWALK (Section 4.2)

Run the programs by X(ecuting) /LIB/PROGRAM where "LIB" is the shared library volume on your network that contains the desired utility "PROGRAM".

## 4.1 STARTUP Command Program

STARTUP is the program that runs automatically in the user station when the boot volume is mounted. STARTUP is called NESTAR.START on the shared SOS library volume /MAIN/LIB/APPLE3/SOS. It is the program that is SYSTEM.STARTUP on the APPLE /// boot diskette supplied by Nestar.

STARTUP is called NESTAR.START on the shared SOS library volume /MAIN/LIB/APPLE3/SOS. It is the program that is SYSTEM.STARTUP on the APPLE /// boot diskette supplied by Nestar.

STARTUP first checks the booted disk for a file named SYSTEM.STARTUP. If present, it is chained to. Otherwise, STARTUP reads a file from the booted disk called STARTCMD.TEXT and interprets each line as a command.

The STARTUP program reads a file from the booted disk called STARTCMD.TEXT and interprets each line as a command. The format of each command is:

<command> ::= <verb><blanks> <optional-operand>

The legal <verb> <operand> sequences are as follows:

| | |
|---|---|
| ; <anystring> | Ignored as a comment. |
| PRINT<anystring> | Print the string on the screen. |
| CLEAR | Clears the screen. |

NET<fileserver command>Executes file server or local command (e.g., MOUNT or SET DRIVE).

NOECHO <command> Executes <command> but doesn't print it.

ASK <command> Asks whether to execute <command>.

ASK=Y <command> Same as ASK, except that a carriage-return (only) response means yes.

ASK=N <command> Same as ASK, except that a carriage return (only) response means no.

ASK ... PROMPT text The PROMPT option on ASK allows you to use your own prompt text. The prompt is NOT quoted and consists of whatever follows the word "PROMPT".

CONTINUE Asks if it is ok to continue. A reply of no means QUIT.

CONTINUE=Y Same as CONTINUE, except that a carriage return (only) response means yes. The prompt on screen will be

| | |
|---|---|
| | CONTINUE (Y/N)?<br><br>and any typed response will replace the default Y. |
| CONTINUE=N | Same as CONTINUE, except that a carriage return (only) response means no. |
| SET USER id | Sets a file server lock with the id specified. The convention is that "id" are your initials and the lock name generated is USER.id. This allows a user to issue the file server command "SHOW ALL LOCKS" to determine the initials of the users currently using the network. |
| SHOW FORMDATE | Displays the date and time on the screen. The format is:<br>Day dd-Mon-Year hh:mm:ss |
| NEWS | Displays general system information (contents of /LIB/NEWS.TEXT). |
| CHAIN<program name> | Passes control to the program named. Note that control is never returned to the startup program so commands following this command are not processed. |

| | |
|---|---|
| SET DATE | Sets the system date to the current date (from the file server), as if the user had used the D(ate command in the Pascal Filer. |
| QUIT | Exits the STARTUP program. |

Example

```
; this is abc1:startcmd.text
PRINT
PRINT     THIS IS /MAIN/USERS/ABC/1
PRINT
continue=y
set date
noecho set user abc
net SET DIR /MAIN/USERS, PRVPW=xxx
net MOUNT ABC/TEMP,D1,RW,SHR
PRINT
ask=n news prompt display current news
```

This list of program commands begins with a comment ignored by the startup program ("this is startcmd.text"). When the volume is booted, "THIS IS /MAIN/USERS/ABC/1" is printed on the user-station screen. The user is then asked whether the startup program should continue or not. Typing "n" <return> quits the program and the Pascal command line comes up. Typing <return> causes the startup to continue. The program then sets the Pascal system date to the current file server date.

A user id is then set in the system. A default partial pathname is set, as well as a private password that may be required to access directories or virtual volumes.

The virtual volume /MAIN/USERS/ABC/TEMP is mounted on drive d1 (.n1), for shared, read/write use.

Finally, the user is prompted to display the system's news. Pressing <return>, however, is equivalent here to "no".

## 4.2 TREEWALK Utility Program

TREEWALK allows you to apply NET program network commands to more than one virtual volume and/or directory at a time.

When you specify a command and directory, TREEWALK will apply that command to the directory, to all volumes and directories listed in that directory, and to all volumes and subdirectories beneath that directory.

To use TREEWALK, X(ecute from the Pascal command line /LIB/TREEWALK.

### Command Syntax:

command [pathname] [options]

Legal commands are:

| | |
|---|---|
| LIST | PROTECT |
| DELETE | Q(uit |
| FS | RENAME |
| HELP | SHOW PROTECTION |
| ? | |

TREEWALK commands, for the most part, are extensions of file server commands simply applied to the entire subtree of the specified path, instead of the single path. Type an <esc> to abort a TREEWALK command.

For a more detailed description of a command, type: "HELP command".

LIST [pathname]

This command gives a nested listing of the specified pathname. The pathname is a legal file server pathname.

SHOW PROTECTION [pathname]

Issues a file server SHOW PROTECTION command for each directory or file found by traversing the specified path. If you only wish to traverse a specific subtree, answer "Y" to the "Show [path name of subtree]" and answer "N" to the subtrees you don't wish to see.

PROTECT [pathname] [,protection list]

Protects each file found by traversing the specified path, with the protection list. If you wish to traverse a specific subtree answer "Y" to the "Protect [path name of subtree]" prompt and answer "N" to the subtrees you don't wish to see. You may optionally be prompted before protecting each directory or file by responding "Y" to the "Prompt for each directory or file" prompt.

DELETE [pathname]

This command issues a FS DELETE command for each directory or file found by traversing the specified path. If you wish to traverse a specified subtree, respond "Y" to the prompt "Delete [subtree]?", or "N" if you don''t wish to traverse that subtree. You may optionally be prompted before deleting each directory or file by responding "Y" to the "Prompt for each directory or file" prompt.

RENAME [pathname]

This command issues a FS RENAME command for each directory or file found by traversing the specified path. If you wish to traverse a specified subtree, respond "Y" to the prompt "Rename [subtree]?", or "N" if you don''t wish to traverse that subtree. If you wish to rename a directory or file, type in the new name after the prompt:

-->RENAME SUBTREE,

If you don't want to rename that path then just enter a <cr>.

FS

This command allows you to enter file server commands from TREEWALK.

Entering

FS command

causes one file server command to be issued.

Entering

FS <return>

causes the NET prompt to be displayed. File server commands can be entered one at a time until "Q" <return> is entered.

Book 6

4-9

# 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 140

- return message, such as OK, ILLEGAL COMMAND, or TYPE=Apple /// PASCAL

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.

Some Pascal I/O error messages may be returned as a result of network operations:

16 Write-protect error: the specified diskette is write-protected.

64 Device error: failed to complete a read or write correctly.

Error 16 occurs when you attempt to write into a virtual volume that has not been mounted with READ/WRITE access.

Error 64 occurs when, for example, when the system attempts to read or write past the end of the volume. This might occur if a block number is given that is outside the range of the file, or if you initialize a virtual volume to a size larger than that given when you created it.

Error 64 may also occur if the network hard disk has been damaged.

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 11. Example: "D4".

5,ILLEGAL STATION NUMBER

A station number must be specified as a two-digit hexadecimal number preceeded 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 occurence of a keyword parameter, even if multiple occurences have the same value.

8,ILLEGAL TYPE PARAMETER

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

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

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: "d1".

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,COMMAND NOT ALLOWED FROM THIS STATION

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

51,NOT BINARY

The pathname indentifies 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.

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,ERROR IN SET TIME PARAMETERS

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 D12".

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.

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,C,3,I,U,T). 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).

Local Commands (90-92)

90,DRIVE(S) REQUIRED

A drive number is required for this command. Example: "SET .N1 VIRTUAL".

91,DRIVE NUMBER CAN NOT BE USED

There are 12 drives (also called "volumes") in Apple Pascal, but only some of them can be made virtual with the SET DRIVE local command.

92,NO SOS NETWORK DRIVER

Returned when a local command includes an inactive or nonexistent device.

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 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.

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 <CONTROL><open-apple> 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.

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.

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. To delete non-empty directories (i.e. subtrees) see the description of the TREEWALK utility in Chapter 4 of this manual.

117,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 necesary 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; for more information, see the table of I/O errors in Appendix A of the file server Installation and Operation manual.

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).

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 whenvever 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

## 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

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 DIR

- displays names of current default directory

SHOW ID

- displays file server identification number

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 TIME

- displays current date and time

SHOW TYPE Dd

- displays type of virtual disk mounted on drive d

SHOW TYPES

- displays types of virtual disks mounted on drives 3-12

SHOW VOLS

- 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)

## Parameters

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

drive: either Dd or .nd (for some local commands) where d=number between 1 and 11

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=I (IBM PC DOS)
   T=T (text)            T=Y (directory)
   T=U (IBM PC           T=3 (Apple /// SOS)
       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 .Nn[,.Nn,...][,VIRTUAL] [,SLOT n]
SET FS [,SLOT n] [,STN $nn]
SPOOL TO device name/file name
SPOOL OFF
```

## Other NET Inputs

drive: 1-11
drive-status: R, REAL, or V, VIRTUAL
slot: default virtual slot

A

Apple //
    compatibility 3-9
    emulation 1-1
ASCII text files 2-19
ASK 4-3

B

BASIC 2-14, 3-8
    files, Apple /// 2-19
bibliography BB-1
block structured devices 1-2
boot diskette 1-1
booting your workstation 1-1, 1-4, 1-10
BUSSEND 3-9
BUSRCV 3-9

C

CHAIN 4-4
CHAINSTUFF 3-10
CLEAR 4-2
CMD 3-3
CMDLOOP 3-3
CMDUNIT 3-1, 3-2
COMMAND 3-2, 3-4
configuration, boot diskette 1-2
contents v
CONTINUE 4-3

INDEX

CREATE 2-7
creating virtual volumes 2-7
CVAL 3-10

D

.Dn 1-1
DCB 3-15
DEF 3-11
Device Configuration Block 3-15
device driver calls 3-18
device drivers 1-3, 3-14
device indentification codes 3-22
devices, network 1-1
disclaimer ii
DONEFLAG 3-5
drives 2-10

E

EXEC CAPTURE 2-19

F

file server software version number iii

G

GETPARM 3-11

L

LIB 4-1
//LIB/APPLE3/SOS 1-3
local NET commands 2-11

M

/MAIN/LIB/APPLE3/SOS 4-2
MININET 3-7
multiple file servers 2-15
multiple networks 2-15

N

.NCMD 1-2, 3-14
Nestar CVAL Convention 3-10
NESTAR.START 4-2
NET
    commands, local 2-11
    inputs 2-14
    program 2-4
NETUNIT 3-1, 3-4
NETWORK
    .DRIVER 1-3
    .LIBRARY 3-1
network devices 1-1
network
    names 2-1
    utility programs 4-1

NEWCMDFLAG 3-5
NEWS 4-4
NFSCMD 3-4
NIL 3-4
.NMSG 1-2, 3-14, 3-19
.Nn 1-2, 1-3, 3-14, 3-20
NOECHO 2-14, 4-3

O

OPTIONS 3-2

P

Parm 3-11
Pascal units 3-1
pathnames 2-1
PRINT 2-11, 4-2
.PRINTER 1-2, 1-4, 3-14
printer, virtual 1-2, 2-18
programming 3-1ff
protected environments 2-19

Q

QUIT 4-5

R

RC 3-4
reading a station number 3-9
RESPONSE 3-4

S

SCP program 1-3, 1-4
SET
    DATE 4-5
    FS 2-13
    .Nn 2-13
    USER 4-4
SETPARM 3-11
shared disk organization 2-1
shared library volume 1-3
SHOW
    DRIVES 2-1
    FORMDATE 4-4
    FS 2-13
    STATION 3-9
size
    virtual volumes 2-7
    virtual diskettes 2-7
SOS 1-2
    BASIC 3-8
    DRIVER 1-1, 1-2, 1-4
    network Drivers 3-14
spooled printer 2-18
STARTUP 4-1, 4-2
starting up 1-1
station numbers 3-9
SYSTEM.LIBRARY 3-1

SYSTEM.STARTUP 4-2

T

TREEWALK 4-1, 4-7

U

units, Pascal 3-1
updating a boot diskette 1-1ff
"USES" 3-2
using virtual drives 2-10
utility programs, network 4-1

V

VAR 3-4
variable size diskettes 2-1
version number, file server software iii
virtual
    devices 1-2
    diskettes 2-1
    drives 2-10
    printer 1-2, 2-18
    spooled printer 2-18
    volumes 2-1, 2-7

Other

%filename 2-15

## 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 :

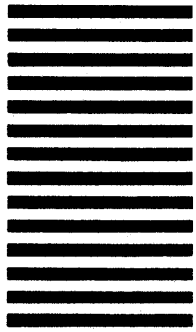
Address :

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