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4/87

the system administrator's guide to XENIX®

2nd Edition

To the System Administrator:

As we prepared this guide, we tried to keep in mind your needs. We assume that you are relatively unfamiliar with XENIX, and perhaps have little computer experience, but are eager to establish an office system that uses XENIX as a base.

XENIX is a sophisticated, complex tool, but you don't have to know all about it or understand it completely to use it to great advantage. Therefore, in this guide we have frequently told you the hows and not the whys. We felt it was important to give you usable information quickly and simply.

When you feel comfortable using the procedures described here, you may want to learn more about XENIX. The following books are excellent sources and can be obtained at most bookstores with a computer science section:

> *Exploring the UNIX™ System*, by Stephen G. Kochan and Patrick H. Wood. Hasbrouck Heights, NJ: Hayden Book Company, 1984.

> *A User Guide to the UNIX™ System*, by Rebecca Thomas and Jean Yates. Berkeley, CA: Osborne/McGraw-Hill, 1982.
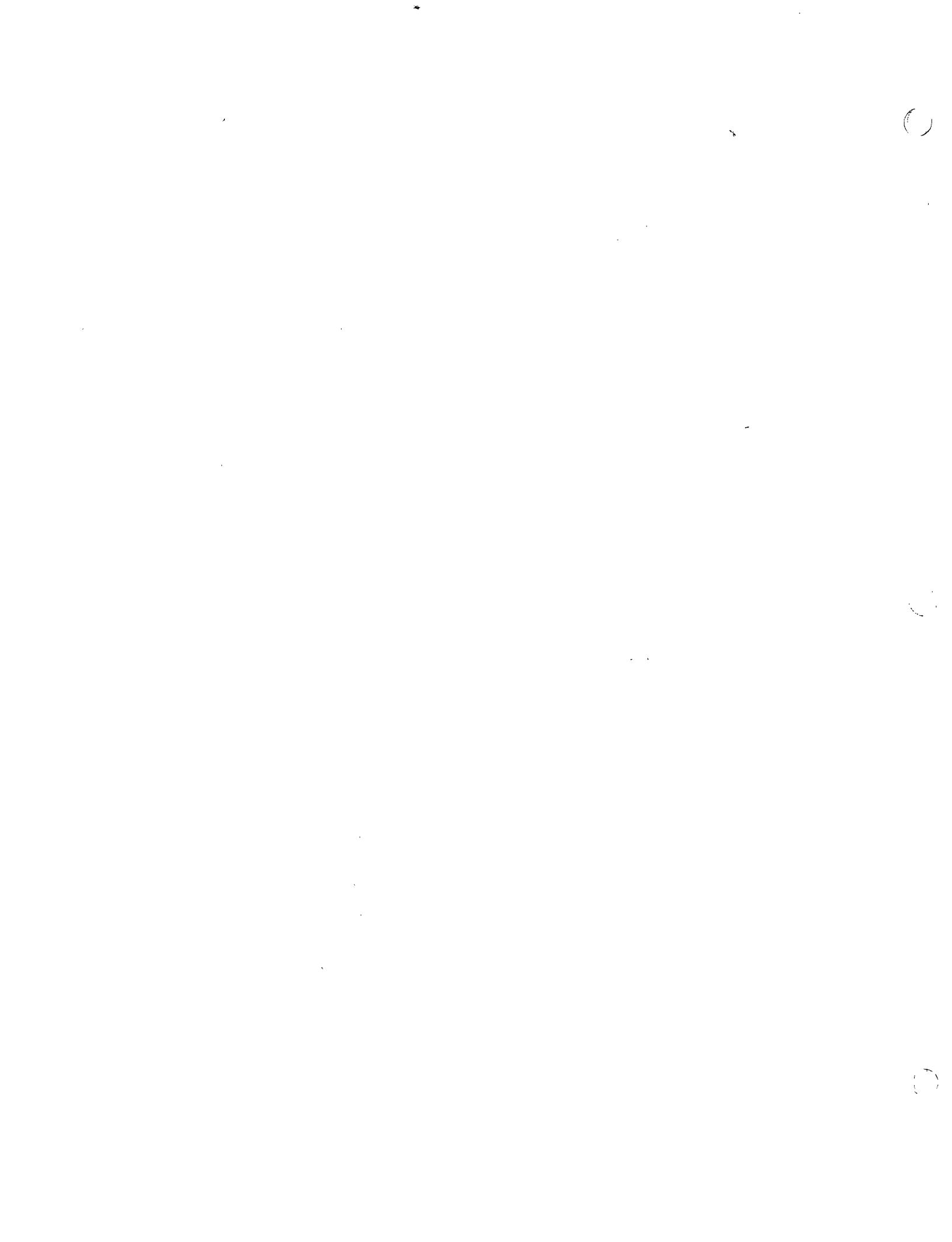
The Tandy XENIX system is in 2 parts — the Core System and the Development System. The Core System comes with your computer; if you want the Development System, you must purchase it separately. It contains programming tools and text-processing tools and is primarily for those who wish to use these advanced features.

We believe that as you increase your XENIX knowledge and skills, you will become intrigued with the possibilities for using it in your office. We welcome your comments and suggestions concerning XENIX and these guides. Please send them to:

> XENIX Editor
> Technical Publications
> 900 Two Tandy Center
> Fort Worth, TX 76102

Although we cannot acknowledge or respond to individual letters, we assure you that your communications will be taken into consideration as we prepare future versions of XENIX and later editions of these guides.

If you have specific questions or problems that require immediate attention, please contact our Computer Customer Service Department. The representatives in this department are specially trained to help you.

contents

introduction

This manual is for you, the System Administrator of a XENIX system. It contains the information you need to install, maintain, and run your XENIX system.

As System Administrator, you have important responsibilities. These include the following:

- Installing XENIX
- Installing applications programs
- Creating users
- Making backups
- Maintaining the file system
- Setting up terminals

XENIX provides you with powerful tools, and you can use them to create and maintain an extremely efficient data processing center for your business. This manual contains step-by-step instructions for completing all routine tasks. You can use it, *The User's Guide to XENIX*, and the *XENIX Quick Reference Guide to Commands* to establish and maintain a fully functioning multiuser, multitasking environment.

A glossary and an index are in the back of this manual. You can use these devices to locate specific information quickly.

XENIX and your computer keyboard

XENIX is a lowercase system. In general, it recognizes lowercase alphabetic characters. Be sure to type lowercase characters when entering commands. If you are typing text to be printed on the line printer, you can use uppercase, lowercase, or a combination.

Some of the keys on your keyboard have a special meaning to XENIX. You frequently use control key sequences in XENIX. When typing a control sequence, press [CTRL], hold it down, and press the second key. Then, release both keys simultaneously.

The following are some useful control sequences:

[CTRL] d	Logs you out of XENIX and ends input for some commands.
[CTRL] q	Starts scrolling (moves text up and off the screen) after you have stopped it.
[CTRL] s	Halts scrolling (stops text from moving up and off the screen).
[CTRL] 6	Produces the tilde (˜) on the screen.
[CTRL] 9	Produces a backslash (\) on the screen.
[CTRL] 0	Produces a vertical line, or pipe (|), on the screen.
[CTRL] '	Produces a backwards quotation mark (`) on the screen.

Some important keys:

BREAK	Interrupts a command or program and returns you to your prompt.
ENTER	End every command in XENIX by pressing ENTER. If a screen message instructs you to type or press RETURN, press ENTER.

XENIX commands

Commands in this guide are in **boldface**. Type boldface text exactly as it appears. Text in *italics* indicates a variable; you substitute something for the italicized text. For example, in the command **cat *filename***, you substitute the actual filename for the word *filename*.

about your equipment

To run XENIX you must have:

- A Tandy computer with 512K memory
- A hard disk
- One floppy drive

You can use the following optional equipment:

- A Tandy printer
- A maximum of 5 Tandy data terminals (more than 2 terminals requires the RS-232 card)
- Multiple floppy drives
- Multiple hard drives
- Disk cartridge system
- Modem(s)
- Additional memory
- High Resolution Graphics

1

installing XENIX
on your hard disk

XENIX is supplied on 4 floppy diskettes — Boot Disk, Install 1, Install 2, and File Maintenance. (An Upgrade floppy diskette is also included in upgrade releases.) Before you can use XENIX, you must transfer the data on these diskettes to the hard disk.

Normally, you transfer XENIX to hard disk only once. After you have done so, however, keep the diskettes in a safe place in case you need to reinstall XENIX because of some problem with the hard disk. If you make a mistake during installation, press the reset switch and repeat the process from the beginning.

Before you begin, look at the Media Error Map that is attached to your hard disk. Copy the information from the TRACK and HEAD columns so that when asked to do so later you can enter it.

Important Note to Disk Cartridge System Users: You must turn on the disk cartridge system **before** the hard disk and the computer. Do not run XENIX with the disk cartridge system attached but not turned on. This can cause XENIX to crash and could result in data loss. Also, be sure that the disk cartridge system is the last thing turned off. (You can connect the entire system, including the disk cartridge system, to a power strip and turn it all on at once.)

formatting your hard disk

1. If you have a disk cartridge system connected, turn it on first. Then turn on the hard disk followed by your computer. Do not write-protect the hard disk.

   Note: Before formatting your hard disk, you should turn it on and let it warm up for 30 minutes.

2. Press [BREAK] and [REPEAT] simultaneously until the screen shows:

   ```
   INSERT DISKETTE
   ```

3. Place Boot Disk in floppy Drive 0. After the screen shows the copyright notice, the following prompt appears:

   ```
   Xenix Boot>
   ```

4. Type **diskutil** [ENTER], and the screen shows this message:

   ```
   Diskutil: format or copy floppy diskettes
            format hard disks
            format or copy disk cartridges

   At any time you may type <break> or press RESET to
   abort the procedure.  The backspace key may be used to
   correct single characters of your input.  End each
   line you type by typing <enter>.

   Diskutil:  Hard, floppy, or cartridge (h, f, or c)?
   ```

11

5. Type **h** `ENTER` and the screen shows:

    ```
    Hard disk unit number (0..3)?
    ```

    Type **0** `ENTER` to indicate that you are formatting your primary, or first, hard disk. The screen may show:

    ```
    Destructive or Non-destructive format (d or n)?
    ```

    Type **d** `ENTER`.

    You must choose "destructive format." This assures that XENIX will write and verify the tracks on your hard disk in the proper manner.

    You choose "non-destructive format" only when you are upgrading from a previous version of XENIX or when you are reformatting and your hard disk contains data that you want to save.

6. The screen now shows:

    ```
    Consult your computer manual, or the instruction sheet
    that accompanies your hard disk, for the answers to
    the following two questions:

    How many cylinders (tracks)?
    ```

7. Answer this question and the one following with the numbers given in the manual. For example, if you have a 15-megabyte hard disk, there are 306 cylinders and 6 heads. After you answer both questions, the screen shows:

    ```
    Desired interleave factor (<ENTER> for default)?
    ```

    Press `ENTER`.

8. Now the screen shows the following message:

    ```
    Find the MEDIA ERROR MAP and type in the list of TRACK
    and HEAD numbers as follows.  For instance, if the
    list shows
        TRACK        HEAD       BYTE COUNT       LENGTH
         133          00          01333            02
         174          03          09826            05
    you should type
         133,0 <enter>
         174,3 <enter>
         done <enter>
    If the list is empty, just type "done".
    At any time, you may type <break> to abort.

    enter next pair or "done":
    ```

9. After you type **done** `ENTER`, the following appears on your screen:

    ```
    Full, partial, or no verify (f,p,n) ?
    ```

    Type **f** `ENTER`. Always do a full verify when first formatting a hard disk.

    Note: If you are reformatting to add an entry to the Media Error Map, be sure to enter all the bad tracks found by diskutil during previous formattings. You may use partial verify in this case to speed formatting, but we recommend that you use full verify. Partial verify takes about half the time of full verify.

10. When the verify is complete, your screen shows:

    ```
    About to format hard disk drive 0.
    This will take about xx minutes.

    Type <enter> to proceed or <break> to abort:
    ```

On your screen, xx is the number of minutes. The time depends on the size of your hard disk.

11. Press ENTER. When the formatting is complete, the screen shows:

```
Hard disk successfully formatted.
Drive parameters and MEDIA ERROR MAP successfully
written.
Your hard disk is ready for the XENIX initialization.

Diskutil:  Hard, floppy, or cartridge (h, f or c)?
```

12. Press the reset switch and then press BREAK and REPEAT simultaneously until the following prompt appears on the screen:

```
Xenix Boot>
```

initializing your hard disk

Follow the steps below to initialize your hard disk.

1. At the prompt, press ENTER and the screen shows:

```
System loaded . . .
Change root disk if desired;
type <enter> to proceed or <break> to abort
```

2. Press ENTER. After a while, the following question appears on your screen:

```
Do you wish to initialize your hard disk?
```

Since you wish to do so, type **y** ENTER. Now the program asks:

```
Has your hard disk been formatted with diskutil?
```

3. Type **y** ENTER. The screen shows the following message:

```
Is this a Model II? [y or n]
```

4. If you are installing XENIX on a Model II, type **y** ENTER. Otherwise, type **n** ENTER. The screen shows:

```
Do you want the standard size swap area? [y or n]
```

Type ~~y~~ ENTER *N*   9766

Note: The swap area is the space XENIX uses to temporarily store information on running programs. The standard size is 2057 blocks. In most cases, you can use the standard size. If you want to change the size of this area, type **n** ENTER in response to the above question. XENIX then asks you a series of questions. Respond when you are prompted to do so.

5. Now, the screen shows that initialization is proceeding. This takes a few minutes. When initialization is complete, the screen shows:

```
Please reboot from the hard disk after the system
shuts itself down.

Halting system . . .
** Normal System Shutdown **

[Z80 Control System Halted]
```

6. Now, remove the Boot Disk from Drive 0.

Note: If, for some reason, you are reinstalling XENIX, the system may tell you that your hard disk contains data and ask whether you wish to "overwrite." Type **y** ENTER to finish initializing.

installing the XENIX core

Now you are ready to copy the contents of the Install disks onto your hard disk. In this phase you boot—startup—from your hard disk. To do so, press the reset switch, but do not press BREAK . The screen shows:

```
Xenix Boot>
```

Press ENTER , and follow the steps outlined below to complete your installation of XENIX.

1. XENIX sometimes refers to a floppy diskette as a "volume." When it does so, simply follow the instructions as they pertain to the floppy diskette. When you press ENTER at the boot prompt above, the screen shows:

    ```
    For each floppy in the distribution set, insert the
    floppy into Drive 0 and press <Enter> or type y. Type
    n after the last floppy is installed.

    If you ever see the message "tar: please mount new
    volume," insert the next floppy into Drive 0 and press
    <ENTER>. Do not interrupt the installation of the
    distribution at this point.

    First Floppy? [y,n]
    ```

2. Insert Install 1 and type **y** ENTER . When the data is transferred to your hard disk, the screen shows:

    ```
    Next Floppy? [y,n]
    ```

    Remove Install 1 and insert Install 2. Type **y** ENTER . When the data on this diskette is transferred to your hard disk, the screen again shows:

    ```
    Next Floppy? [y,n]
    ```

    Remove the Install disk. If there are more Install diskettes, continue to insert them into the drive until all have been transferred to hard disk. Then type **n** ENTER . The screen shows:

    ```
    Setting up directories and permissions.
    ```

3. XENIX then asks for information concerning your location and timezone. Answer these prompts appropriately for your area.

4. Next, the screen shows:

    ```
    Installation complete.

    Type CONTROL-d to proceed with normal startup, (or
    give root password for system maintenance):
    ```

5. Type CTRL **d**. Your hard disk now contains the complete XENIX operating system. The last instruction above is the normal boot you see whenever you start the system. The next chapter explains how to log in and log out and how to shut down the system.

2

accessing XENIX

Now that you have installed XENIX on your hard disk, XENIX boots when you power up the hard disk and the computer. At this point in the installation, however, XENIX is booted, and you are ready to enter the date and time and log in. See the section at the end of this chapter for routine startup procedures when your system has been totally shut down.

XENIX asks you to enter the date and time in the following format:

yymmddhhmm

yy is the year; **mm** is the month; **dd** is the day; **hh** is the hour (in 24-hour units); and **mm** is the minutes. For example, to enter 2:05 P.M., October 7, 1984, type:

8410071405 ENTER

You may press ENTER and not type the date and time at all. We strongly recommend, however, that you always type the full date and time. XENIX stores this information and lets you automatically access it in applications programs. The date is also important in determining when files were created or changed. If you press ENTER and do not type a date, XENIX uses the date it displayed as the current date.

Now type the current date and time and you are ready to log in.

logging in

Logging in is simply identifying yourself to XENIX. As the System Administrator, you may log in as "root" and as a user. And, as the System Administrator of a multiuser system, you are the only person who can log in as root. For now, we will show you how to log in as root, how to assign yourself a root password, how to log out, and how to shut down the system. In the next chapter, we will show you how to log in as a user and how to create other users.

You must log in as root to perform the following operations: install applications programs, make periodic and daily backups of the system, restore a hard disk, check the files.

1. After you enter the date and time, the screen shows:

    login:

    Type **root** ENTER.

2. The root prompt (**#**) now appears on your screen. Type:

    passwd ENTER

The screen shows:

```
Changing password for root
Enter new password (minimum of 5 characters)
Please use a combination of upper and lowercase
      letters and numbers.
New password:
```

Choose your password carefully. It can contain a minimum of 5 characters and can consist of any characters on the keyboard except BACKSPACE, BREAK, and ENTER. Mix upper- and lowercase characters and numbers. Be sure that it is not something easily guessed or something that you might not remember.

Warning: Do not forget your root password. If you do forget, you must reinstall the XENIX system from the distribution floppy diskettes.

3. Type your password and then press ENTER. Notice that the screen does not display the password.

4. Now the screen shows:

```
Re-enter new password:
```

5. Type your password again and press ENTER. XENIX records your password in a file called /etc/passwd. The screen shows the root prompt.

logging out

To log out, or sign off, at the root prompt type:

CTRL d

XENIX returns to the login: prompt. In a multiuser environment, the system is now ready for a new user to log in.

At this point, you can shut down the system and turn off your computer, hard disk, and peripherals. We recommend, however, that you leave your system up and running 24 hours a day. Password protection makes your files secure, and the continuing successful operation of your hardware is more assured if the system is not turned on and off with any frequency. The cost of power to keep it running is offset by fewer hardware repair bills and less down time.

shutting down the system

Although we recommend that you not shut down the system on a regular basis, the routine for shutting down is given below.

Caution: If you are in a multiuser environment, that is, if other users are logged in on terminals, you should warn users before shutting down the system. To do so, at the root prompt type **shutdown** ENTER. XENIX asks you how many minutes until shutdown and asks the reason for the shutdown. Then XENIX sends a message to that effect to all users. XENIX then shuts down at the specified time.

If the system is not shut down properly, the next time you boot XENIX you may see a message that the system was not shut down properly and needs cleaning. XENIX will ask if you wish to proceed with cleaning. Always respond "yes" to this question.

1. The screen now shows the login: prompt. Type **root** ENTER and then type your password.

2.   When the root prompt appears, type:

shutdown [ENTER]

The screen shows:

        Minutes until shutdown? (0-30):

Type a number from 0 to 30, and press [ENTER].

Next, the screen shows:

        Shutdown and Halt, Reboot, or go Single-user? (h, r,
        or s):

Type **h** [ENTER]

Now, the screen shows:

        Shutdown reason?

Whatever you type at this prompt will be displayed with the warning message.

Note: If you want extra protection for your hard disk, before typing the above command type **/etc/park –on** [ENTER]. The read/write head of the hard drive will move to the last cylinder of the hard disk when the system shuts down. Using **park** protects your hard disk from accidentally being damaged by a hard knock or a power surge. When you start up XENIX for the first time, park is off. This means that the read/write head is not moved before shutdown. If park is on, you may need to press the reset switch twice to reboot XENIX.

3.   The following appears on your screen:

        ** Normal System Shutdown **

        [Z80 Control System Halted]

4.   Now turn off your computer and then turn off your hard disk.

starting up after shutdown

Your entire system is now turned off. If you have a disk cartridge system connected, turn it on. Then turn on the hard disk, followed by the computer.

1.   The following appears on your screen:

        Xenix Boot>

2.   Press [ENTER]. After XENIX boots, the screen displays information about availability of system space. Then the following instructions appear:

        Type CONTROL-d to proceed with normal startup,
        (or give root password for system maintenance):

3.   Type [CTRL] **d**. Enter the date and time, and then log in as root and enter your password. The root prompt appears on your screen.

Note: Be sure to wait until the password prompt appears to type your password. If you type it ahead of the prompt, the screen shows your password.

You are now ready to create users.

If you prefer, you can press ⌷F1⌷ at the Xenix Boot> prompt, and the system will go directly to multiuser mode. This method should not be used if XENIX has not been running recently, as the date and time will be set to the time when XENIX went down.

Set the date and time by logging in as root and typing **asktime**. Setting the time more than a few minutes ahead should be done in maintenance mode.

3

adding users

As the System Administrator you are now able to log in as root, but you also need to be able to log in as a user. You should log in as root only when you need to perform tasks that only root has the power to do; otherwise, log in as a user.

In some situations, you may need to let someone besides yourself have access to your root password. Anyone who knows this password can also log in as root and use root's full powers. Everyone with access to the root password needs to be aware that making even a minor mistake in the root mode can cause major problems with the system. Therefore, log in as root only when it is absolutely necessary.

One of the special powers available only to root is that of creating users. You do this with a program called **mkuser**. In a multiuser environment you will need to create several users. You add users to the system one at a time. First, however, create a user directory for yourself.

creating a user

1. At the root prompt, type:

   mkuser [ENTER]

   The screen shows:

                     Newuser

            Add a user to the system

      Do you require detailed instructions? (y/n):

2. Because this is your first time to set up a user, type **y** [ENTER], and XENIX takes you through the mkuser program step by step. The screen now shows:

         -----Add a new user to this system-----

      This program will guide you through the steps required
      to add a new XENIX user to the system. It will ask for
      the following information. If you don't know any of
      these items, press BREAK and come back later.

            login name,   comment,   group, shell, password

      Generally the program will tell you what it wants
      (such as the login name), describe the acceptable
      responses, and prompt you for an answer.

      Nothing is updated on the system until you confirm
      everything is correct. The program will ask you this
      after you have entered all the information. At any
      time until then you can press BREAK to exit without
      adding the user. You can also answer 'q' or 'quit' to
      any question to achieve the same effect.

      Press RETURN to start:

3. Press ENTER.

   Note: Whenever XENIX refers to RETURN or asks you to press RETURN, always substitute ENTER.

4. Now the screen shows:

   ```
   Please give the new user's login name.  This must be
   at least 3 characters long, begin with a lower case
   letter, and contain only lower case letters and
   digits.  It must also not already exist in this system

   Enter new user's login name:
   ```

   Because you are setting up the first user on your system, the login name can be anything you choose. It is usually convenient to use a form of the user's real name. For example, if the user's name is Ross Pratt, the login name can be ross, rossp, rpratt, and so on.

5. Type *name* ENTER. The screen shows:

   ```
   Users are usually assigned to the default user group.
   This is the group name "group", number 50.  If you
   want to assign the new user to some other group, you
   can either specify an existing group, or a new group
   to be created.

   Do you want to use the default group? (y/n):
   ```

6. Type **y** ENTER. The screen shows:

   ```
   Please give the initial password for this user.

   For maximum security a minimum number of characters is
   required. Up to eight characters are significant. You
   may use any characters except RETURN and LINE FEED.

   Note that the password entry will NOT echo on the
   screen. This is just to provide an extra degree of
   security.

   If you don't want a password for this user, just type
   RETURN.

   Please enter at least 5 characters for the password.
   Enter password:
   ```

7. Type the password you have chosen and press ENTER.

   Note: As you did when you selected your root password, choose a password that is not easily guessed and that you can easily remember. Forgetting a user password is not critical, however. If a user password is forgotten, the System Administrator must install a new password for the user. The user can then change the password to a preferred one. Instructions for doing so are below.

8. The screen now shows:

   ```
   Re-enter for check:
   ```

   Type your password again and press ENTER.

9. The screen shows:

   ```
   Please specify the type of shell (command interpreter)
   this user requires.  You can type 1, 2, or 3 as
   follows:

        1    Standard (Bourne) Shell.
        2    Visual Shell.
        3    C Shell.

   ENTER Shell type (1,2 or 3) and press ENTER:
   ```

Select 1 or 3 and press ENTER .

If you specify Option 2, the user will be unable to log in if the XENIX Development System is not installed.

10.   The screen now shows:

```
There is an optional field in the password file where
you can put a comment, such as the user's fullname,
phone #, room #, etc.  If you wish to leave this
blank, just type RETURN.  The comment should be short
(up to 20 characters).

Please Enter Comment: >_____
                      >
```

11.   Press ENTER and the screen shows:

```
These are the details you have entered for the new
user.  Please check they are correct.

User name is: name, user id is xxx.
Group name is "group", group number is 50.
Comment Field is:
Shell is "/bin/sh"

Do you want to change anything? (y/n):
```

Type **n** ENTER .

12.   The screen shows:

```
Password file updated
Group file updated
Home directory /usr/name created
/usr/name/.profile created
User name added to this system

Do you want to add another user? (y/n):
```

13.   Type **n** ENTER , and the screen shows the root prompt.

Now that you have worked through the mkuser program following the detailed instructions, you can shorten the procedure by simply responding to a series of prompts that appear on your screen.

1.   At the root prompt, type:

mkuser ENTER

2.   The screen shows:

```
                    Newuser

          Add a user to the system

   Do you require detailed instructions? (y/n):
```

3.   Type **n** ENTER and XENIX asks for the login name. Type **name** ENTER . The screen shows:

```
Do you want to use the default group?(y/n):
```

4.   Type **y** ENTER . The screen shows:

```
Please enter at least 5 characters for the password
Enter password :
```

5.   Type your password and press ENTER . The screen shows:

```
Re-enter for check:
```

6. Type your password again and press ENTER. The screen shows:

        ENTER Shell type (1,2 or 3) and press ENTER:

7. Type **1** ENTER, and the screen shows:

        Please Enter Comment: >_____
                              >

8. Press ENTER. The screen shows:

        User name is "name", user id is xxx.
        Group name is "group", group number is 50.
        Comment Field is:
        Shell is "/bin/sh"

        Do you want to change anything? (y/n):

9. Type **n** ENTER. The screen shows:

        Password file updated
        Group file updated
        Home directory /user/name created
        /usr/name/.profile created
        User name added to this system

        Do you want to add another user? (y/n):

10. Type **n** ENTER, and the root prompt appears.

changing a user password

A user who wishes to do so may change his or her password when logged in.
However, only you, as System Administrator, may create a new password if a user
forgets his or her password.

creating a new user password

1. At the root prompt, type:

    passwd *login name* ENTER

2. The screen shows:

        Enter new password (minimum of 5 characters)
        Please use a combination of upper and lowercase
        letters and numbers.
        New password:

3. Type the new password and press ENTER. The screen shows:

        Re-enter new password:

    Type the new password again and press ENTER.

    The screen shows the root prompt. Now the new password is substituted for
    the old, forgotten one.

changing a user password

1. At the user prompt ($), type:

    passwd ENTER

2. The screen shows:

        Changing password for user
        Old password:

Type your password and press ENTER. The screen shows:

```
Enter new password (minimum of 5 characters)
Please use a combination of upper and lowercase
letters and numbers
New password:
```

3. Type your new password and press ENTER. The screen shows:

```
Re-enter new password:
```

Type your password again and press ENTER. The screen shows your user prompt. The new password is substituted for the old one.

4

installing and using applications programs

As the System Administrator, you are responsible for installing applications programs and for instructing users in how to access them, use them, and back up the data they enter. To install an applications program, you must be logged in as root.

installing an applications program

1. At the root prompt, type:

    install `ENTER`

2. The screen shows the following Installation Menu:

    ```
    Installation Menu ·

           1. to install
           q. to quit


    Please select :
    ```

3. Type **1** `ENTER` to select the Install option. The screen shows:

    ```
    Insert diskette in Drive 0 and press <ENTER>
    ```

4. Insert the first installation diskette in Drive 0, close the drive door, and press `ENTER`. If the application is complete on 1 diskette, the screen shows:

    ```
    Installation complete--Remove the diskette, then
    press <ENTER>.
    ```

    If the application is contained on more than 1 diskette, XENIX tells you when to insert the remaining diskettes and then displays the above message when the installation is complete.

5. After you press `ENTER`, your screen shows the Installation Menu again. If you wish to install another application, type **1** `ENTER` and follow the above instructions. Otherwise, type **q** `ENTER` and you return to the root prompt.

accessing applications programs

Both the System Administrator, logged in as root, and the user can access applications programs. You, as System Administrator, can, however, restrict a user's access. Instructions for how to do this are in Chapter 6.

To access an applications program for which you have permission as a user, at the user prompt type:

program name ENTER

Although the System Administrator, logged in as root, can access all application programs on the system, we recommend that you always do so as a user.

using Multiplan™, Unify®, and Scripsit® 16

If you are using the DT-100 and the following versions of these applications, you must install a special DT-100 file after you install the application. The versions are:

Multiplan™ Version 01.06.00 (Cat. No. 26-6480)
Unify® Version 01.00.00 (Cat. No. 26-6415)
Scripsit® 16 Version 01.00.00 and 01.00.01 (Cat. No. 26-6431)

After you install the application, at the root prompt, type:

dt100-install ENTER

The screen shows:

```
              DT100 Terminal
           Installation Menu

              1. to install
              q. to quit
   Please Select:
```

Now, type **1** ENTER . When prompted, insert the DT-100 Installation diskette (Cat. No. 700-2020 or 26-6052) into Drive 0.

All later versions of these applications do not require any modification.

using Profile® 16

You must use Version 01.01.00 (or later) of Profile® 16 (Cat. No. 26-6412).

using accounting applications

A new version of runcobol lets you use the F1 and F2 keys on the DT-100 for accounting applications.

backing up applications files

Backing up is a very important procedure in all data processing environments. It is analogous to making a carbon copy or a photocopy of a document you typed on a typewriter.

Backing up in a computerized system, however, is even more important. You need not only to make a copy of your documents but also to make a copy of the system on which you created the documents. This is your responsibility as System Administrator, and the next chapter tells you how.

The manual that comes with an applications program may contain instructions for making a copy on floppy diskette of the data you created on your hard disk. If so, follow those instructions exactly to back up your applications files. If the manual does not contain backup instructions, you can use the procedure that follows.

Before you can make backups, however, you must format the diskettes or cartridges onto which you will copy data. Both the System Administrator and the User can format diskettes and cartridges using the **diskutil** program, which you access from the XENIX Boot prompt. These may also be formatted while XENIX is running by using the **format** utility.

You can format as many diskettes/cartridges as you wish at any one sitting. We recommend that you keep an ample supply of formatted disks on hand. This can save time when you wish to back up files at the end of a working period.

Diskettes and disk cartridges can be formatted in one of two ways; either by using diskutil or by using the **format**(C) command. Diskutil is a stand-alone utility for formatting and copying disks. Diskutil is generally faster than the **format** command, but XENIX must be shutdown for diskutil to be used. **format** allows floppy disks and disk cartridges to be formatted while XENIX is running.

Format should not be used on floppy disks when the system has several users logged-on as it may take several minutes to format a single disk, and there is the potential of incoming characters being lost on some TTY lines.

Note: If a disk is formatted using **format** and it is bad, a message indicating this is displayed, but the disk may still be readable enough to be accepted by XENIX. You should not attempt to use a disk that has failed formatting.

For information on using the **format** command, see **format**(C).

formatting diskettes using Diskutil

1. Because you are currently logged in to the system, shut down the system and then press the reset switch. The following boot prompt appears on your screen:

    ```
    Xenix Boot>
    ```

2. Beside the prompt, type:

    diskutil ENTER

3. Your screen displays the following message:

    ```
    Diskutil: format or copy floppy diskettes
              format hard disks
              format or copy disk cartridges

    At any time you may type <break> or press RESET
    to abort the procedure.  The backspace key may be
    used to correct single characters of your input.
    End each line you type by typing <enter>.

    Diskutil:  Hard, floppy, or cartridge (h, f, or c)?
    ```

4. Type **f** ENTER . The screen shows:

    ```
    Copy or format (c or f)?
    ```

5. Type **f** ENTER . The screen shows:

    ```
    Format floppy disk in drive number (0..3)?
    ```

    Respond by typing the number of the floppy drive into which you plan to place the floppy diskette to be formatted. Then press ENTER .

6. Now the screen shows:

   ```
   Select the format to be used:
      x  or ENTER for Tandy 16/6000 XENIX format.
      i  for SD 128x26 (3740/4960) format. (x, ENTER or i)?
   ```

   Respond by pressing ENTER. The other format is used to produce disks that can be read by other computer systems that only support single-density diskettes.

7. Now the screen shows:

   ```
   About to format Tandy XENIX floppy disk in drive 0.
   Type <enter> to proceed or <break> to abort:
   ```

8. Insert the diskette and press ENTER. Be sure the diskette has a write-enable tab. When the diskette is formatted, the screen shows:

   ```
   Disk format and verification complete.
   About to format Tandy XENIX floppy disk in drive 0.
   Type <enter> to proceed or <break> to abort:
   ```

9. If you will need more than 1 diskette to back up your files, remove the formatted diskette, insert a new diskette, and press ENTER. When you have formatted all the diskettes you will need, press the reset switch, and the XENIX boot prompt reappears on your screen.

formatting disk cartridges

1. If you are currently logged in to the system, shut down the system and then press the reset switch. The following boot prompt appears on your screen:

   ```
   Xenix Boot>
   ```

2. Beside the prompt, type:

   diskutil ENTER

3. Your screen displays the following message:

   ```
   Diskutil: format or copy floppy diskettes
            format hard disks
            format or copy disk cartridges

   At any time you may type <break> or press RESET
   to abort the procedure.  The backspace key may be
   used to correct single characters of your input.
   End each line you type by typing <enter>.

   Diskutil: Hard, floppy, or cartridge (h, f, or c)?
   ```

4. Type **c** ENTER. The screen shows:

   ```
   Copy or format (c or f)?
   ```

5. Type **f** ENTER. The screen shows:

   ```
   Drive number (0 or 1)?
   ```

   Respond by typing the number of the drive into which you plan to place the cartridge to be formatted. Then press ENTER.

6. Now the screen shows:

   ```
   Desired interleave factor (<enter> for default)?
   ```

7. You should press ENTER for the default value. The screen now shows:

```
About to format 10 megabyte cartridge in drive 0.
Type <enter> to proceed or <break> to abort.
```

8. Insert the cartridge into the drive you selected and press ENTER. Be sure that the cartridge is not write protected. When the cartridge is formatted, the screen shows:

```
Cartridge successfully formatted
```

9. The screen now shows:

```
Format another (Y or N)?
```

If you will need more than 1 cartridge to back up your files, type **Y** ENTER. You will then be prompted to insert another cartridge.

When you have formatted all the cartridges you will need, type **N** ENTER. Then if you are ready to run XENIX, press the reset switch, and the XENIX boot prompt reappears on your screen.

Notes About Disk Cartridges: XENIX locks disk cartridges while they are in use. This is to prevent anyone from removing a disk while it is in motion. During this time, the cartridge release button is ignored.

When the drive is no longer in use, XENIX unlocks the drive so you can remove the disk cartridge.

If you are using the disk cartridge as a mountable filesystem, XENIX keeps the drive locked until you unmount the filesystem. Note that if you improperly shutdown your XENIX system or if it crashes with the cartridge mounted or in use, XENIX does not unlock the drive. To unlock it, press the reset switch. XENIX unlocks the drives at the Xenix Boot> prompt so you can remove the cartridge disk.

backing up your files

You are now ready to back up your applications files.

1. Place your formatted disks within easy reach and log in to XENIX as a user. Now type:

    tsh ENTER

2. Insert a formatted diskette or cartridge in Drive 0, and at the tsh prompt (tsh>), type:

    save 0 -ss /usr/*name***/***filename* ENTER

    save is the command that tells XENIX to copy information from the hard disk. **0** indicates that the information is to be copied onto the diskette in floppy Drive 0. **-ss** indicates that the diskette is single-sided. If you are using double-sided diskettes, you type **-ds**. If you are using a cartridge, you type **-c10**, if you have a 10 meg disk cartridge system. If you have the 20 meg system, use **-c20**. *name* is your login name, and *filename* is the name you gave the file when you created it.

    You can back up more than 1 file on a disk. To do so, simply specify each filename on the command line; separate filenames with spaces. For example:

    ```
    save 0 -ss /usr/name/filename /usr/name/filename
    ```

Be sure to type the command exactly as shown, including the spaces and slashes. Substitute your name and the filename appropriately for the words in italics.

3. When the screen indicates that the file or files have been found, your backup is complete. To leave tsh, type:

    exit [ENTER]

Your user prompt now appears on the screen.

restoring applications files to your hard disk

If you wish, you can later restore to your hard disk the information you copied to floppy diskette or cartridge.

1. Log in to XENIX as a user. Place the disk you wish to restore in Drive 0. At your prompt, type:

    tsh [ENTER]

2. To restore from floppy diskette, type at the tsh prompt:

    restore 0 [ENTER]

    To restore from a 10 megabyte cartridge, type at the tsh prompt:

    restore 0 -c10 [ENTER]

    To restore from a 20 megabyte cartridge, type:

    restore 0 -c20 [ENTER]

3. When the screen indicates that the file or files have been restored, you can then restore more files or exit tsh.

    You can also use **tar** to back up and restore. For instructions, see Chapter 9.
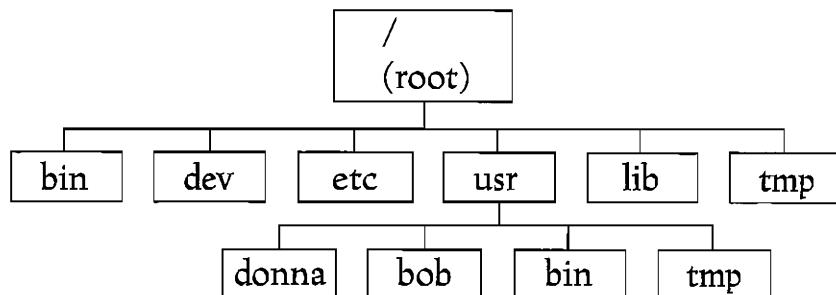
5

directories and files

XENIX is organized in a system of directories and files. Directories can themselves contain other directories, or subdirectories, which in turn contain files. XENIX stores information in directories and files in much the same way that a filing cabinet does. A directory is similar to the file cabinet itself, and a subdirectory is like a drawer in a file cabinet. Within the drawer are folders, some of which contain other folders that contain memos, letters, reports, charts—all kinds of information.

XENIX directories and files are organized "hierarchically"; that is, all directories and files branch from a single root. A chart of these directories and files looks like an inverted tree. The trunk is at the top, representing the "root" directory, and the main branches, smaller branches, and twigs are other directories and subdirectories. The leaves are the files.

Below is an example of a typical XENIX organizational structure.

```
                          /
                        (root)
        ┌────────┬────────┬────────┬────────┬────────┐
       bin      dev      etc      usr      lib      tmp
                             ┌──────┬──────┬──────┐
                           donna   bob    bin    tmp
```

When you log in to XENIX as root, you are in the root directory. XENIX uses the slash (/) to symbolize the root directory. When you create a user, XENIX automatically assigns that user a workspace called /usr/*name*. /usr is a major XENIX directory that contains the workspaces of all users on the system. The user's login name is a subdirectory of /usr; it is also called the user's "home directory."

The user may create further subdirectories in his or her home directory and may create files within those subdirectories. To access a file you have already created, you need to know its "pathname." A pathname is exactly what the word implies—the path XENIX takes to find the file. It consists of the directories and subdirectories within which the file exists and the name of the file.

For purposes of the examples that follow, now log in as user. You are automatically in your home directory.

creating directories and files

Although you can use XENIX to perform many complicated tasks, you can also use it to perform some simple tasks that will streamline your office routine. These examples show you how.

1. To use XENIX as a reminder service, first create a subdirectory within which you can create a "To Do" file. At the prompt, type:

    mkdir schedule [ENTER]

2. Now your home directory contains a subdirectory called "schedule." You are still in your home directory, however. To create a file in the schedule directory, you must be **in** that directory. To get to the schedule directory, you must change directories. Type:

    cd schedule [ENTER]

3. Within the schedule directory, you can now create a "To Do" file. At the prompt, type:

    cat >todo [ENTER]

    The file is created, and you can now place information in it. Notice that we typed the filename in all lowercase letters and omitted the space between the 2 words. You can use any characters in a filename except the slash. You can also use spaces. However if you use spaces or some special characters when you access the file, you must enclose it in single quotes.

    Note: You can use the same filename for different files, but the files must be in different directories. The same file can exist several times in the same directory, but each time it must have a different name.

4. You are now ready to make notes in your todo file. Type whatever you wish. To end a line, press [ENTER]. When you finish, type [CTRL] **d**, and the system prompt appears on your screen.

5. Now create another directory and another file. This time create a file of frequently used names, addresses, and phone numbers. First, determine your current directory, that is, the directory you are in at present. To do so, type:

    pwd [ENTER]

    The screen shows:

    `/usr/name/schedule`

6. To create another directory in your home directory, you must again change directories; that is, you must leave the schedule directory and go to the /usr/name directory. To do so, type:

    cd /usr/name** [ENTER]

7. Now you are ready to create another directory called phonebook. To do so, type:

    mkdir phonebook [ENTER]

8. To move to the phonebook directory, type:

    cd phonebook [ENTER]

    Verify that you are now in the phonebook directory by typing:

    pwd [ENTER]

9.   To create a file, type:

    cat >namelist [ENTER]

As in Step 4, make entries in your file and then type [CTRL] **d.** The user prompt appears on your screen. To return to your home directory, type:

    cd /usr/*name* [ENTER]

You can also type **cd** [ENTER] (without the filename) to get to your home directory.

displaying the contents of directories and files

1.   You can verify that the directory and files you created now exist. To list (or display) on the screen the contents of your home directory, type:

    lc [ENTER]

The screen shows:

    `phonebook    schedule`

Note: The list is in alphabetic order.

2.   To display the contents of the todo file on the screen, first move to the schedule directory. Type:

    cd schedule [ENTER]

3.   Now type:

    cat todo [ENTER]
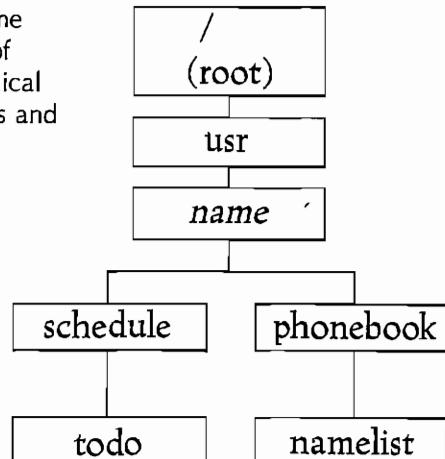
Your screen shows the list of things you have to do that you entered earlier. Now display the contents of namelist. First, move to the phonebook directory. To do so, type **cd /usr/*name*/phonebook** [ENTER]. Now type:

    cat namelist [ENTER]

Note: For an explanation of some new words you've been using in these examples (cat, cd, lc, mkdir), see the "Quick Reference Guide to Commands" section in this manual.

moving files

You now have 2 directories in your home directory, and you have a file in each of these directories. In the XENIX hierarchical system, a diagram that shows these files and directories looks like this:

```
        ┌──────────┐
        │    /     │
        │  (root)  │
        └────┬─────┘
        ┌────┴─────┐
        │   usr    │
        └────┬─────┘
        ┌────┴─────┐
        │  name    │
        └────┬─────┘
      ┌──────┴───────┐
 ┌────┴─────┐  ┌─────┴──────┐
 │ schedule │  │ phonebook  │
 └────┬─────┘  └─────┬──────┘
 ┌────┴─────┐  ┌─────┴──────┐
 │   todo   │  │  namelist  │
 └──────────┘  └────────────┘
```

You may occasionally want to move a file from one directory to another. For purposes of example, let's move the todo file out of the schedule directory and into the phonebook directory.

1. After you displayed the namelist file above, you were in the phonebook directory. To move the file, first position yourself in the directory in which that file exists. To do so, type:

    cd /usr/*name*/schedule [ENTER]

2. Verify that you are in the schedule directory by typing **pwd** [ENTER]. Now, at the prompt type:

    mv todo /usr/*name*/phonebook [ENTER]

3. Now move to the phonebook directory. Type:

    cd /usr/*name*/phonebook [ENTER]

4. List the contents of the phonebook directory. Type:

    lc [ENTER]

    Your screen shows that the phonebook directory now contains 2 files—namelist and todo.

    Note: To keep the todo file in the schedule directory and also place a copy of it in the phonebook directory, follow Steps 1-4 above and change Step 2 slightly. Instead of typing **mv** (move), type **cp** (copy).

removing a file

To remove, or delete, a file you must position yourself in the directory that contains the file. For purposes of this example, delete the todo file from the phonebook directory, where you last placed it.

1. First, verify that you are in the phonebook directory by typing **pwd** [ENTER]. Now, type:

    rm todo [ENTER]

2. Now list the directory contents to verify that todo has indeed been removed. Type:

    lc [ENTER]

    Your screen shows that the directory now contains only 1 file—namelist.

    Note: If you want to remove all the files in a directory, you can do so by typing **rm *** [ENTER]. The asterisk (*) is the wild card character and in this case tells XENIX to remove all files. **Use rm * with extreme caution. You can inadvertently lose all your files.**

removing a directory

Before you can remove a directory, you must first remove all the files in that directory. Since you have already removed the file from the schedule directory, it is empty and you can delete it.

1.   You cannot be positioned in a directory you are removing. You were in the phonebook directory when you deleted the todo file. Type **pwd** [ENTER] to verify that you are still there.

2.   To return to your home directory, type:

   cd /usr/*name* [ENTER]

3.   Now to remove the schedule directory, type:

   rmdir schedule [ENTER]

4.   To verify that the schedule directory no longer exists, list the contents of your home directory. Type:

   lc /usr/*name* [ENTER]

   Your screen shows that your home directory contains the phonebook directory but not the schedule directory.

6

permissions

As System Administrator logged in as root, you have access to every directory, file, and program in your XENIX system. This means that you have total read, write, and execute permission. In other words, you can ask XENIX to display any file on the screen and you can read its contents. You can also use **ed** to change its contents (write to the file). In addition, you can execute, or run, any program in the system.

These 3 kinds of permissions—read, write, and execute—can be given or denied to anyone logged in to the system. One of your responsibilities as System Administrator is to set permissions. Before doing so, however, you need to know how permissions affect a user's ability to access the system.

If you have **read** permission for a file, you can display it on the screen and read the information in it. If you have read permission for a directory, you can display its "table of contents" on the screen. That is, you can see a list of all the subdirectories and files in that directory.

If you have **write** permission for a file or a directory, you can move it, add to it, delete information from it, remove it, rename it, or change it in any way. If you have write permission for a directory, you can create subdirectories and files within it.

If you have **execute** permission for a program, you can run it. If you have execute permission for a directory, you can move into it and search it for files, such as programs to run.

The 3 kinds of permission are available to 3 categories of users: individual users (u), groups (g), and others (o). An individual user is the owner of a particular file or directory. He or she usually has read, write, and execute permission for all files and directories in his or her home directory.

A group of users may have collective permissions for a particular file or directory. For example, if several users are working on a single project, you, as System Administrator, can give them group permissions rather than individual user permissions.

Others are anybody and everybody who neither own a file or directory nor are members of an owner's group.

reading permission settings

Whenever a user creates a file or directory, XENIX automatically assigns these permissions: read and write for the user, read for the user's group, and read for others on the system.

You can look at the permission settings on a particular file or directory. For purposes of example, let's look at the phonebook directory you created earlier. To do so, log in as root, and at the root prompt, type:

lc -l /usr/name ENTER

Of course, use the user name under which you created the directory. Your screen shows:

```
total x
-rw-r-----  1 name  group 344 Aug 16 15:00 .profile
drwxr-xr-x  2 name  group  32 Aug 16 17:15 phonebook
```

Note: Your screen shows 2 entries in this directory—.profile and phonebook. The date for .profile is the date you created this user. The date for phonebook is the date you created your phonebook directory.

For purposes of example, let's look in detail at the entry for your phonebook directory. The 10-character letter-and-dash grouping that begins with d describes the permissions.

d   Indicates that this is a directory, not a file. A file is indicated by a dash (-) in this place.

rwx   The characters in these next 3 positions indicate the individual user's permissions. In this case, they are read, write, and execute.

r-x   These 3 characters indicate the permissions of the members of the individual user's group. In this case, they are read and execute, not write, since a dash is in the write position.

r-x   These 3 characters indicate the permissions of others. In this case, they are read and execute.

The number 2 following the permission settings is the number of links for this directory. (A link is a connection between blocks.) XENIX uses this information internally.

The next numbers show the size of the directory in bytes.

The date and time indicate when the directory was created or last changed. The last item on the line is the name of the directory.

setting and changing permissions

To set or change permissions, you must be in the directory in which you want to make changes. You use the following characters when changing permissions:

u	user	+	add
g	group	-	remove
o	other	=	set
a	all		

You also use r, w, and x to indicate read, write, or execute permission.

For purposes of example, let's change the permissions for the phonebook directory.

1. Position yourself in the /usr/*name*/phonebook directory.

2. To give the individual user, the group, and others read, write, and execute permission, type:

    chmod a = rwx /usr/*name*/phonebook [ENTER]

    chmod tells XENIX to change mode.

3. To verify that the settings have been changed, type:

    lc -l /usr/*name* [ENTER]

4. Your screen shows that everyone now has read, write, and execute permission. The settings are:

    d r w x r w x r w x

5. To remove permissions, you use the minus sign. Let's remove write permission for others. At the prompt, type:

    chmod o-w /usr/*name*/phonebook [ENTER]

6. You can verify that the changes were made. To add permission, you use the same format, or syntax as above, substituting the appropriate user character and the plus sign.

7

backing up

Backing up is a standard operating procedure that ensures the safekeeping of the information you store on your hard disk and on floppy diskettes. Data can be lost under various circumstances—a power failure, inadvertent removal of files, a hardware malfunction, and so on.

As the System Administrator, one of your primary responsibilities is making system backups. Only you, logged in as root, may do this.

We recommend that you schedule regular backups; daily is probably best. Label your floppy diskettes so that you can easily retrieve the appropriate ones when necessary, and keep them in a place where they cannot be damaged by excessive heat or dust or by a magnetic field.

With XENIX you can back up your hard disk to floppy diskette, and you can back up one floppy diskette to another. Since your XENIX is new and this is the first time you have backed it up, XENIX requires that you do a full system backup. After this, you can do a periodic backup, or a backup that copies only those files you created since the last full system backup.

backing up your hard disk to floppy diskettes

First, using format or diskutil, format all the floppy diskettes you will need. If you are ever unsure about the number, format more diskettes rather than fewer. For this example, format 5 diskettes. (See Chapter 4 for instructions.) After doing so, press the reset switch and reboot XENIX.

1. Log in as root.

2. Now to begin backing up your hard disk, at the root prompt type:

    sysadmin `ENTER`

3. The following menu appears on your screen:

    ```
                   File System Maintenance

    Type      1 to do daily backup,
              2 to backup all files,
              3 to get a backup listing,
              4 to restore a file,
              5 to restore a backup,
              6 to check a file system,
              q to quit

          > Enter Number:
    ```

4. Type **2** `ENTER` to back up all files. The screen shows:

    ```
    FULL SYSTEM DUMP
    Backup which hard drive (0-3)?
    ```

5. Type the number of the hard drive you want to back up (in this case Drive 0, or the primary hard disk) and [ENTER]. The screen shows:

   ```
   Backup to C)artridge or F)loppy drive?
   ```

6. Type f [ENTER]. The screen shows:

   ```
   Backup to which floppy drive (0-3)?
   ```

7. Type 0 [ENTER]. Now the screen shows:

   ```
   Are your floppy diskettes S)ingle or D)ouble sided?
   ```

8. If you are using single-sided floppy diskettes, type S [ENTER]. If you are using double-sided diskettes, type D [ENTER]. After you enter either S or D, the screen shows:

   ```
   Insert volume in Floppy drive 0, then press <ENTER>
   ```

9. When the diskette is full, the screen shows:

   ```
   Change volumes and press <ENTER> to continue.
   ```

10. Insert a new formatted diskette. The cursor stays at the end of the prompt until you press [ENTER].

    Note: Be sure to label each diskette with the date, and number the diskettes in the order in which the backup was done.

    When the entire file system is backed up, the screen shows:

    ```
    DONE
    ```

11. XENIX returns to the File System Maintenance menu. Type q [ENTER] to quit, and the root prompt appears on your screen.

    Note: To do a daily backup, or a backup of all files since the previous complete backup, select 1 at the File System Maintenance menu and respond to the prompts in a manner similar to the above instructions.

backing up your hard disk to cartridge

1. Log in as root.

2. Now to begin backing up your hard disk, at the root prompt type:

   sysadmin [ENTER]

3. The following menu appears on your screen:

   ```
                  File System Maintenance

   Type        1 to do daily backup,
               2 to backup all files,
               3 to get a backup listing,
               4 to restore a file,
               5 to restore a backup,
               6 to check a file system,
               q to quit

         > Enter Number:
   ```

4. Type 2 [ENTER] to back up all files. The screen shows:

   ```
   FULL SYSTEM DUMP
   Backup which hard drive (0-3)?
   ```

5. Type the number of the hard drive you want to back up (in this case Drive 0, or the primary hard disk) and [ENTER]. The screen shows:

   ```
   Backup to C)artridge or F)loppy drive?
   ```

6. Type **c** `ENTER`. The screen shows:

    Backup to which cartridge (0-1)?

7. Type **0** `ENTER`. Now the screen shows:

    Insert volume in Cartridge drive 0, then press <ENTER>

8. When the cartridge is full, the screen shows:

    Change volumes and press <ENTER> to continue.

9. Insert a new formatted cartridge. The cursor stays at the end of the prompt until you press `ENTER`.

    Note: Be sure to label each cartridge with the date, and number the cartridges in the order in which the backup was done.

    When the entire file system is backed up, the screen shows:

    DONE

10. XENIX returns to the File System Maintenance menu. Type **q** `ENTER` to quit, and the root prompt appears on your screen.

    Note: To do a daily backup, or a backup of all files since the previous complete backup, select 1 at the File System Maintenance menu and respond to the prompts in a manner similar to the above instructions.

    Notes About Disk Cartridges: XENIX locks disk cartridges while they are in use. This is to prevent anyone from removing a disk while it is in motion. During this time, the cartridge release button is ignored.

    When the drive is no longer in use, XENIX unlocks the drive so you can remove the disk cartridge.

    If you are using the disk cartridge as a mountable filesystem, XENIX keeps the drive locked until you unmount the filesystem. Note that if you improperly shutdown your XENIX system or if it crashes with the cartridge mounted or in use, XENIX does not unlock the drive. To unlock it, press the reset switch. XENIX unlocks the drives at the Xenix Boot> prompt so you can remove the cartridge disk.

backing up floppy diskettes

In a multiuser environment, you may on occasion need duplicates of files that have been backed up on floppy diskette. You back up floppy diskettes with diskutil.

1. If you are at the root prompt, shut down the system and press the reset switch. At the XENIX Boot prompt, type:

    diskutil `ENTER`

2. The screen displays the following message:

    Diskutil: format or copy floppy diskettes
             format hard disks
             format or copy disk cartridges

    At any time you may type <break> or press RESET to abort the procedure. The backspace key may be used to correct single characters of your input. End each line you type by typing <enter>.

    Diskutil: Hard, floppy, or cartridge (h, f, or c)?

3. Type **f** `ENTER`, and the screen shows:

```
Copy or format (c or f)?
```

4. Type **c** `ENTER`, and the screen shows:

```
Source drive number (0..3)?
```

5. For purposes of this example, you must have at least 2 floppy drives. You will place your source diskette in Drive 0 and your destination diskette in Drive 1. To answer the prompt in Step 4, type **0** `ENTER`. The screen shows:

```
Destination drive number (0..3)?
```

6. Type **1** `ENTER` and the screen displays the following instructions:

```
Insert source disk in drive 0
Insert destination disk in drive 1

Type <enter> to proceed or <break> to abort:
```

7. Place the diskettes in the appropriate drives and press `ENTER`. The screen shows the following message while the backup is in progress.

```
This will take about 77 seconds.
    Copying cylinder __, side __
```

As diskutil copies each cylinder, the number of that cylinder scrolls past. If you are using single-sided diskettes, the side number remains 0. If you are using double-sided diskettes, the side number changes from 0 to 1 after Side 1 is copied. When the copy is complete, the screen shows:

```
Disk copy and verify complete.

Insert source disk in drive 0
Insert destination disk in drive 1

Type <enter> to proceed or <break> to abort:
```

8. If you wish to copy more diskettes, remove the diskettes just copied, insert others, and follow the instructions above.

9. If you do not wish to copy more diskettes, press the reset switch, reboot XENIX, and log in as root.

backing up disk cartridges

In a multiuser environment, you may on occasion need duplicates of files that have been backed up on cartridges. One way to back up cartridges is using diskutil.

Note: You must format the destination cartridge with diskutil before making backups.

1. If you are at the root prompt, shut down the system and press the reset switch. At the XENIX boot prompt, type:

   diskutil `ENTER`

2. The screen displays the following message:

```
Diskutil: format or copy floppy diskettes
          format hard disks
          format or copy disk cartridges

At any time you may type <break> or press RESET to
abort the procedure. The backspace key may be used
to correct single characters of your input. End each
line you type by typing <enter>.

Diskutil: Hard, floppy, or cartridge (h, f, or c)?
```

3. Type c [ENTER]. The screen shows:

    ```
    Copy or format (c or f)?
    ```

4. Type c [ENTER]. The screen shows:

    ```
    Source drive number (0 or 1)?
    ```

5. For purposes of this example, you must have two of the disk cartridge drives. Place your source cartridge in Drive 0 and your destination cartridge in Drive 1. To answer the prompt in Step 4, type 0 [ENTER]. The screen shows:

    ```
    Destination drive number (0 or 1)?
    ```

6. Type 1 [ENTER] and the screen displays the following instructions:

    ```
    Insert source cartridge in drive 0
    Insert destination cartridge in drive 1

    Type <enter> to proceed or <break> to abort.
    ```

7. Place the cartridges in the appropriate drives and press [ENTER]. The screen shows the following message while the backup is in progress:

    ```
    Reading 00000000   Writing 00000000
    ```

    Diskutil copies the cartridges by reading in several blocks at one time, then writing them out to the destination cartridge. As diskutil copies each set of blocks, the number of the starting block is displayed. The numbers displayed are **hexadecimal** values. When the copy is complete, the screen shows:

    ```
    Copy complete
    Unlocking 0   Unlocking 1

    Diskutil: Hard, floppy, or cartridge (h, f, or c)?
    ```

8. If you wish to copy more cartridges, remove the cartridges just copied, insert others, and follow the instructions above.

9. If you do not wish to copy more cartridges, press the reset switch, reboot XENIX, and log in as root.

    Notes About Disk Cartridges: XENIX locks disk cartridges while they are in use. This is to prevent anyone from removing a disk while it is in motion. During this time, the cartridge release button is ignored.

    When the drive is no longer in use, XENIX unlocks the drive so you can remove the disk cartridge.

    If you are using the disk cartridge as a mountable filesystem, XENIX keeps the drive locked until you unmount the filesystem. Note that if you improperly shutdown your XENIX system or if it crashes with the cartridge mounted or in use, XENIX does not unlock the drive. To unlock it, press the reset switch. XENIX unlocks the drives at the Xenix Boot> prompt so you can remove the cartridge disk.

8

restoring information to your hard disk

Maintaining an up-to-date library of backup diskettes or cartridges lets you easily and accurately restore the information to your hard disk if for any reason it ceases to function properly and your data is destroyed. You can also use your backup diskettes or cartridges to transfer the information on one hard disk to another hard disk.

As System Administrator, you are responsible for maintaining a complete and accurate backup library and for restoring information to hard disk when necessary. To do so, you must be logged in as root.

If you have been working through this manual in a tutorial fashion, and we assume that you have, the following instructions are for information only. **Do not use them now.** Use them only when your hard disk fails and you need to restore data. At present, your hard disk is up and running, and the information on it is intact. If you attempt to restore over a properly functioning hard disk, you can damage your files.

These instructions for restoring information to hard disk are organized according to system design—Restoring a Primary Hard Disk with 2 or More Floppy Drives or a Cartridge, Restoring a Secondary Hard Disk, and Restoring a Primary Hard Disk with 1 Floppy Drive. When you need to restore a hard disk, follow the instructions that correspond with the design of your system.

restoring a primary hard disk with 2 or more floppy drives or a cartridge

Warning: Use these procedures only when you encounter serious difficulties with your hard disk that can be remedied in no other way.

Your XENIX package contains a diskette labeled File Maintenance Diskette. You use it to quickly and efficiently restore files or an entire system to your primary hard disk. Before you begin, be sure that all your backup diskettes/cartridges are at hand. Turn on your hard disk, turn on your computer, and format your hard disk if necessary. (See Chapter 1 if you need format instructions.)

1. Insert the File Maintenance Diskette in Drive 0. Press the reset switch, and then press BREAK and REPEAT simultaneously until the following appears on your screen:

    Xenix Boot>

2. Press ENTER and your screen shows:

```
System loaded...
Change root if desired,
type <enter> to proceed or <break> to abort
```

3. Press ENTER and the following menu appears:

```
              File System Maintenance

Type      1 to get a backup listing,
          2 to restore an entire dump,
          3 to restore a daily dump,
          4 to check a file system,
          q to quit
```

Note: Restoring an entire backup is restoring everything that was backed up from your hard disk to floppy diskette or cartridge, including your XENIX system. Restoring a daily backup is restoring the information on diskettes/cartridges that was obtained during a periodic backup.

When you have both an entire backup and a daily backup to restore, first restore the entire backup. In other words, at the File System Maintenance Menu, first select 2. When the entire backup is fully restored, then restore the daily backup by choosing 3 from the File System Maintenance Menu.

4. Type **1** ENTER to verify that you are restoring the latest backup. Answer the prompts, and insert your first backup diskette/cartridge into the appropriate drive when asked to do so.

5. When the backup listing is complete, press ENTER to return to the File System Maintenance menu. Now type **2** ENTER, and the screen shows:

```
RESTORE AN ENTIRE BACKUP SET TO A HARD DISK

Restore to which hard drive (0-3)?
```

Note: Although XENIX gives you the option of entering the number of a secondary hard drive, enter only **0** in response to this prompt.

6. Type **0** ENTER. The screen shows:

```
Restore from C)artridge or F)loppy drive?
```

Type **F** ENTER or **C** ENTER as appropriate. Answer the following question about the drive that is to be backed up. The screen will show:

```
Do you want the standard size swap area [y or n]?
```

Normally, you will give the same answer as you did when you installed the system. After you enter the information, your screen shows:

```
About to erase any data on drive 0
Press ENTER to continue or BREAK to abort:
```

Note: Any existing information on your hard disk will be overwritten when the full system backup is restored. Your backup diskettes/cartridge contain everything that was on the hard disk; so you need not be concerned about this warning. It is simply a reminder.

7. Press ENTER, and then answer the prompts as they appear on the screen. During the process of restoring, you may see the following message on your screen:

```
"/dev/rhd0" contains data; press <ENTER> to continue
or <BREAK> to abort:
```

8. Press ENTER and continue restoring. When all the information on your backup diskettes/cartridges has been restored to your hard disk, your screen shows:

> End of Dump

9. The File System Maintenance menu reappears on your screen. Type **4** ENTER to select check a file system. Answer the prompts as they appear.

10. When the verification of the file system on your hard disk is complete, the File System Maintenance menu appears on your screen. Press **q** ENTER to quit, and wait until your screen shows:

> [Z80 Control System Halted]

11. You can now press the reset switch and boot XENIX.

restoring a secondary drive

Your XENIX Core contains a special program called **/etc/sysadmin**. You can use it to restore files or an entire system to a secondary hard disk.

restoring files

1. Log in to XENIX as root, and at the root prompt type **/etc/sysadmin** ENTER. The following menu appears:

```
              File System Maintenance

     Type     1 to do daily backup,
              2 to backup all files,
              3 to get a backup listing,
              4 to restore a file,     ·
              5 to restore a backup,
              6 to check a file system,
              q to quit

         >  Enter Number:
```

2. Type **3** ENTER to verify that the diskettes/cartridges you are about to restore to hard disk are the latest backup.

   Note: If you have made a daily backup since the last periodic backup, first restore the periodic backup and then restore the daily backup.

3. The screen shows:

```
     PRODUCE BACKUP LISTING
     Read from C)artridge or F)loppy drive?
```

4. Type **c** if you are restoring from cartridge or **f** if you are restoring from floppy diskette. Press ENTER and the screen shows:

```
     Insert first volume in drive zero, then press <ENTER>
```

5. After you press ENTER, the screen briefly displays the following:

```
     LIST IS IN /tmp/backup.list
     Enter 'Y' to see the list on your screen now.
```

   Type **Y** ENTER.

6. The menu appears again. To restore a file, type **4** ENTER. The screen shows a list of mounted file systems, then:

```
     Enter directory name from above list (or /)
     (Directory name must begin with "/")
```

45

7.   Enter the name of the file system to which you want to restore. The screen shows:

```
Enter Pathname of Files to Restore.
If a directory is specified, all files in it will
be restored.
Type one name per line, blank line to terminate

Enter Pathname:
```

8.   When you have entered all pathnames, press [ENTER] at the prompt. The screen shows:

```
These files will NOT be restored with numbers as
names, that is, they will be restored to their
correct places.

Restore from C)artridge or F)loppy drive?
```

9.   After you have answered this prompt, you are asked from which drive you want to restore.

10. Type the number of the drive from which you want to restore. Press [ENTER].

11. Answer the succeeding prompts and follow the instructions exactly as they appear on your screen by inserting your first backup diskette/cartridge and specifying the volume number. When all files have been restored to the hard disk, XENIX returns to the File System Maintenance menu.

12. Type **q** [ENTER] to quit.

restoring an entire system

To restore an entire system of files to hard disk, follow the above procedures, but at Step 1, select 5.

1.   The screen shows:

```
RESTORE A HARD DISK

Restore which hard disk (0-3)?              .
```

2.   Type the number of the hard disk you wish to restore. The screen shows:

```
Restore F)ull or D)aily backup
```

Type **F** [ENTER] for a full backup or **D** [ENTER] for a daily backup. The screen now shows:

```
Restore from C)artridge or F)loppy drive?
```

3.   Type **c** if you are restoring from cartridge or **f** if you are restoring from floppy diskette. Press [ENTER].

4.   You are now asked from which drive you want to restore. If you are restoring from floppy, the screen shows:

```
Are your floppy diskettes S)ingle or D)ouble sided:
```

Type the letter corresponding to the type of diskettes you are using and [ENTER].

5.   The screen shows:

```
Insert volume in Floppy drive n, then press ENTER:
```

6. Insert your first backup diskette/cartridge and press [ENTER]. After a brief time, the screen shows:

    ```
    Mount desired backup volume: Specify volume#:
    ```

    Type **1** [ENTER]. When the restoration is complete, the File System Maintenance menu reappears.

7. Type **6** [ENTER] to check a file system. If problems are encountered during the check, the system tells you and awaits your input. If the check is satisfactory, you are returned to the menu.

8. Type **q** [ENTER] to quit.

restoring a primary hard drive with 1 floppy drive

To restore an entire system to a primary hard disk when you have only 1 floppy disk drive and your backups are on floppy diskette, first install the Core. (See Chapter 1 for instructions.) Now log in to XENIX as root.

1. At the root prompt, type:

    /etc/sysadmin [ENTER]

2. The File System Maintenance menu appears on your screen. From this point on, follow the instructions given above in "Restoring a Secondary Hard Disk."

    Note: You cannot use option 5, RESTORE A HARD DISK, in this case. You must use option 4 and type **/** [ENTER] at the Enter Pathname: prompt.

9

another way to back up and restore

Sometimes you want to back up only a single file or a few files and directories. XENIX lets you do this quickly with a program called **tar**. You, as System Administrator, can use tar to copy your own files or those of any user. A user can also use tar, but only to copy those files to which he or she has access.

You can also use tar to restore files and directories. For more ways to use tar, see the help page for **tar** (if you have installed the **help** files).

In the following example, you back up and restore the namelist file you created earlier.

backing up with tar

1. Log in as root. Insert a formatted floppy diskette or cartridge into Drive 0, and type:

    tar cvfk *device* ***number of Kbytes namelist*** [ENTER]

    cvfk is the command variant; *device* specifies where the files will be copied. Specify **/dev/rfd0** for floppy Drive 0, **/dev/rcd0** for cartridge Drive 0. If you are using a single-sided diskette, the number of Kbytes is 608. If you are using a double-sided diskette, the number of Kbytes is 1224. If you are using a 10 megabyte removable cartridge, the number of Kbytes is 9760. If you are using a 20 megabyte removable cartridge, the number of Kbytes is 20896. The *r* preceding fd0 tells XENIX to copy raw data, which is a faster way to copy. You can copy several files or directories at the same time. Simply space between each name. If you use a directory name, tar copies everything below that name in the hierarchy.

2. When the file is copied, the screen shows:

    ```
    a namelist x tape blocks
    ```

    The letter a indicates that the file has been added. x is the number of tape blocks.

restoring with tar

1. Place your backup floppy diskette or cartridge in Drive 0 and type:

    tar xvf *device* **namelist** [ENTER]

    xvf is the restore command variant. *Device* is the same as described above.

2. When the file is restored to hard disk, the screen shows:

    ```
    x namelist, x bytes, x tape blocks
    ```

10

printing

With XENIX you can print a file you created in XENIX, you can print a file you created with an applications program, and you can create text and print it immediately. You print using the XENIX command **lpr**.

from the console

You can log in either as root or as a user to print from the console. Log in now as a user.

printing a file

First, print the namelist file you created earlier.

1.   At the prompt, type:

      lpr phonebook/namelist `ENTER`

2.   The namelist file prints on your line printer. When it is finished, your user prompt appears on the screen.

XENIX automatically prints 66 lines per page.

Note: You can print a file you create with an applications program by following the above instructions. Be sure to enter the filename correctly.

printing text

You can use XENIX as a kind of typewriter; that is, you can enter text and print it on your printer. When you enter text in this way, however, you do not create a file. For this example, write a memo.

1.   At your user prompt, type:

      lpr `ENTER`

2.   Now type anything you want. End each line by pressing `ENTER`. When your memo is complete, type `CTRL` **d**, and your memo is printed on your line printer.

from a terminal

If you have a printer connected to a terminal, from the terminal you can print on its printer or you can print on the system printer.

using the system printer

To print on the system printer, at the user prompt, type:

      lpr *filename* `ENTER`

XENIX places the file in the system spooler and prints it on the system printer when it is available.

using the "local" printer

The local printer is the one connected to a terminal.

If any of your users have a DT-1, it must be modified before it can be used for local printing. Consult your Radio Shack Computer Center representative about this modification.

If any of your users have a DT-100, it needs a Tandy DT-100 Terminal Interface (Cat. No. 26-1198) before it can be used for local printing.

Before doing local printing from a terminal, be sure the printer is properly connected and that it is online. To print locally, type:

local lpr *filename* ENTER

If the printer does not start or if it stops during printing, check the printer before pressing any key. If the printer goes offline, the system waits for it to come back online. Correct the problem that caused the printer to go offline and place the printer back online. The printer then continues from the point at which it went offline.

Warning: While doing local printing, do not press any key on the keyboard unless your terminal screen displays a message asking you to do so. Do not attempt to terminate the printing process by pressing BREAK or any other key. Inadvertently pressing a key may cause extra characters to be printed on the printer and may cause the printer, the terminal, or both to end processing.

XENIX automatically sets the size of the form on which you print to 66 lines (6 lines = 1 inch). This does not mean that you actually print 66 lines of text on the form. The printer prints whatever you have specified and then goes to the top of the next form. From the top of the form to the bottom is 66 lines.

You can change the number of lines per form by using the following command:

local lpr -F "p = *x*" *filename* ENTER

-F tells XENIX that you want to change the size of the form. For *x*, substitute the number of lines you want per form. For example, to print checks or invoices that are 30 lines (5 inches) from top to bottom, type:

local lpr -F "p = 30" *filename* ENTER

Note: Using **-F** with **lpr** is not a way to paginate. You are not specifying the number of text lines on a page, but rather the number of lines from the top to the bottom of a form. Do not attempt to use **-F** as a paginating device. It will not work as such.

If a user wishes to be able to print locally all the time, you can add the following line to the user's .profile file:

PRINTER = local;export PRINTER

Now, when the user logs in, he or she is set to do local printing and need not use the local command to do so. Using lpr means printing on the local printer.

Note: To use local printing with applications programs, see the instructions in the manual that comes with the program.

11

using ed

When you add terminals to your multiuser XENIX system, you will need to edit, or change, some existing files. To do this, you use the line editor, ed.

In this chapter, you learn how to use ed.

creating a file

1. Log in as a user and at the prompt, type:

   ed [ENTER]

   Your screen now shows the ed prompt, the asterisk (*).

2. At the prompt, type **a** [ENTER], and you are ready to begin entering, or appending, text. Type:

   And Olaf who on bended knee [ENTER]
   Did almost ceaselessly repeat: [ENTER]

   (If you know the rest of this quote, you can also enter it.)

3. When you are through entering text, type [ENTER] to end the last line. At the beginning of the next line type a period (.) and [ENTER]. The screen again shows the ed prompt (*). The period tells ed that you have finished appending.

   While you are entering text, it is kept in a special work space called a "buffer." To save this text as a file, at the ed prompt type:

   w Olaf [ENTER]

4. The **w** copies the file and saves it as a file named "Olaf." Your screen shows 59, the number of characters in the file Olaf.

5. Now end, or quit, your editing session. At the ed prompt, type:

   q [ENTER]

   Your screen now shows the user prompt.

displaying the contents of the editing buffer

1. To reenter the editor and to see the contents of the file you just created, type:

   ed Olaf [ENTER]

2. **ed** displays:

   59

3. To display the contents of the file, type:

    1,$p `ENTER`

4. The screen shows:

    ```
    And Olaf who on bended knee
    Did almost ceaselessly repeat:
    ```

    (Did you complete the quote? If so, your third line also appears!)

    Typing **1,$** tells ed to start displaying at Line 1 of the text and to display through to the last line ($). To display only the last line, type:

    $ `ENTER`

    To display any single line, type the line number and `ENTER`. You need not type p.

5. You can move back and forth among lines quickly by typing either a plus (+) or a minus (−) and `ENTER`. A plus displays the next line in the file, and a minus displays the previous line. To display the current line, type a period and `ENTER`.

substituting text in the editing buffer

You can delete portions of a line and substitute other letters or words. For example, let's change the word "ceaselessly" to "unceasingly" in Line 2 of the Olaf file.

1. Type:

    2s/ceaselessly/unceasingly/ `ENTER`

2. To verify that the substitution was made, type:

    p `ENTER`

    The screen shows:

    ```
    Did almost unceasingly repeat:
    ```

    In Step 1, **2** is the line number, and **s** tells ed to "substitute." The text to substitute for and the text to substitute are separated by slashes.

deleting text from the editing buffer

You can delete a portion of a line, or you can delete an entire line or several lines.

deleting a portion of a line

1. You use the **s** command to delete only part of a line, that is, a character or a string of characters. For example, delete the word *Olaf* from Line 1 of the file Olaf. Type:

    1s/Olaf// `ENTER`

2. Now display the line. Type:

    1 `ENTER`

    The screen shows:

    ```
    And  who on bended knee
    ```

deleting lines

1. You use the **d** command to delete a single line or several lines. To delete Line 2 from the file Olaf, type:

       2d [ENTER]

2. Display the contents of the file to verify that Line 2 is deleted. Type:

       1,$p [ENTER]

3. The screen shows:

       And   who on bended knee

Note: To remove the entire contents of a file you create with ed and write to a file, you use the rm command. See Chapter 5 for instructions.

undeleting lines

1. You use the **u** command to undelete the last line deleted. To undelete Line 2 from the file Olaf, type:

       u [ENTER]

2. Display the contents of the file to verify that Line 2 has been restored to the file. Type:

       1,$p [ENTER]

12

setting up terminals

Your Tandy XENIX system consists of 1 computer and as many as 5 terminals. As System Administrator, you are responsible for connecting the terminals to the computer, installing the terminals, and making users.

In this chapter are instructions for connecting the DT-1 and the DT-100 to any of the following computers: Enhanced Model II, Enhanced Model 12, Model 16, Model 16b, and Tandy 6000.

DT-1

To connect the DT-1 to your computer you need 2 items—a DB-25 Cable (Cat. No. 26-4403) and a Null Modem Adapter (Cat. No. 26-1496). Before you begin, be sure that your system is shut down properly and that the computer and all peripherals are off. Connect the DT-1 according to the instructions in *Data Terminal Owner's Manual*.

connecting the DT-1 to your computer

1. Connect one end of the DB-25 Cable to the RS-232 jack in the DT-1.

2. Connect the other end of the cable to the female plug of the null modem adapter.

3. Connect the male plug of the adapter to Serial Channel A or B of your computer.

4. If your computer requires it (see the owner's manual), insert a terminator plug into the unused serial channel.

5. Now power up your hard disk, your computer, and the DT-1.

setting input-output parameters for the DT-1

Before using the DT-1 with your computer, you must be sure the DT-1 is using the appropriate Input-Output parameters. To do this, you must be at the keyboard of your DT-1.

1. To display the Input-Output parameters menu, type:

    `CTRL` `SHIFT` `ENTER`

2. The screen shows:

```
                SET-UP

    TC1 TC0 EM1 EM0 REV DTR DSR DCD
     0   0   0   0   0   1   1   1

    STB O/E PAR WDL BR3 BR2 BR1 BR0
     0   0   0   0   0   1   0   0

                 ALF AWP F/H CT1 CT0
                  1   1   0   1   0
```

3. The cursor is positioned below **TC1**. Change the pattern of 0's and 1's to the following. As you change a character, the cursor moves to the next character. To move around the screen otherwise, use the arrow keys.

    0 0 1 0 0 0 1 0

    0 0 0 0 1 0 0 1

    0 1 0 0 1

4. After you type the last **1**, press ENTER . The DT-1 asks if you want to store the parameters permanently. Press **Y**. The screen shows:

    SET-UP STORED

5. To leave the Set-Up Mode, type:

    CTRL   SHIFT   ENTER

    The menu leaves the screen, the buzzer sounds, and the cursor returns to home position. Your input parameters are stored permanently. Each time you power up your DT-1, it uses these parameters.

    For further information about Input-Output parameters, see *Data Terminal Owner's Manual*.

enabling the DT-1

Before you can use the DT-1, you must enable it. Return to the keyboard of your computer and log in as root.

1. If you connected the cable to Serial Channel A, type:

    enable tty01 ENTER

2. If you connected the cable to Serial Channel B, type:

    enable tty02 ENTER

    Create a user directory and a password for the person who is to use this terminal and it is ready to access XENIX. (See Chapter 3 for instructions.)

DT-100

To connect the DT-100 to your computer you need 2 items—an RS-232 Cable (Cat. No. 26-1495) and a Null Modem Adapter (Cat. No. 26-1496). Before you begin, be sure that your system is shut down properly and that the computer and all peripherals are off. Connect the DT-100 according to the instructions in *DT-100 Data Terminal Quick Reference Guide*.

connecting the DT-100 to your computer

1. Connect one end of the RS-232 cable to the DT-100 modem jack.

2. Connect the other end of the cable to the female plug of the null modem adapter.

3. Connect the male plug of the adapter to Serial Channel A or B of your computer.

4. If your computer requires it (see the owner's manual), insert a terminator plug into the unused serial channel.

5. Now power up your hard disk, your computer, and the DT-100.

telling XENIX your terminal type

In XENIX is a file called **/etc/termcap**. It contains some codes that identify various terminals. Your computer is automatically set to let you connect and use a maximum of 5 DT-1 terminals. When you connect and install another terminal, you must identify that terminal to XENIX.

The code for your DT-100 is dt100. You let XENIX know your terminal type by listing it in a file called **/etc/ttytype**. To do this you use the XENIX line editor **ed**. (For a quick review of ed, see Chapter 11.)

1. At the root login prompt, type:

   cat /etc/ttytype [ENTER]

2. The screen shows the following:

   ```
   trs16 console
   adds25 tty01
   adds25 tty02
   adds25 tty04
   adds25 tty05
   adds25 tty06
   ```

   trs16 is your computer, or the console. **adds25** is the code for the DT-1 terminal. To identify your DT-100, you must change **adds25** to **dt100 tty01**.

3. Now use ed to change this line. Type:

   ed /etc/ttytype [ENTER]

   The screen shows the number of characters in this file.

4. Type:

   2s/adds25/dt100/ [ENTER] (Serial Channel A)
   3s/adds25/dt100/ [ENTER] (Serial Channel B)
   w [ENTER]

   The screen shows the number of characters in the file as it now exists after being edited.

5. Type **q** [ENTER] and your login prompt returns to the screen. XENIX knows that you are installing a DT-100.

enabling the DT-100

1. If you connected the cable to Serial Channel A, type:

   enable tty01 [ENTER]

2. If you connected the cable to Serial Channel B, type:

   enable tty02 [ENTER]

   Create a user directory and a password for the person who is to use this terminal, and it is ready to access XENIX. (See Chapter 5 for instructions.)

disabling terminals

At times, you may need to disconnect a terminal. Before doing so, disable it.

If the terminal is connected to Serial Channel A, at the root prompt type:

> **disable tty01** [ENTER]

If the terminal is connected to Serial Channel B, at the root prompt type:

> **disable tty02** [ENTER]

setting up remote terminals

If you connect terminals to the computer with cables, as many as 5 terminals in the same location (room, floor, building) can use the same XENIX system. If you connect a computer and terminals with a modem, terminals at a distance (in another building, town, state) can use the same XENIX system via telephone lines.

Connect the modem following the instructions in the manual that comes with the modem. Now you must inform XENIX that you are operating from a remote location, and you must set the baud rate so that it is compatible among computer, modem, and terminal.

setting up the DT-1 for remote use

1. At the computer, log in as root and edit the file **/etc/ttys**. To do so, type:

   > **cat /etc/ttys** [ENTER]

2. The screen shows:

   ```
   19console
   09tty01
   09tty02
   09tty04
   09tty05
   09tty06
   ```

3. You must change the 9 in Column 2 to a 3 in the line that identifies the terminal you are setting up for remote use. For example, to set tty01 for remote use, type:

   > **ed /etc/ttys** [ENTER]

4. The screen shows the number of characters in this file. Now type:

   > **2s/09/03/p** [ENTER]

5. The screen shows:

   ```
   03tty01
   ```

6. Now type:

   > **w** [ENTER]

7. The screen shows the number of characters in the edited file. Type **q** [ENTER] and your prompt returns to the screen.

8. Now enable tty01. Type:

   > **enable tty01** [ENTER]

9. At the DT-1 you must now set the Input-Output parameters to correspond with the baud rate of your modem. For instructions, see "Setting Input-Output Parameters for the DT-1," earlier in this chapter.

   If you are using 300 baud, set the Input-Output parameters to the following pattern:

   ```
   0 0 1 0 0 0 1 0
   0 0 0 0 0 1 0 0
       0 1 0 0 1
   ```

   If you are using 1200 baud, set the Input-Output parameters to the following:

   ```
   0 0 1 0 0 0 1 0
   0 0 0 0 0 1 1 0
       0 1 0 0 1
   ```

10. Now when you log in to XENIX, the system switches between 1200 and 300 baud until it receives a rate that is compatible. Your screen may show "garbage," a configuration of random characters. If this happens, press [ENTER]. If your screen shows garbage again, press [BREAK] until the login prompt appears.

setting up the DT-100 for remote use

Connect the modem following the instructions in the manual that comes with the modem and the instructions in *DT-100 Data Terminal Quick-Reference Guide*. Install the terminal and edit the **/etc/ttytype** file. (See the instructions above under "Telling XENIX Your Terminal Type.") Now edit the **/etc/ttys** file to let XENIX know you are setting up the terminal for remote use. (See the instructions above under "Setting Up the DT-1 for Remote Use.")

The DT-100 parameters are set up by default to be compatible with XENIX. See *DT-100 Data Terminal Quick-Reference Guide* for instructions on how to select these default parameters.

terminal setup problems

When you enable a terminal, the device on the other end of the line should not respond to the "login:" prompt by itself unless it really intends to log in. If the cable is connected to a modem which always echos anything that is sent to it, the computer and the modem may continuously send characters to each other. This slows down the system and creates unnecessary disk drive activity. This is called "thrashing."

A long cable with nothing connected on the other end can pick up noise. This noise appears as a continuous stream of input characters. A DT-1 terminal with the power off can also generate a continuous stream of characters. To fix this problem, leave the DT-1 power on, or disconnect the cable from the computer.

To prevent noisy lines from greatly interfering with system performance, XENIX keeps track of how often it must invoke *getty*, the "login:" prompt program. If XENIX must restart *getty* too frequently, it will disable the troublesome line and then send a mail message to root that is similar to this:

```
From root Thu Jul 10 13:15:02 1986
Subject: init: Thrashing problem on line tty04.
This line will be disabled
```

The message indicates the time that XENIX disabled the line, and which line was disabled. If you receive a mail message like this one, attempt to correct the thrashing problem, and then re-enable the line.

if a terminal stops working:

1. Check the cables, power cords, and power switches to see that everything is properly set up.

2. At the console, log in as root, and invoke the *xmail* program. Read any mail that was sent to root. If there is a problem with a terminal line, the system may automatically disable it. If you see a message similar to the following one in the mail, see Chapter 12: "Terminal Setup Problems":

   ```
   From root Jul 10 13:15:02 1986
   Subject: init: Thrashing problem on line tty04.
   This line will be disabled.
   ```

   It is also possible that someone disabled the terminal line and forgot to re-enable it. See Chapter 12: "Enabling the DT-1" or "Enabling the DT-100."

13

communicating with users

As System Administrator you frequently want to communicate with users on your system. You may wish to inform them that you are about to shut down the system, or you may need to relate other information, such as announcements or reminders. XENIX lets you do this with **/etc/motd** (message of the day) or with **wall** (write all). If you are connected to a terminal by modem, you can also send messages and transfer files with a utility called **cu**.

/etc/motd

If you place information in the message-of-the-day file, the screen displays it whenever a user logs in. You use **ed** to write in this file.

1. Log in as root and type:

    ed /etc/motd `ENTER`

2. Your screen shows the number of characters in the file and the ed prompt (*). (If the file contains information, delete it before writing a new message of the day.) To write a new message, type:

    a `ENTER`
    Today is Beethoven's birthday. `ENTER`
    The Tandy String Quartet will present `ENTER`
    the Opus 18 quartets in the 9th floor `ENTER`
    Conference Room, beginning at 4:00 PM. `ENTER`
    A wine and cheese hour will follow. `ENTER`
    Everyone is invited. `ENTER`
    . `ENTER`

    Your screen now shows the ed prompt. Type:

    w `ENTER`

    Your screen shows the number of characters in the file and the ed prompt. Type:

    q `ENTER`

3. Now, whenever users log in, this message appears just before their login prompt.

wall

wall connects you immediately with all users on the system. You should use it only in an emergency since it interrupts whatever is occurring at the time. It is a handy tool, however, for notifying users of a critical situation, for example, a shortage of disk space.

1. To use **wall**, log in as root and type:

    wall ENTER
    Shortage of available disk space. ENTER
    Please clean up files quickly. ENTER
    CTRL **d**

2. Notice that you end your message by typing CTRL **d**. The screen shows:

    ```
    Broadcast message from root
    Shortage of available disk space.
    Please clean up files quickly.
    ```

14

communicating with other systems

cu is a XENIX utility that lets you communicate with other systems. The systems can be connected manually, that is, by cable, or they can be remote, that is, connected via modem.

Regardless of how the systems are connected, you must disable the channel you are using (tty01 or tty02) before you call up another system. To do so, use the disable command. For example, to disable channel tty01, type from the root prompt:

disable tty01 ENTER

When you are through using cu, you may wish to allow users to log in through that channel. If so, you must enable the channel once again. To do so, use the enable command from the root prompt:

enable tty01 ENTER

You may find it more convenient to reserve a channel for dial-out by simply leaving it disabled and leaving the other channel enabled so that others can call in.

calling up a manually connected system

At the system prompt, type:

cu wait -s *baud rate* **-a /dev/null -l /dev/***channel*

The baud rate must be the same for both the sending and the receiving devices. The possible baud rates are:

100, 150, 300, 1200, 2400, 4800, 9600

/dev/null indicates that you are not connected via modem. **channel** is the serial channel to which the cable is connected at your terminal. If you are connected through Channel A, replace *channel* with tty01; if you are connected through Channel B, replace *channel* with tty02.

For example, if you are sending and receiving at 1200 baud and are connected through Channel B, type:

cu wait -s 1200 -a /dev/null -l /dev/tty02 ENTER

calling up a remote system

If you are using a modem, you can call up another system and let XENIX identify the speed (baud rate) of your modem. To do so, you use the following command:

cu *phonenumber* -s *speed*

You can, however, select the dialout speed to your modem.

To select a dialout speed of 1200 baud (and 1200 baud only), type:

cu *phonenumber* -a /dev/cua#.1200 -s 1200 [ENTER]

phonenumber is the desired phone number. # is 0 if you are dialing out on tty01; it is 1 if you are dialing out on tty02.

To select a dialout speed of 300 baud (and 300 baud only), simply substitute 300 for 1200 in the above command line.

You can use cu to transfer only ASCII files; you cannot transfer binary files with cu.

You may lose characters during a file transfer if your communication lines have noise. To correct this problem, you may need to place the call again or lower the baud rate.

using cu

If you wish everyone on your system to be able to use cu, change the permissions on the device file that corresponds to the serial channel you are using for cu to include read and write permissions for everyone. See Chapter 6 for instructions on how to set and change permission settings.

You can use cu to access a network, call up a bulletin board, or communicate with a terminal on another system. You do not use it to communicate with users on your XENIX system. The **hello** program is used for that.

After you connect, cu runs as two processes—send and receive. You communicate by transferring files between 2 systems. The send process reads what you type at the keyboard, or a file you previously created, and passes it to the other system. The receive system reads what is transmitted from the other system and displays it on your screen.

If you are connecting to a bulletin board or a network, after you connect and log in you follow the communications protocol established by the system you are calling.

If you wish to communicate with a terminal on another XENIX system, you can use the procedure that follows. The procedure for initiating and terminating communication with cu is the same regardless of the device you wish to access.

sending and receiving messages

1. After you type the cu command, the screen displays a message that you are connected. Press [ENTER] and log in at the prompt. To send a message, at the shell prompt type:

   hello *user* [ENTER]
   You can now type the message [ENTER]
   you want to send. Be sure to [ENTER]
   end each line you type by pressing the [ENTER]
   <ENTER> key. To end a message, type [ENTER]
   <CTRL> d at the beginning of a new line. [ENTER]
   [CTRL] d

2.   After you type [CTRL] **d**, the other system's prompt appears on the screen. To exit cu, type:

[ENTER] ˜. [ENTER]

Note: To obtain the tilde (˜) at the console keyboard, type [CTRL] **6**.

3.   Now your screen shows your XENIX shell prompt.

When you use **hello** to send a message, that message immediately appears on the receiver's screen if the system is in use. If the receiver wishes to respond, he or she does so using the **hello** command as shown in Step 1 above. If the receiver does not wish to respond, he or she can ignore the message and continue with whatever task was at hand.

transferring files

You can use cu to communicate with another XENIX system and with a non-XENIX system. You can transfer files, however, only between 2 XENIX systems. You cannot use the following commands unless both systems are operating with XENIX.

When you transfer a file with cu, you simply copy it onto another XENIX system. You can copy it with the same name or with another name. To copy a file, you must be in the directory where the file exists.

To copy a file from your system to another XENIX system, at the other system's prompt type:

˜%**put** *filename* [ENTER]

This command copies a file from your system to the other system; its name remains the same on both systems. If you wish to copy it and rename it on the other system, type:

˜%**put** *filename newfilename* [ENTER]

To copy a file from another system onto your system, type:

˜%**take** *filename* [ENTER]

To copy a file from another system onto your system and rename it on your system, type:

˜%**take** *filename newfilename* [ENTER]

15

adding file systems

As you work with your XENIX system, you may find that you need more space than is available on the primary hard disk. XENIX notifies you when the primary hard disk is full by displaying the following message on the console:

```
No space on dev 1/33
```

You can then decide whether to delete some files or to create additional file systems. If you want additional file systems, you can create them either on floppy diskettes or on an additional hard drive.

creating file systems on floppy diskettes

1. Format the diskettes you need according to the instructions in Chapter 4.

2. Now you can create a file system on the diskette. If you have just used diskutil to format the diskette, boot XENIX by pressing the reset switch. Now, insert a formatted diskette in Drive 0, and log in to XENIX as root.

3. At the root prompt, type:

   makefs `ENTER`

4. Your screen shows the following menu:

   ```
                 Make a File System on . . .

   Type      1 a single-sided floppy
             2 a double-sided floppy
             3 a hard disk
             4 a disk cartridge
             q to quit

        > Enter Number:
   ```

5. Type **1** `ENTER` if you are using single-sided diskettes; type **2** `ENTER` if you are using double-sided diskettes. The screen shows:

   ```
   On which floppy Drive (0-3)?
   ```

6. Type **0** `ENTER`. The screen shows:

   ```
   Insert formatted disk in Drive 0 and press <ENTER>
   ```

7. When the file system is created, the screen shows:

   ```
   Press <ENTER> to continue
   ```

   The menu reappears on your screen. If you do not wish to create another file system, type **q** `ENTER`. Your root prompt returns to the screen.

8. Before you can access your new file system, you must mount it. That is, you must attach it electronically to your original XENIX file system. XENIX has a special directory available for this called **/mnt**. To mount your new file system, type:

    /etc/mount /dev/fd0 /mnt [ENTER]

9. Your new file system is ready to use, and you can work on it just as you do on the original file system on your hard disk.

10. When you are through working on your new file system, you must unmount it before removing it from the drive. To do so, at the root prompt type:

    /etc/umount /dev/fd0 [ENTER]

    Note: When you use the **shutdown** command to halt the system, your system's filesystems are automatically unmounted.

creating file systems on secondary hard disks

Connect the hard disk to the computer according to the instructions that accompany the hard disk. Then, power up your computer and format the hard disk. Follow the format instructions in Chapter 1. Be sure to enter the track and head information from your Media Error Map as instructed. If this is your second hard disk, XENIX refers to it as Hard Disk 1. Be sure to enter it as such when XENIX asks for the hard drive number during formatting.

1. When the format is complete, press the reset switch, and log in to XENIX as root. At the root prompt, type:

    makefs [ENTER]

2. The screen shows the following menu:

    ```
            Make a File System on . . .

    Type    1 a single-sided floppy
            2 a double-sided floppy
            3 a hard disk
            4 a disk cartridge        .
            q to quit

       > Enter Number:
    ```

3. Type **3** [ENTER]. The screen shows:

    ```
    On which hard drive (0-3)?
    ```

4. Type **1** [ENTER]. The screen shows the following:

    ```
    Disk has xxx cylinders.
    Disk has x heads.
    Disk has xx tracks reserved for bad track mapping.
    Making a file system of xxxxx blocks on /dev/hd1.
    ```

5. When the file system is created, the screen shows:

    ```
    Press <ENTER> to continue
    ```

6. Press [ENTER], and the menu returns to the screen. At the menu, type **q** [ENTER], and your root prompt reappears.

7. To mount your secondary hard disk, type:

    mkdir /hd1 [ENTER]
    /etc/mount /dev/hd1 /hd1 [ENTER]

Your secondary hard disk must be mounted before you can acccess and use it. If you will be using it regularly, you can or create the /etc/rc.user file to include **mount**. Then it is automatically mounted when you boot up XENIX.

To do so, add the following line to the /etc/rc.user file:

/etc/mount /dev/hd1 /hd1

8. In most cases, you will use the secondary hard disk regularly and will not want to unmount it. You must unmount it, however, before doing File System Check. (See "Restoring a Primary Hard Disk with 2 or More Floppy Drives" in Chapter 8.)

To unmount, type:

/etc/umount /dev/hd1 [ENTER]

creating file systems on cartridge

1. At the root prompt, type:

   makefs [ENTER]

2. Your screen shows the following menu:

   ```
                    Make a File System on . . .

       Type     1 a single-sided floppy
                2 a double-sided floppy
                3 a hard disk
                4 a disk cartridge
                q to quit

           > Enter Number:
   ```

3. Type **4** [ENTER]. The screen shows:

   ```
   On which cartridge Drive (0 or 1)?
   ```

4. Type **0** [ENTER]. The screen shows:

   ```
   Do you wish to format a cartridge? (Y/N):
   ```

5. Type **Y** [ENTER]. The screen shows:

   ```
   About to format a cartridge in Cartridge Drive 0
   Warning! Any existing data will be destroyed.
   Press <BREAK> to prevent this, or insert a disk
   cartridge in Drive 0 and press ENTER to continue:
   ```

6. When the file system is created, the screen shows:

   ```
   Press <ENTER> to continue
   ```

   The menu reappears on your screen. If you do not wish to create another file system, type **q** [ENTER]. Your root prompt returns to the screen.

7. Before you can access your new file system, you must mount it. That is, you must attach it electronically to your original XENIX file system. XENIX has a special directory available for this called /mnt. To mount your new file system, type:

   /etc/mount /dev/cd0 /mnt [ENTER]

   You can also use **/cdmnt0** instead of **/mnt**.

8. Your new file system is ready to use, and you can work on it just as you do on the original file system on your hard disk.

9. When you are through working on your new file system, you must unmount it before removing it from the drive. To do so, at the root prompt type:

   /etc/umount /dev/cd0 `ENTER`

   Note: When you use the **shutdown** command to halt the system, your files are automatically unmounted.

Notes About Disk Cartridges: XENIX locks disk cartridges while they are in use. This is to prevent anyone from removing a disk while it is in motion. During this time, the cartridge release button is ignored.

When the drive is no longer in use, XENIX unlocks the drive so you can remove the disk cartridge.

If you are using the disk cartridge as a mountable filesystem, XENIX keeps the drive locked until you unmount the filesystem. Note that if you improperly shutdown your XENIX system or if it crashes with the cartridge mounted or in use, XENIX does not unlock the drive. To unlock it, press the reset switch. XENIX unlocks the drives at the Xenix Boot> prompt so you can remove the cartridge disk.

16

maintaining the file system

As System Administrator, you are responsible for monitoring disk space and for ensuring the consistency of files. Maintaining adequate disk space and consistent, or "clean," files is essential to an efficient system. When the disk runs out of space, your system can no longer function. If your file system is inconsistent, or "dirty," you can lose files or even bring your system to a halt.

Checking disk space and files is part of your regular routine as System Administrator.

checking disk space

XENIX reports disk space in blocks. A 15-megabyte hard disk has 31212 blocks; a 35-megabyte hard disk has 69632 blocks. A minimum of 2057 blocks is always reserved as a "swap" area. XENIX uses this space to temporarily store information on running programs. We recommend that you always keep 15% of your blocks free.

With this information and some simple arithmetic, you can arrive at the maximum number of blocks to use. For example, if you have a 15-megabyte hard disk, you can use 24474 blocks.

You find out about disk space, number of files, and who has access to them by asking XENIX.

how much disk space is free?

1. To find out how many blocks are free on your root file system, or your primary hard disk, at the root prompt type:

    df [ENTER]

2. Your screen shows:

    ```
    /      (/dev/root): xxxxx blocks xxxx i-nodes
    ```

    Of course, the number will reflect the blocks available on your particular system.

3. To find out how many blocks are free on your secondary hard disk, type:

    df /dev/hd1 [ENTER]

4. Your screen then shows the number of available blocks.

how many blocks are allocated to what files and users?

1. To find out specific information about how many blocks are owned by each user on a particular disk, type:

    quot −f /dev/hd0 [ENTER]

    Note: In this case, you are asking about the primary hard disk (hd0).

2. Your screen shows something similar to the following:

    ```
    /dev/hd0:
    8486   673   bin
    4654   148   root
     651    77   sys
      38    29   pat
       3     3   donna
       2     2   bc
    ```

    The number in Column 1 is the total number of blocks used by the files. The number in Column 2 is the number of files. Column 3 identifies the login name of the owner.

how many blocks are used by individual directories?

1. To find out how many blocks are being used by everything below your current directory, type:

    du [ENTER]

    The screen shows a list of directories, subdirectories, and files and the number of blocks used by each as well as a subtotal of individual directories.

2. You can also specify a directory. When you need more space on the hard disk, it is helpful to know what user files are consuming how many blocks. Then, if they are not essential, you can delete them and have more available space. For example, to find out how many blocks are in /usr/pat, type:

    du /usr/pat [ENTER]

3. Your screen shows something similar to the following:

    ```
     4   /usr/pat/scripsit
     3   /usr/pat/projects
     1   /usr/pat/schedule
     2   /usr/pat/bc
    12   /usr/pat
    ```

    Column 1 shows the number of blocks, and Column 2 shows the directory name.

checking files

When you boot up XENIX, you may see a message saying that the file system needs cleaning. XENIX also asks if you want to clean the system. You always respond yes. Then XENIX runs a program called **fsck** (file system check).

Inconsistent files can result from shutting down the system improperly or from hardware problems such as a faulty drive. If you suspect file problems, you can run **fsck** yourself. Before doing so, make sure the file system is not mounted. If you are in multi-user mode, it may be necessary to have some or all of the users log off the system to prevent accesses to the file system you want to clean.

1. To check the files on your secondary hard disk, log in as root and at the root prompt, type:

    fsck −y /dev/hd1 [ENTER]

2. Your screen shows each of the 5 checking phases and then reports the number of files, the total number of blocks, and the number of free blocks as follows:

    ```
    /dev/hd1
    ** Phase 1 - Check Blocks and Sizes
    ** Phase 2 - Check Pathnames
    ** Phase 3 - Check Connectivity
    ** Phase 4 - Check Reference Counts
    ** Phase 5 - Check Free List
    xxxx files xxxx blocks xxxx free
    ```

    XENIX then tells you if the root structure was "okay" or if the file system has been modified.

    fsck warns you if you attempt a file system check on a disk that was not formatted by XENIX 3.0. This is a warning only. You may also see one of the following on the screen:

    ```
    free inode count wrong in superblk
    fix? yes

    free blk count wrong in superblk
    fix yes
    ```

    This is normal. Do not attempt to use this procedure on your primary or root hard disk. You must use the File Maintenance diskette to check a primary.

monitoring processes

Functions of the XENIX system—for example, editing, printing, copying—are known as "processes." On your XENIX system you and your users can run several processes at the same time. It is frequently helpful to know what processes are currently running.

1. To find out what processes are running at your console or terminal, at the root prompt type:

    ps [ENTER]

2. To find out what processes are running on an entire multiterminal system, at the root prompt type:

    ps -e [ENTER]

3. Your screen shows a report similar to the following:

    ```
    PID  TTY  TIME  COMMAND
      2  co   1:07  -sh
     73  01   2:09  tsh
     74  01   0:10  sh -c ps-e
     77  co   0:59  ps -e
    ```

    PID is the process identification number, which XENIX generates and uses. **TTY** is the terminal running the process (co is the console, or host computer). **TIME** is the total time the process has been running. **COMMAND** is the name of the process's command or program.

17

transferring TRSDOS-II files to XENIX

You use the **tx** command to transfer files from TRSDOS-II formatted diskettes to XENIX. If you have files on TRSDOS-II SAVE formatted diskettes (-r option), you can also transfer them with the **tx** command.

When you transfer files to XENIX, XENIX changes the filename to meet XENIX filename specifications. That is, XENIX changes all uppercase letters to lowercase and changes the slash (/) preceding the extension to a period (.).

You can also use the **tx** command to display directory information for TRSDOS-II diskettes.

Notes:

1. When you transfer password-protected files to XENIX, only the user has ownership.

2. The "r" permission must be set on the /dev files for the floppy drives (/dev/rfd*n* and /dev/fdbt*n*—*n* is 0,1,2, or 3, depending on the drive number).

Important: XENIX can only read TRSDOS-II 4.x media. To transfer TRSDOS files to XENIX, use the FCOPY command to first copy the files to TRSDOS-II and then use the **tx** command to transfer the files to XENIX.

The syntax for **tx** is:

    (a) **tx :d options Tfspec | Twc Xdir**

    (b) **tx :d options Tfspec Xfspec**

    (c) **tx :d -f [Tfspec | Twc]**

The following *options* are available:

    -a   absolute; copy files even if the file already exists

    -c   do not convert uppercase letters in the filename to lowercase

    -f   display the directory for the specified drive

    -l   do not add a linefeed to TRSDOS-II VLR files

    -p   prompt the operator before each file is moved

    -r   specifies that the source is TRSDOS-II SAVE media

    -s   do not strip length byte from TRSDOS-II VLR files

    -v   verbose; display informative messages during copy

    -x   converts carriage returns to linefeeds (0AH to 0DH)

Where: Tfspec = TRSDOS-II file specification
          Twc   = TRSDOS-II wildcard specification
          Xfspec = XENIX file specification
          Xdir   = XENIX directory
          :d   = the drive that contains the TRSDOS-II diskette. *:d* is required.

If you omit Xdir, the default is the current working directory (syntax example a).

The *options* and drive number (*:d*) are position-independent. You may place them in any order on the command line (except within filenames).

If you use a wildcard mask, you must enclose it in quotation marks.

examples

1. tx :0

    copies all files from the TRSDOS-II diskette in Drive 0 to the current working directory of XENIX (default).

2. tx :0 ARMAIN/DAT .
   tx ARMAIN/DAT . :0

    copies the file ARMAIN/DAT from the TRSDOS-II diskette in Drive 0 to the current working directory (.). The XENIX filename is armain.dat.

3. tx :1 LEAOWN/IDX LEAOWN/DAT OWNER/DAT /usr/lease/owners -x
   tx -x LEAOWN/IDX LEAOWN/DAT OWNER/DAT /usr/lease/owners :1
   tx LEAOWN/IDX :1 -x LEAOWN/DAT OWNER/DAT /usr/lease/owners

    copies the files LEAOWN/IDX, LEAOWN/DAT, and OWNER/DAT from the TRSDOS-II diskette in Drive 1 to the XENIX directory /usr/lease/owners. The XENIX filenames are leaown.idx, leaown.dat, and owner.dat.

    XENIX converts any carriage returns in the files to linefeeds. (This is useful when you transfer BASIC source to XENIX.)

4. tx :1 -c LEAOWN/IDX LEAOWN/DAT OWNER/DAT /usr/lease/owners
   tx LEAOWN/IDX LEAOWN/DAT OWNER/DAT -c /usr/lease/owners :1
   tx LEAOWN/IDX -c :1 LEAOWN/DAT OWNER/DAT /usr/lease/owners

    copies the files LEAOWN/IDX, LEAOWN/DAT, and OWNER/DAT from the TRSDOS-II diskette in Drive 1 to the XENIX directory /usr/lease/owners. Because you specified the -c switch, XENIX does not convert the filenames to lowercase. Therefore, the filenames are:

TRSDOS-II	XENIX
LEAOWN/IDX	LEAOWN.IDX
LEAOWN/DAT	LEAOWN.DAT
OWNER/DAT	OWNER.DAT

5. tx :3 "AR*" /usr/AR -pav
   tx -p -a -v :3 "AR*" /usr/AR
   tx "AR*" /usr/AR :3 -apv

    displays all files on the TRSDOS-II diskette in Drive 3 that match the wildcard mask AR*. Because you include the -p option, XENIX asks:
        copy ?

To copy the TRSDOS-II file into the XENIX directory /usr/AR, type **y** [ENTER]. If you do not wish to copy the file, type **n** [ENTER].

Because you specified the absolute switch (-a), XENIX does not prompt if the destination file already exists. XENIX does display informative messages, however, since you specified the -v switch.

6. tx :0 -f

 displays directory information for every file on the TRSDOS-II diskette in Drive 0. `

7. tx :0 -f -r

 displays directory information for every file on the TRSDOS-II SAVE diskette in Drive 0.

8. tx :3 INIT/* -f

 displays directory information for all files matching the wildcard mask INIT/* found on the TRSDOS-II diskette in Drive 3.

9. Wildcard Examples

 The wildcard character * (asterisk) matches zero or more occurrences of any legal filename character, including the slash (/).

 The wildcard character ? (question mark) matches only 1 occurrence of any legal filename character, including the slash (/).

 For example, assume you have the following files in the directory:

TEST	TEST1	TEST/DAT
TESTA/DAT	TEST1/DAT	TEST/C

 The wildcard mask "TEST*" matches all these files. XENIX, which does not follow TRSDOS-II wildcard conventions, does not recognize extensions and, therefore, considers the extension part of the filename.

 The wildcard mask "TEST?" matches only the file TEST1, because the question mark tells XENIX to match only one letter. Filenames with extensions are too long to match this wildcard.

 The wildcard mask "TEST?*" matches the following files:

TEST1	TEST/DAT	TESTA/DAT
TEST1/DAT	TEST/C	

 The file TEST does not match because the question mark must match at least 1 character.

 Note: You must enclose in quotation marks any filename that contains the wildcard mask characters (* or ?).

error messages

Unknown option found   You used an illegal option.

Multiple drive specification   You specified more than 1 device type.

Illegal drive unit number   You specified an illegal drive number. Drive numbers must be in the range 0 to 7.

Drive number not found on the command line   You did not specify a source drive number in the command line.

Directory Xdir does not exist   You specified a directory name that does not exist in the XENIX file system.

Filestat failed on *Tfspec*   This is an internal error. XENIX opened the file but could not read the file status.

Filename *Xdir* is not a directory   You specified as a directory a XENIX file.

18

what to do if...

Following the instructions in this manual will help to ensure that your system runs smoothly and functions efficiently. On occasion, however, you will encounter problems. This chapter lists some of the more common ones and what you can do about them.

your printer jams

Your printer will come to a halt if it needs a new ribbon or if the paper is not feeding properly. If it should stop, however, and neither of these is the reason, try the following procedure.

1. Log in as root. To find out what processes are currently running on the system, including invisible processes that XENIX itself is running, type:

    ps -ef `ENTER`

2. Your screen might show the following:

    ```
    UID   PID  PPID   C    STIME    TTY  TIME  COMMAND
    root    0    0   12   Dec 31     ?   0:00  swapper
    root    1    0    0   Dec 31     ?   0:01  /etc/init
    root   35    1    0  15:21:12   co   0:03  -sh HOME</ PATH<:/
                                                bin:/usr/bin
    root   41   35   24  15:23:57   co   0:02  ps -ef
    root   20    1    0  15:21:01    ?   0:00  /etc/update
    root   29    1    1  15:21:08    ?   0:00  /etc/cron
    cron   32    1    0  15:22:00   co   0:00  /usr/lib/lpd
    ```

    The last column indicates that one of the processes currently running is the line printer daemon. Its identification number is 32, and it is running on the console, or host computer.

3. To "unjam" the printer, you need to kill the process, move to the printer file directory, and "unlock" the printer. To do so, type:

    kill -9 32 `ENTER`
    cd /usr/spool/lpd `ENTER`
    rm -f lock `ENTER`

4. Now type:

    /usr/lib/lpd `ENTER`

    The printer should begin to operate. In all probability, the printer will begin printing the file it was printing when the jam occurred.

you forget your root password

If you as System Administrator forget your root password, you must reinstall XENIX.

76

a user forgets his or her password

The user can select another password, and you, logged in as root, can change the password. See Chapter 3 for instructions.

the system runs out of space

You can delete some files and make more space (see Chapter 5), or you can create new file systems on another hard disk or on floppy diskettes (see Chapter 15).

your file system is damaged

You can restore the file system from your backup library. See Chapters 8 and 9 for instructions.

you lose the screen display

Occasionally, you may be unable to call anything up on the screen. This can happen when a program stops prematurely as a result of an error, when you press [BREAK], or when you inadvertently type [CTRL] s.

To restore the screen display, follow these steps.

1. Type [CTRL] **q**. (This restarts transmission from the computer if you accidentally typed [CTRL] s.)

2. Now press [ENTER] and [REPEAT] simultaneously.

If the screen is still blank, follow these steps.

1. Type [CTRL] j. You may see an error message on the screen. If so, ignore it.

2. Now type:

   stty sane [CTRL] j

Your screen display should return.

you have a runaway process

A runaway process is either a process you cannot stop (a program that continues to execute) or a continuous stream of unwanted characters that appears on the screen. A runaway process can be the result of user error or electronic malfunction. In either case, you can use the following procedures, in the order given, to try to terminate the process.

1. Wait a while to see if the process will cease on its own accord, unless, of course, you know that the process is damaging files.

2. Press [BREAK].

3. If you have another terminal on your system, use it to try to kill the process. At the other terminal, log in as root, and type:

    ps —e ENTER

    The screen should show the processes currently running on all terminals. Determine the ID number of the unwanted process. At the root prompt, type:

    kill —2 *process ID* ENTER

    Wait a few seconds. If the process does not stop, type:

    kill —1 *process ID* ENTER

    Wait a few more seconds. If the process still does not stop, type:

    kill —9 *process ID* ENTER

    In all probability, this last command will stop the process.

4. If you are running XENIX from the console and do not have other terminals, you may have to press the reset switch to stop a runaway process. Because this is an incorrect way to shut down the system, it may cause file inconsistencies. Therefore, use it as a last resort, and then clean the file system by responding **Y** ENTER to the prompt.

19

important files and directories

This chapter contains listings of the most frequently used files and directories in the XENIX system. Many are required for proper XENIX operation, and you should not modify them or remove them.

the root directory

root (/) contains the following directories, which are required for system operation and should not be deleted:

/bin	XENIX command directory
/dev	device special directory
/etc	additional program and data file directory
/lost + found	storage area for orphaned files recovered by the file system cleaning program
/mnt	mount directory (reserved for mounted file systems)
/usr	user home directories
/tmp	temporary directory (reserved for temporary files created by programs)
/lib	contains a system date utility

root also contains the following files, which are required for system operation and should not be deleted:

/diskutil	disk formatter program
/xenix	xenix system object code
/z80ctl	z80 control program

the /bin directory

/bin contains the commands most likely to be used by anyone on the system. The following list contains a few of these commands. All commands in this directory are required.

basename	echo	passwd	su
cp	expr	rm	sync
date	fsck	sh	tar
dump	login	sleep	restor
dumpdir	mv	stty	test

the /dev directory

/dev contains special files that control access to peripheral devices, such as disks and printers. All files in this directory are required and must not be removed.

/dev/console	system console
/dev/lp	line printer
/dev/mem	physical memory
/dev/null	null device (used to redirect unwanted output)
/dev/fdx	floppy disk drives
/dev/hdx	hard disk drives
/dev/cdx	disk cartridge drives
/dev/rxx	unbuffered interface to corresponding device name
/dev/root	root file structure
/dev/swap	swap area
/dev/ttyxx	terminals
/dev/tty	terminal you are using
/dev/cdx	cartridge disk drives

the /etc directory

/etc contains miscellaneous system program and data files. All files are required, but you may modify some of them.

The following files must not be removed or modified:

/etc/mnttab	mounted device table
/etc/mount	for mounting a file structure
/etc/mkfs	for creating a file structure
/etc/init	first process after boot

The following files may be modified but not removed:

/etc/passwd	password file
/etc/rc	bootup shell script
/etc/ttys	terminal setup
/etc/termcap	terminal capability map
/etc/motd	message of the day

The following directory contains files that may be modified but not removed:

/etc/default	defaults for various programs

the /mnt directory

/mnt, /mnt0, /mnt1, /mnt2, /mnt3, /cdmnt0, and /cdmnt1 are empty directories that are reserved for mounting removable file systems.

the /tmp directory

/tmp contains temporary files created by XENIX programs. The files are normally present when the corresponding program is running. If you terminate the program prematurely, the files may be left in /tmp. You may remove any temporary file that does not belong to a running program.

the /usr directory

/usr contains the home directories of all users on the system. It also contains several other directories that provide additional XENIX commands and data files.

/usr/bin	contains more XENIX commands, which are less frequently used or are not essential for system operation
/usr/lib	contains more libraries and data files used by various XENIX commands
/usr/spool	contains various directories for storing files to be printed
/usr/tmp	contains more temporary files. You may remove any temporary file that does not belong to a running program.
/usr/adm	contains data files associated with system administration and accounting

log files

Some directories contain log files that grow in size during normal system operation. You should truncate many of these files periodically to free disk space. (Use the command **cp /dev/null** *filename*.) Before doing so, however, be sure to take note of their contents. Some of these files can be especially useful.

For example, the /usr/adm/messages file contains a record of all error messages sent to the system console. If it shows an unusual number of disk error messages, you might suspect a defective or misaligned drive.

The following is a list of these files (by full pathname) and their contents.

/etc/ddate	date of the latest backups. Do not delete or truncate this file.
/usr/adm/logouts	users who were logged off by idle.
/usr/adm/pacct	accounting information
/usr/adm/messages	error messages generated by the system when started
/usr/adm/shutdown.log	log record of each shutdown
/usr/adm/wtmp	user logins and logouts

/usr/spool/at/past is a directory that contains a file for each use of the at command. You may remove files in this directory, but not the directory itself.

20

system defaults

A system default is a condition that exists within your XENIX system when you install it. For example, when you first boot the system, the root password is [ENTER]. You changed this default when you established your own root password. (See Chapter 2.)

Some system defaults you may wish to change; most, however, you will keep. Following is a summary of system defaults, the files affected, and how to change the defaults. You must be logged in as root to edit any files containing system defaults.

Note: After you edit a file to change a default, the setting you establish remains in effect until you change it again.

mkuser defaults

You use the mkuser program when you add users to the system.

group and user id numbers

The /etc/passwd file contains information about users, including login names and user and group identification numbers. XENIX automatically assigns a group number of 50 to all users on the system and sequentially assigns each user a number above 200 when you add users with the mkuser program.

If you work with more than 1 XENIX system and users want to transfer files from one system to another, then each user must have identical login names and identification numbers on every system. Each name and number must be unique.

For example, harryo has an ID number of 206 on one system. He wishes to transfer some of his files to another system, but a user on that system already has the ID number 206. harryo must choose a new ID number not in use on any system involved in his file transfers.

First, determine a unique ID number, and then edit the /etc/passwd file to change 206 to the new number. Now, you must change the user ownership of each of the user's files and directories from the old user ID to the new one. To do so, type:

    chown *user name (directory or filename)* [ENTER]

Follow the same procedure to change a group ID, but use **chgrp** instead of **chown**.

.profile file

The mkuser program creates a standard .profile file for each user. You can change the parameters of this file by editing **/usr/lib/mkuser.prof**. Use **ed** to do so.

drive defaults

Drive defaults concern which drives are mounted and what kind of floppy drives you are using.

mounted drives

Initially, only your primary hard disk is mounted. You can mount and unmount additional file systems as you want to use them. You can create the /etc/rc.user file to include a mount statement. Then a secondary hard disk system is automatically mounted when you type CTRL d in the boot procedure.

floppy drives

To find out the system defaults for floppy drives, at the root prompt type:

drive ENTER

Your screen should show the following:

```
drive 0: nodetect, wait, seekrate=0
drive 1: nodetect, wait, seekrate=0
drive 2: nodetect, wait, seekrate=0
drive 3: nodetect, wait, seekrate=0
```

nodetect indicates that for Drives 0, 1, 2, and 3 the door-open detection device is off. You can choose for it to be on by specifying detect instead of nodetect.

wait indicates that XENIX is to wait for the drive motor to reach proper speed before attempting to read or write to the disk in the specified drive. You can also select nowait.

seekrate = 0 indicates that the speed at which the drive locates the track to read or write to is 3 milliseconds (3 ms). **seekrate = 2** indicates that the speed is 10 ms. You can also set the seekrate at 6ms by specifying 1 and at 15ms by specifying 3.

We recommend the following settings for the following types of floppy drives:

Thinline	detect, wait, seekrate = 0
Latch	nodetect, nowait, seekrate = 3
Pushbutton	detect, nowait, seekrate = 2

To change the drive settings, use the following format:

drive *number*   wait | nowait   detect | nodetect   rate = x

You must type the command in this order even though when you display the drive specifications they are in a different order. For example, to change the defaults of Drive 3, type:

drive 3 nowait detect rate = 0 ENTER

Now, verify that the change is made by typing **drive** ENTER.

terminal defaults

System defaults specify that you will use a console and 5 DT-1 terminals. This information is in the /etc/ttytype file. For instructions on how to change this file if you are installing a different kind of terminal, see Chapter 12.

Information on the status of terminals on your system is in the /etc/ttys file. Display this file and you see which terminals are enabled and disabled. Initially, only the console is enabled. To enable other terminals, you use the enable command. (For instructions, see Chapter 12.)

printer defaults

The printer spooler produces a header page (banner) to separate sets of printer output. If you do not want the banner page, edit the file /etc/default/lpd. Change the line

banners = 1

to

banners = 0

appendix a
using tsh

tsh, or trsshell, is a special XENIX command level that uses TRSDOS command names. These commands perform the same functions as XENIX commands; so if you are comfortable with XENIX terminology, you can disregard them.

If, however, you have been using TRSDOS and are more comfortable with TRSDOS terminology, you may want to use tsh commands. To do so, you must enter the trsshell. You can do this from the root prompt or from the user prompt.

At either prompt, type:

tsh [ENTER]

The screen shows the trsshell prompt:

    tsh>

At this prompt, you can use any command listed in this chapter or any XENIX command.

Before you can log out of XENIX, you must exit the trsshell. To do so, type:

exit [ENTER]

> or

[CTRL] **d**

The screen now shows your XENIX prompt.

Note: If your login shell is trsshell, you need not exit trsshell before logging out. Type [CTRL] d to log out of the system.

Following are the tsh commands and their syntax and function. You can use wild cards in any tsh command that lets you specify multiple filenames.

again *string* | *history-number*

Executes a previously executed command. You can specify the command by a search *string* or history number. If you type **again** without any options, tsh executes the last command entered.

alias *command comand-line*
unalias *command*

Maps a command name to another command line. This lets you give shorter or easier names to commands that you use often. If you omit *command-line*, **alias** displays the command line for that command. If you omit both *command* and *command-line*, **alias** displays the current lists of aliases. Use **unalias** to remove an alias.

auto *command line*

Creates or removes an automatic command that executes when you enter tsh. The *command line* is stored in the .tshrc file. This file executes when trsshell starts up. If the file doesn't already exist, it is created.

To cancel the auto function, type:

auto [ENTER]

The automatic command line is removed from the .tshrc file.

cd *directory*
chdir *directory*

Changes the current working directory to the specified directory. If you do not specify a directory, your home directory becomes the current working directory.

cls

Clears the screen and places the cursor beside the tsh prompt.

copy *file1 file2*

Copies *file1* to *file2*. If *file2* is an existing file, the permissions and ownership do not change. If *file2* is being created, the permissions and ownership are the same as the file being copied.

Note: The copy command will not copy a file onto itself.

device

Displays a list of devices that trsshell recognizes and their descriptions. You use the device names with the **dismount, mount, restore,** and **save** commands.

copy *file1 file 2 . . . directory*

Copies multiple files into a directory. The filenames do not change.

dir

Displays an alphabetic list of the contents of the current directory.

dir *filename*

Displays, in long format, the specified file. You can specify multiple files.

dir *directory name*

Displays an alphabetic list of the contents of the specified directory. You can specify multiple directories.

dir *filename directory name*

Displays an alphabetic list of filenames and directory names; the list of filenames precedes the list of directory names. You can specify multiple filenames and directory names.

dir *option filename*
dir *option directory name*

You can use the following *options* with the dir command.

-a   Displays a list of all files. If you are logged in as root, XENIX assumes the -a option even if you do not specify it.

-b   Displays invisible character in octal notation.

-c   Sorts or prints files based on the creation date.

-d   Displays only the directory name, not its contents, if you specify a directory name.

-g   Displays the group ID instead of the owner ID in the listing.

-r   Reverses the order of the sort, depending on the options you specify. For example, you may wish oldest date first or inverse alphabetic order.

-s   Displays size in blocks, including indirect blocks, for each entry.

-t   Sorts by time you modified the file or directory unless you specify the -c or -u options.

-u   Sorts or prints according to last access time.

-A   Displays a list of all files except for . and . .

-R   Displays the contents of all subdirectories for the specified directory.

dismount *drive number -device*

Tells XENIX that you are removing a mounted file system on the specified drive and device.

Execute the dismount command before removing the mounted disk.

For information on the mount process, see **mount**.

display *filename*

Displays a full screen of text of the specified file. If the file contains more lines of text than the screen can show at one time, the following prompt appears at the bottom of the screen:

    --more--

If you are reading a file, and not a pipe, a percentage appears after "more." This is the percentage of the file (in characters, not lines) read thus far.

To see the next line of text, press ENTER . To see the next full screen of text, press SPACEBAR .

Below are the options available for use with the display command. You use them in the following form:

    display *options filename*

-n   specifies the number of lines the screen displays, or the window size. If you do not specify n, XENIX uses the entire screen. On a screen that can display 24 lines, the default window is 22 lines. Terminal characteristics and default window size are stored in the /etc/termcap file.

-s   "squeezes" extra blank lines from the screen. That is, if you have inserted more than one blank line between lines of text, that space is reduced to only one blank line. You use this option to increase the amount of pertinent information the screen displays.

-r   displays control characters on the screen. For example, if the file contains CTRL c, the screen shows:

     ^C

If you do not specify the -r option, the screen does not display control characters that cannot be interpreted.

-w   waits to exit at the end of a file until you press SPACEBAR . If you do not specify -w, XENIX exits immediately.

+ *linenumber*   displays the file, starting at the specified line number.

When your screen shows the --**more**-- prompt, you have the options listed below.

Note: In these options, *n* is always optional. If you omit *n*, however, XENIX uses 1.

n SPACEBAR	displays the next *n* lines. If you omit *n*, the screen displays the next window of text.
CTRL D or d	displays (scrolls) the next 11 lines of text. If you specified *n*, the number of lines scrolled is *n*.
*n*z	displays the next *n* lines and *n* becomes the new window size
*n*s	skips *n* lines and then displays the full screen of text.
*n*f	skips *n* full screens and then displays the next full screen of text.
q Q :q :Q	exits display.
=	displays the current line number.
v	starts up the editor **vi** at the current line.
h	help command—displays a list of and describes all display commands. You can also use the question mark (?) to see this list on the screen.
!*command*	invokes a shell with *command*. The percent sign (%) in *command* is replaced with the current filename, and the exclamation mark (!) in *command* is replaced with the previous shell command. If no current filename exists, % is not expanded. The sequence \! is replaced by !.
n:n	skips to the *n*th file in the command line (skips to the last file if *n* doesn't make sense).

n:p	skips to the nth previous file in the command line. If you give this command while XENIX is displaying a file on the screen, then **display** goes to the beginning of the file. If n doesn't amake sense, **display** skips to the first file. If **display** is not reading from a file, nothing happens.
:f	displays the current filename and line number.
.	repeats the previous command.

You do not need to press ENTER after typing any of the above commands; each command executes immediately. Until you type the command character itself, you can cancel the numeric argument being formed by typing CTRL U. You can press BACKSPACE to display the **--more--** prompt.

Whenever output is being sent to the screen, you can type CTRL 7 to stop the display. The screen then shows the **--more--** prompt. You can then enter any of the above commands. Unfortunately, you may lose some output; any characters in the output queue are flushed when you type CTRL 7.

This program sets the terminal to noecho mode so that output can be continuous. The screen does not show what you type, except for the slash (/) and the exclamation mark (!).

do *filename*

Executes the commands stored in *filename* as if they had been entered from the keyboard. You may nest do commands as deep as necessary or as the system memory allows.

files *directory name*

Lists in columns in alphabetic order all files in the specified directory. If you do not specify a directory, XENIX uses the current directory. You can specify multiple directories. When you do so, the screen shows the filenames first and then the directories.

Directories are marked with a trailing slash (/), and executable files are marked with a trailing asterisk (*).

Below are the options available for use with the files command. You use them in the following form:

files *options directory name*

-a   Displays a list of all files. If you are logged in as root, all files are listed even if you do not specify the -a option.

-b   Displays invisible characters as /nnn (octal).

-c   Sorts and displays based on when the files were created.

-d   Lists only the directory name and not its contents if you specified a directory.

-q   Lists group ID and not owner ID.

-r   Reverses the order of the sort, depending on the options you specify. For example, you can sort in reverse alphabetic order or by oldest date first.

-s Lists size in blocks, including indirect blocks, for each entry.

-t Sorts by time modified unless you specify the -c or -u option.

-u Sorts and displays according to last access time instead of last modification.

-x Displays in columnar format. Sorted material is displayed across rather than down.

-l Forces a one-entry-per-line output format, for example, to a teletype.

-A Displays a list of all files except those that have . and . .

-C Forces multicolumn output. You use this to redirect output.

-R Displays the contents of all subdirectories for the specified directory.

free *filesystem*

Displays the number of free blocks on the specified file system. If you do not specify a file system, the screen shows the amount of free space on all mounted file systems.

help

Displays an explanation of the help text and the notations used. To see a list of available subjects, type **help** * [ENTER]. To see the help text for a particular subject, type **help** *subject* [ENTER].

To halt the display of the help text file, type **q**.

history

Displays a list of the previously executed commands. History assigns each command a number which can be used to re-execute it using the **again** command. History is set to display the last 20 commands. (See also **again** and **set**).

kill *filename*

Kills (removes) the specified file from a directory. The file is destroyed. You must have write permission for a directory to delete files from it. You do not, however, need read or write permission for the file to be able to delete it.

You may specify multiple filenames. If you do so, XENIX prompts you for each file before the file is removed. Type **y** [ENTER] in response to the prompt.

To delete a directory, type **kill -r** *directory name*. This deletes the contents of the directory and the directory itself. If you attempt to delete a file that is actually a directory, the screen shows an error message.

Note: You cannot remove the file . . from a directory.

lib

Displays a list of the trsshell commands.

mount *drive number device*
dismount *drive number device*

> Tells XENIX that a file system is now present on the specified drive and device. The file system's contents are made available in the /mnt*drive number* directory. ***device** specifies the type of device you are mounting (ss, ds, c1Ø). See **device** for more information. If you omit **device**, tsh assumes floppy diskette.

> For example, if you place a XENIX diskette in floppy Drive Ø, you tell XENIX by typing **mount Ø** [ENTER]. The contents of the diskette are made available in the directory /mntØ. You tell XENIX that you are removing the diskette from Drive Ø by typing **dismount Ø** [ENTER].

> The mount and dismount commands keep track of mounted devices. If you do not specify a drive number, the screen shows a table of currently mounted file systems.

> **Note:** You can only mount disks that contain XENIX file systems. If you attempt to mount a diskette that contains an alien file system, for example, TRSDOS, the command will fail and the system could require rebooting.

move *file1 file2*
move *file1 file2 . . . directory name*

> Copies *file1* to *file2*. If *file2* already exists, the existing permissions and ownership are retained. If it does not exist, the permissions and ownership of the source file become those of *file2*.

> You can copy multiple files into a directory with the second command line above. The filenames are not changed.

> **Note:** You cannot copy a file onto itself with the move command.

print *filename*

> Queues the file for printing on the printer. You can place multiple filenames on the command line.

> Listed below are the options you can use with the print command. To use the options, follow this format:

> > **print** *option(s) filename(s)*

> -T local   Sends output to local printer regardless of how PRINTER was set.

> -T spooler Sends output to the print spooler for printing.

> -r   Removes the file after it is queued.

> -c   Copies the file so that no changes are made before it is printed.

> -m   Reports by **mail** when printing is complete.

> -n   Does not report by **mail** when printing is complete. This is the default.

rename *old.file new.filename*

> Changes *old.file*'s name to *new.filename*.

restore *drive number* **-d** *-device*
restore *drive number* *-device filename* . . .

> Restores files that were saved on diskette/cartridge to where they were originally. With the restore command, you may use multiple filenames or directory names. If you specify a directory name, the directory and its subdirectories, files, and their contents are restored.
>
> *Device* specifies the type of device from which you are restoring (ss, ds, c10, c20). See **device** for more information.
>
> -d is optional. If you specify -d, the screen shows a list of files on the diskette/cartridge.

save *drive number* *-device filename* | *-all*

> Saves files or directories and their contents to the disk in the specified drive. You may use multiple filenames or directory names. If you specify a directory, the directory and its subdirectories, files, and their contents are saved.
>
> Specify the -all option if you want to save the entire filesystem, including all mounted filesystems.
>
> *Device* specifies the type of device to which you are saving (ss, ds, c10, c20). See **device** for more information.
>
> -ss tells XENIX that you are using single-sided diskettes. -ds specifies double-sided diskettes. -c10 specifies a 10 megabyte disk cartridge and -c20 specifies a 20 megabyte disk cartridge. You must specify one of these device types.

set

> Displays a list of the internal option settings of tsh.

set *option*

> Changes an internal option. The following options are available.
>
> **verbose on** | **off**   If verbose is off, trsshell does not inform you of a command's success or failure.
>
> **retry on** | **off**   Enables or disables retry. If retry is on, the command line is converted to lowercase if trsshell is unable to execute a command. Trsshell then tries to execute the lowercase command line.
>
> **prompt** *string*   Set the trsshell prompt to *string*. For example, to set the prompt to:
>
>> cue>
>
> type:
>
>> **set prompt cue>** [ENTER]
>
> **term** *terminal-type* Sets the user's terminal type by setting the environment variable TERM.
>
> **history** *number* Sets the number of commands that **history** remembers to *number*.

showhistory on | off If showhistory is on, trsshell displays each command and its history number as soon as you enter it.

showstatus on | off If showstatus is on, trsshell displays the exit code if a command fails.

showdir

Displays the pathname of the current working directory.

source *file*

Reads the command to execute from the specified file. Source reads and executes the commands as if you had typed them from the keyboard. Source differs from Do in that the commands are executed from the current shell. Trsshell does not display the commands or record them in the history list.

time

Displays the current date and time.

version

Displays the name of the shell and its current version.

appendix b
quick reference guide to commands

This section contains a listing and a summary of all the commands in *The System Administrator's Guide to XENIX.* It also contains some commands available on the Core but not mentioned in the manual.

When using these commands, type **boldface** text exactly as it appears. Text in *italics* indicates a variable; you substitute something for the italicized text. For example, in the command **cat *filename***, you substitute the actual filename for the word *filename*.

cat concatenate, or display, text on the screen

cat *filename*
displays the contents of the file on the screen

cd change directory

cd
returns you to your login directory

cd *directory*
changes your working directory to *directory*

chmod change mode

chmod *who operation code permissions file*
changes the permissions mode for *file*

who

a	all (user, group, others)
g	group
o	others
u	user (login owner)

operation code

+	add permission
−	remove permission
=	assign all permissions (read, write, and execute)

permissions

r	read
w	write
x	execute

cp copy file

> **cp** *filename1 filename2*
> makes a copy of *filename1* and names it *filename2*

> **cp** *filename1 filename2 directoryname*
> copies 2 files into the specified directory

date displays the current date and time on the screen

df disk space free

> **df**
> displays the number of blocks free on all mounted file systems

> **df** */dev/hdx*
> displays the number of blocks free on the specified disk

du disk usage

> **du** *directory*
> displays the number of blocks in use on the specified directory and in what files

kill terminate a process

> **kill** *number*
> terminates the process *number*

lc list, or display, the contents of a directory and information on files in that directory

> **lc** *directory name*
> displays the contents of the specified directory

lpr printer spooler

> **lpr** *filename*
> prints the file on the printer

ls list, or display, the contents of a directory and information on files in that directory

> **ls** *directory name*
> displays the contents of the directory

> **ls -l** *directory name*
> displays the contents of the directory, including the names of all subdirectories and files, size, last modification date, and permissions

mkdir make directory

> **mkdir** *directory name*
> makes a directory

more display text on the screen, 1 screen at a time

> **more** *filename*
> displays the contents of *filename* on the screen, 1 screen at a time

mv move or rename files and directories

> **mv** *filename1 filename2*
> changes the name of *filename1* to *filename2*
>
> **mv** *filename1 directory name*
> moves *filename1* to the specified directory
>
> **mv** *directory name new directory name*
> changes the name of the specified directory

passwd change your login password

park park, or position, the read/write head of the hard drive

> **park -on**
> positions the read/write head on the last cylinder of the hard disk
>
> **park -off**
> positions the read/write head on the cylinder in use

ps process status

> **ps -e**
> displays information about all active processes

pwd print working directory

> **pwd**
> displays the full pathname of your working directory

quot summarize file system ownership

> **quot -f** *file system*
> displays the number of blocks and the number of files owned by each user in the specified file system

restore under tsh, restores to hard disk files saved on floppy diskette or disk cartridge

> **restore** *drive number -device*
> restores files on the diskette or cartridge in Drive *n* to hard disk

rm remove files or directories

> **rm** *filename*
> removes the specified file
>
> **rmdir** *empty directory name*
> removes the specified empty directory
>
> **rmuser** *user name*
> removes the specified user

save   under tsh, save, or back up, files or directories to floppy diskette or cartridge

   save 0 -*device* /usr/name/filename
   copies a file to the specified *device* in Drive 0

wall   write to all users on the system

who   who is on the system

   who
   displays a list of online users by login name, terminal, and login time

glossary

accessing. The process of getting at information stored in the computer.

applications program. A group of instructions that does a specific, practical task, such as keeping track of accounts payable.

backup. A copy of information that is stored in machine-readable form, such as floppy diskette or hard disk.

banner. A heading that separates parts of information printed on the line printer.

baud rate. The speed at which information is transmitted.

block. A set of consecutive machine instructions, characters, or digits the computer understands as a unit.

boot. The process of loading the disk operating system.

buffer. An area of a computer's memory that is used to store information temporarily.

bulletin board. In the world of computers, an electronic version of the cork type. Users exchange information by placing notices on it and responding to posted notices.

byte. The basic unit of information in the computer. A byte is the equivalent of 1 character.

cable. A device consisting of plugs and wiring that lets you manually connect computers and peripheral devices.

Cartridge disk. A platter in a protective enclosure with magnetic material on both sides, on which the computer can store data.

Central Processing Unit. The circuits in the computer that control the execution of instructions.

cleaning. In XENIX terminology, the process of clearing up inconsistencies on the file system.

command. A sequence of characters that tells the computer to take a particular action immediately. A command is usually typed at the keyboard.

communications protocol. The steps you take to get to and converse with connected electronic media.

computer. An electronic device that can receive and follow instructions and then use these instructions to calculate and to compile, select, and correlate information. It usually consists of a keyboard, a video screen, input/output devices, and a Central Processing Unit (CPU).

console. The host computer in a multiterminal system. See also host computer.

core system. In XENIX, the basic unit of the operating system that you must have to run applications programs.

CPU. Central Processing Unit.

current directory. The place in the XENIX system in which you are working.

cursor. A blinking or steady screen-symbol that indicates the place at which the next typed character will appear.

cylinder. A division of a hard disk.

data. Items of information that a computer can process or generate.

data terminal. A connection between you and a computer that transfers information from human form to a format computers understand. It consists of 3 parts—a keyboard, a videoscreen, and input/output channels.

default. A condition that exists when you turn on your computer.

development system. In XENIX, a group of programs and utilities with which you can make other programs and do typesetting and printing. It is separate from the core system.

device. Any piece of computer equipment.

directory. A list of the files on a disk. In XENIX, a disk can have multiple directories, each containing other directories and files.

disable. Disconnect or disallow electronically.

disk. A device on which a computer can store information. See floppy diskette; hard disk.

diskette. See floppy diskette.

diskutil. In XENIX, a program with which you format and/or copy hard disks, disk cartridges or floppy diskettes.

display. The video screen. If a program displays text, it shows it on the screen. If a program prints text, it prints it on paper at the line printer.

edit. Alter, or change, text. You edit text when you add, modify, or delete portions of it.

editor. A program that lets you use specific commands to modify text.

enable. Connect or allow electronically.

error message. Text that appears on the screen that tells you a mistake has been made. It may be your mistake or the computer's.

execute permission. In XENIX, a setting that lets you run a program.

file. A defined unit of data stored on disk. In XENIX, sometimes both files and directories are referred to as files.

file system. The organization and allocation of files on disks.

floppy diskette. A flexible platter made of a plasticlike material on which the computer can store data.

format. Organize a disk into tracks so that the computer can write on it.

garbage. A random display of characters that may appear on the screen or in printed copy.

group. In XENIX, a specifically defined collection of users.

hard disk. A fixed circular metal plate with magnetic material on both sides, on which the computer can store data.

head. A device that reads information from, writes information on, and deletes information from a disk.

hierarchical structure. In XENIX, the way directories and files are organized; that is, the way in which they branch from a single root.

home directory.   In XENIX, your login directory.

host computer.   The controlling computer in a multiterminal computer system.

initialize.   To make a formatted disk ready for use.

input-output parameters.   The electronic options for placing data into a computer or taking it out.

log in.   The way in which you identify yourself to the computer.

login directory.   The root directory with which your login name is associated.

log out.   The way in which you tell the computer you are leaving the system.

manually connected terminal.   A computer or data terminal that is connected to the host computer by cable.

media error map.   A list of bad, or flawed, tracks and heads that comes with your hard disk.

megabyte.   1 million bytes.

menu.   A screen display that gives you a list of options.

modem.   A device you connect to your computer and with which you communicate with another terminal over telephone lines.

mount.   Make a device electronically or physically accessible to your computer.

multitasking.   The ability of an operating system to perform several tasks at the same time.

multiuser.   A computer configuration, or system design, that lets more than 1 person use the computer at the same time.

network.   A series of interconnected computer communication systems.

null modem adapter.   A device you connect to your computer that tells it you are connecting to another computer or data terminal manually.

operating system.   A set of instructions the computer uses to do what you ask it to do. For example, the operating system controls the line printer and acts as a base for an applications program.

other.   In XENIX, anyone besides a user and a group.

parameters.   Information that defines the options a user supplies when a program is run.

password.   A code you supply before the computer lets you use it.

pathname.   In XENIX, the route, or path, the operating system takes to a specific file or directory.

permission.   In XENIX, access to files and directories. You may have read, write, and/or execute permission.

permission setting.   The code attached to files and directories that determines a user's access.

primary hard disk.   The first hard disk you install. In XENIX, the primary disk is referred to as hard disk 0 (hd0).

printer.   A device for making paper copies of the information produced by a computer.

printing.   Making a paper copy of information produced by the computer.

process.   An operating system's basic unit of activity.

program.   A set of instructions that tells a computer step by step how to perform a task.

read permission.   Lets you display a file on the screen and read it.   .

reformat.   Reorganize a disk. Reformatting erases existing data.

remote terminal.   A computer or data terminal connected to a computer by modem.

restore.   Put information stored on floppy diskettes back onto a hard disk.

root.   In XENIX, the System Administrator's login name. Also, the name of a basic directory that is required for system operation.

runaway process.   A computer activity that does not stop as the program instructs or that you cannot stop manually with ease.

secondary hard disk.   Any hard disk on a system other than the primary hard disk. In XENIX, secondary hard disks are identified sequentially as hard disk 1, hard disk 2, and so on.

serial channel.   A port on the computer to which you make a modem or cable connection.

shell.   A program that reads and interprets what you type at the keyboard.

shutdown.   Closing the system to use.

spooling.   The process by which data is placed in a line, or queue, to await transmission. For example, when you print a file on the line printer, the computer first places it on a waiting list, or spool, and then in its turn the file is printed.

swap area.   The space on the primary hard disk where XENIX temporarily stores information on running programs.

syntax.   The form of a command, including the order in which items are placed and the way in which they must be stated.

system administrator.   In XENIX, the person responsible for installing, monitoring, and maintaining the system.

terminal.   In common usage, a computer or a data terminal.

text.   Anything other than graphics that you type at the keyboard or display on the screen.

UNIX™.   An operating system developed by Bell Laboratories and from which XENIX is derived.

unmount.   Disconnect or make unavailable for use.

user.   In XENIX, anyone logged in to the system other than root.

utility.   A program, often supplied with an operating system, that performs basic system functions such as saving and restoring files and copying files.

verify.   To make certain that a comparison is correct.

volume.   In XENIX, a floppy diskette.

write permission.   Lets you edit a file or directory.

write-protect.   A device or switch that makes it impossible to write on a disk.

XENIX.   A multiuser, multitasking operating system derived from UNIX.

index

index

index