



# **ALTOS 586 Computer System**

## **Introduction To XENIX**

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## **ACKNOWLEDGMENTS**

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# Introduction To Xenix 1

## INTRODUCTION

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### **Using This Manual**

This guide to the Altos XENIX operating system is divided into three sections:

1. Introduction
2. Using XENIX
3. The Business Shell

The introduction explains concepts used in working with the XENIX system and gives background information, including where to get further information. At the end of the introduction is a short list of useful definitions.

The second section explains how to install XENIX and how to use your Altos Computer System with XENIX.

The third section explains the Business Shell, which is a special feature supplied by Altos as part of the XENIX system. The Business Shell provides special services to you, and contains help and tutorial information.

## INTRODUCTION TO XENIX

This guide is short and concise. The focus is on two categories of information:

1. Information about Altos XENIX that cannot be obtained in any other publication on XENIX or UNIX, because it is unique to the Altos XENIX system.
2. Immediately useful information; information that you want to have convenient when you begin using Altos XENIX.

Other material is available to help in using Altos XENIX, and references for that material are given in this section.

### Documentation Conventions

All information the user enters is shown in **bold face**. Variable information is shown using these three small letters: n, a, and x. They mean, respectively, any number, any letter, and any character, either letter or number. For example:

#1 of n                      Version n.na                      Filename xxxxxx

The symbol <CR> means Carriage Return and refers to the Return key. Any designation inside < > refers to a key that does not display. For example:

Press <CR>                      Press <Space Bar>

All XENIX utilities and commands that are described in the text portions of this manual are underlined. For example:

The tar utility permits backing up . . .

**WHAT IS XENIX?**

---

XENIX is an operating system, which means that it supplies services for the application programs that run on your Altos computer system. Programs that provide word processing, or do accounting, or do "data base" services for information retrieval and reporting, are all grouped under the general name "application programs."

The services that an operating system such as XENIX supplies include sending information to peripheral devices and receiving information from them. ("Peripheral devices" refers to terminals, disk storage, printers, etc.) The operating system also does general coordination and provides library services for keeping track of files. In addition to this, the XENIX system supplies a large number of utilities, that is, useful programs for doing various tasks, and provides methods for developing new programs.

XENIX is furnished by Microsoft, Incorporated, and is based on version 7 of the UNIX operating system, which was developed by Bell Laboratories. Altos has altered the original XENIX only in those ways which will improve its performance on the Altos hardware.



## UNIX AND ALTOS XENIX CONCEPTS

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Some basic concepts are briefly explained below. For convenience in using this manual, many of the terms used here are also given in "Common Definitions" at the end of this section.

Figure 1-1 accompanies this explanation of concepts.

### **Shells and the Kernel**

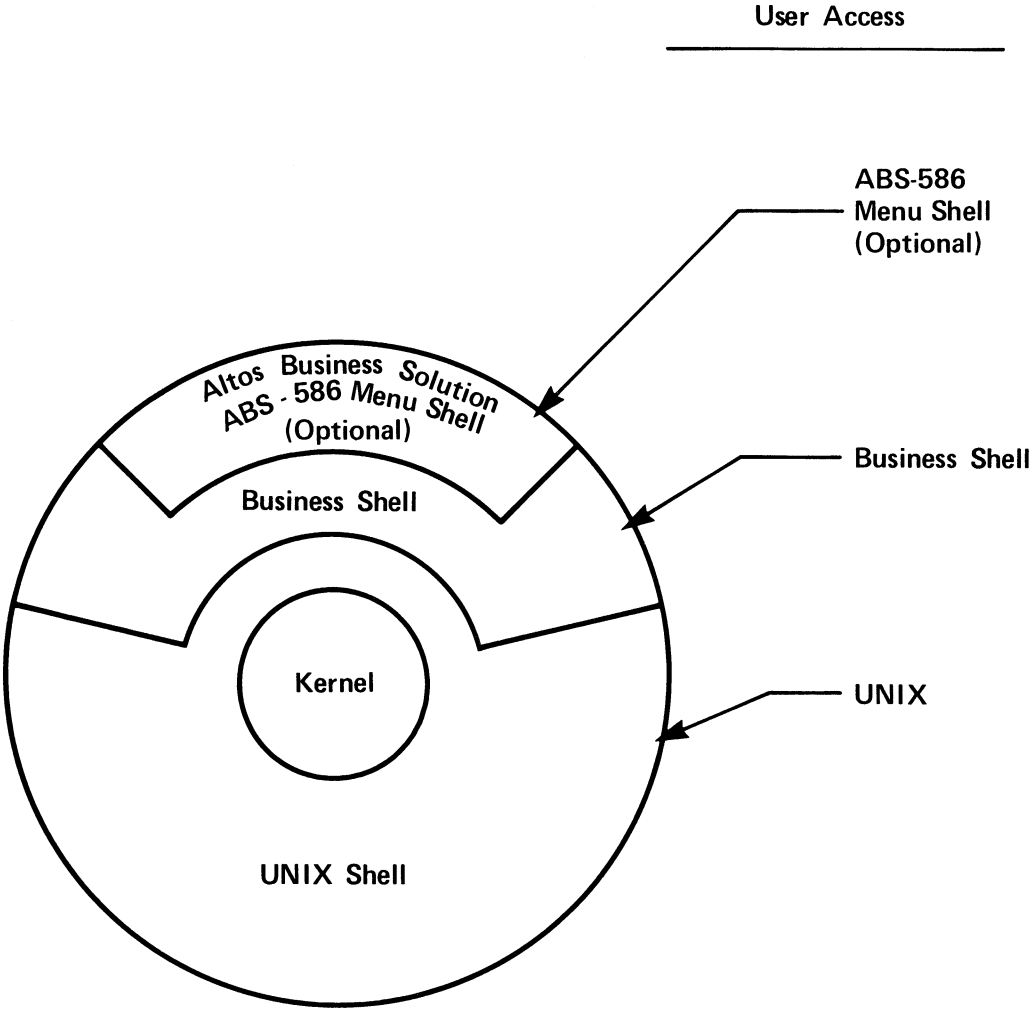
The UNIX operating system is designed in layers. It can be thought of as somewhat like an onion; with the outermost layer being what is visible and touchable, and the inner layers supporting the outer ones. At the center is the "kernel" which deals with the hardware and with peripheral-dependant considerations and provides fundamental services for the outer layers.

The outermost layer is called, in UNIX, a "shell." The user works with the shell, giving it commands and asking it questions, and the shell calls on the lower layers to fulfill the requirements. As shown in Figure 1-1, the outermost layer actually has more than one shell. The ABS-586 Menu Shell (the Altos Business Solution), makes use of the Business Shell, and the Business Shell is supported by the UNIX shell.

Typically, when Altos XENIX is started up it comes up in the ABS or in the Business Shell if ABS is not available. There are commands for getting from one shell into another shell, although for many users there is no need to do so.

### **ABS -- The Altos Business Solution**

The Altos Business Solution is an optional group of software packages supported by the ABS-586 Menu Shell and the Business Shell. These shells provide a framework for these programs and provide menus for controlling the computer system and directing the tasks you wish to have the system do. The shells also give help and tutorial information.



Depending on how your system is set up, you will begin operations up in one of these shells.

**Figure 1-1. Design of Altos XENIX**

## INTRODUCTION TO XENIX

The ABS software packages include:

- \* Altos Accountant
- \* Altos Executive Word Processor with Computer Tutor
- \* Altos Executive Financial Planner
- \* Data Base Manager
- \* Business BASIC III

The Accountant provides the accounting services. The Word Processor provides text entry, formatting and printing services. The Financial Planner is a dynamic spreadsheet for calculating and showing "what if" planning possibilities. The Data Base Manager provides means of storing and retrieving information, and can generate special reports on demand. Business BASIC is an interactive, easily-learned computer programming language.

Most of these packages are also available from Altos separately. An Altos dealer may offer the Business Shell and the optional ABS-586 Menu Shell with some of the ABS packages and some other software packages.

The Altos Business Solution has a complete set of documentation for the entire package. Refer to the **Altos-586 XENIX Applications Software User Guide** for more information on installing and using the ABS-586 Menu Shell and its associated application programs.

### **BSH -- The Business Shell**

The Business Shell provides a set of menus for calling up XENIX services, and optional application programs that may be installed by an Altos dealer or system developer. For every action that a Business Shell menu can call, there is corresponding help and tutorial information that can be seen on demand. BSH is the abbreviation for this shell.

The Business Shell allows on immediate and practical use of the system. The user can call on XENIX for services such as backing up and restoring files, or sending messages to other users, without leaving the Business Shell.

For those users who want to learn about XENIX and begin to use it directly, the Business Shell provides a good foundation for exploration. After the Business Shell has taken you through a procedure a few times, you can try going into the UNIX shell and using that procedure directly.

## INTRODUCTION TO XENIX

When the ABS package or other application programs are provided, an optional main menu, called the Master Control Services, is installed via the ABS-586 Menu Shell. When you log in as the system administrator (admin), the menu allows you to access the business shell XENIX services, the ABS or other software packages, and other services such as installing the software packages.

### **Further Information**

Section Three of this manual consists of information for using the Business Shell. The ABS is explained in a separate publication. Publications listed in "Other Information Available," later in this section, pertain to XENIX or UNIX.

## **XENIX FILE AND DIRECTORY CONCEPTS**

This topic is discussed more deeply in Section Three. Some basic concepts are given here for convenience in understanding some of the material in Section Two, Using XENIX.

A file in XENIX is much like an ordinary paper business file in a drawer of a file cabinet. A XENIX file is a collection of records, and a record could be broken down into transactions or field entries, etc.

A XENIX file is "owned". The owner may be one of the system users, or several users who have the same "login id," such as the accounting department. The XENIX system itself owns certain files.

### **Directories and Subdirectories**

Files are organized into directories. Actually, the organization is usually by subdirectories within directories, within other directories, and so on. Eventually, every file in your XENIX system can be traced from a starting point, the root or most fundamental directory, through various subordinate directories, to the actual file.

For example, a system user named John may have a number of files in his directory, which happens to be called /usr/john. His directory, /usr/john, is one of the user directories under /usr. Today John is working on a trip report. Using a word processor, he opens a file called "report.trip" and begins writing. The period in "report.trip" has no special meaning. John uses it as a convenience. He starts all his text files about reports with "report," and he uses a period to separate the rest of the identification.

When he is working in his directory, he simply refers to the file as "report.trip." From the /usr directory, it is /john/report.trip. From another system directory, it is /usr/john/report.trip. (A name like that is called a pathname. It gives the system a path to follow when looking for the file.)

John and other people in the Accounting department might share other files that start with /usr/acct. For instance, there might be a category of files under the /usr/acct/payables directory, such as "expen.may" or "rents.jul" or "pettycash."

**Attributes, Permissions, and Ownership**

Files and directories have attributes and permissions that govern who can read them, modify them, delete them. Within the limitations of such permissions, a user may make use of many directories in the system for a variety of work. John and Alice, for instance, might share /usr/acct files but not /usr/john and /usr/alice files.

The Altos XENIX system comes with a large directory of files set up, but these are system files and application program files that are used to provide user services. The actual user files are created by the user.

To change file characteristics, refer to the Business Shell menu selections that change file permissions, change file ownership, and change file group selections. More information on these functions is given in Section 3, "The Business Shell."

**Limitations**

The basic filename, such as "report.trip," is limited to fourteen letters. So when a file is specified by directories and sub-directories, as in:

```
/name1/name2/name3..../nameN
```

each name is not more than fourteen characters.

There is no formal limit to the size of the full pathname of a file; that is, to the number of sub-directories that may be involved in fully specifying a file starting from the most basic root file in the system. The only limit is that of practical use and system storage limits.

There are few limits on the characters that may be used in filenames. The one basic rule is that a space cannot be in a filename, because XENIX uses spaces to separate filenames in a list. There are four other special characters that should not be used because they have special functions: \*, ?, [, and ].

These characters are used for matching filenames when you want to treat a group of files together. For example, John could list all the names of his report files using "report.\*". The asterisk means "match anything after the period." The question mark matches any one character. The brackets are used to list characters for matching.

## **SYSTEM CONFIGURATION**

---

This subsection gives information on adapting your system to the terminals or printer you are connecting.

### **Terminals**

If you have difficulty connecting a terminal to the system for installation, see the Appendix "Cables, Terminals, and Printer Interfaces" in the **Altos 586 Operator's Guide**.

XENIX and the Business Shell can support a variety of terminals. The Business Shell makes use of special terminal capabilities.

### **Customizing the Business Shell**

The Business Shell contains a special procedure that asks you for information about the terminals installed on your system. Based on the information you give, the procedure adapts the business shell to make use of special terminal capabilities. The procedure is available from the System Administration menu in the business shell. It is called "The Port Configuration Utility." When application programs or the ABS package is provided, the procedure is available from the Master Control Services menu in the ABS-586 Menu Shell.

### **Printer**

The standard printer is assumed to be a serial printer operating at 9600 baud and connected to serial port 6. If you need to change the baud rate, change the port location, or support additional printers on your XENIX system, see Appendix A, **Serial Line Printer and Spooler**.

**OTHER INFORMATION AVAILABLE**

---

The purpose of this publication is to be concise and convenient. There are other documents that can be consulted for background information or more detailed information. Listed below are some publications on XENIX and UNIX.

**Altos Business Solution**

(The ABS is an optional package.)

A set of publications on the ABS package and the application programs provided within it. The **Altos-586 XENIX Applications Software User Guide** provides information on how to install the optional ABS-586 Menu Shell and the application programs, and how to access the ABS menus.

**Altos 586 UNET User Guide**

(The communication network services are an optional package.)

This document provides information on how to install the optional communication network services and how to use them.

**Altos XENIX Development System  
Programmer's Reference Guide**

(This documentation is provided only with XENIX development systems.)

Gives general information on the ALTOS release of XENIX, and detailed information of use to programmers.

The **Guide** includes reference and tutorial material pertaining to programs developed at the University of California, Berkeley, that are available in the ALTOS XENIX Development System.

All the material listed above is available from ALTOS. As mentioned above, some of this material is aimed at the programmer or advanced system user. However, the tutorial information can be of use to those just beginning to use XENIX. Volume 2a of the **UNIX Programmer's Manual** has tutorial material of this nature. The Berkeley manuals have tutorial material on several useful programs.



**UNIX Programmer's Manual, Seventh Edition**

(This material is only provided with the XENIX development system.)

A three-volume set (vols. 1, 2a, 2b) published by Bell Laboratories. The programmer's reference book, with some tutorial material, are useful for all users.

**Commercially-Available Books:**

**A User's Guide to the UNIX System**, by Thomas and Yates

**Using the UNIX System**, by Gauthier

The Thomas and Yates book is supplied with the XENIX Run Time System. It explains UNIX concepts and provides tutorials for getting started with UNIX and for the most useful commands. All the utilities listed in the Thomas and Yates book are not provided with the XENIX Run-Time System. Refer to Appendix B, **Sample Listing of XENIX Run-Time Utilities**, for a listing of utilities provided with your system.

## **COMMON DEFINITIONS**

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These definitions are provided for convenience. They explain certain terms and concepts that are useful for understanding the information given in this manual. They are not meant to replace the full definitions given in the Glossary of the **Altos 586 Operator's Guide**. Also, refer to **A User Guide to the UNIX System**, by Thomas and Yates, for a complete UNIX glossary.

### **ABS -- Altos Business Solutions**

A software package offered by ALTOS, based on the Business Shell, which includes several application programs. A full list is given in the introduction.

### **ABS-586 Menu Shell**

An optional set of menus (called the Master Control Services menus), which are included when the ABS or other application packages are purchased. It is used to access the business XENIX services, the ABS or other software packages, and other services such as installing the software packages. See also Business Shell and Shell.

### **Administrator**

This term has special meaning in the Business Shell. The "administrator" is allowed to do special functions that can affect all users, and has access to more information than regular users. Also called the System Administrator. See also Super-User.

### **Application Programs**

Programs that provide word processing, or do accounting, or do "data base" services for information retrieval and reporting, are all grouped under the general name "application programs." Compare with Operating System.

## **Business Shell**

A set of menus, with accompanying tutorial and help information, used to control the computer system and direct it in the tasks you wish done. See also Shell and ABS-586 Menu Shell.

## **Console**

One of the terminals for using the computer system. The terminal connected to serial port 1 is the console, and has certain system control privileges not available from other terminals. In particular, the system can only be started up or shut down from the Console.

## **Directory**

A catalog of files, organized by owners. The system has its files, each user has a collection of files, and some collections are shared among users. Each collection has a directory, and the system keeps a directory of library information about all these files, where they are, who can use them, and how they can be used.

## **File**

A group of records. In this manual, generally refers to files kept on the hard disk. See also Directory.

## **File Attributes**

A file may have attributes assigned to it, which control who may read it or change it or delete it and which give various other details about the organization and use of the files. For example, a user might allow others to read file but not allow anyone else to change or delete it.

## **Kernel**

Inner portion of an operating system which handles peripheral devices and basic functions. Not seen by the user, except in its effects.

## **Logging Off**

Ending your individual session. Called "Quit" in the Business Shell and the ABS-586 Menu Shell. See Logging On.

## **Logging On**

Identifying yourself to the XENIX system so you can use it and can access your own files. User "logging" allows the system to protect your information from use by others. See also Password, Logging Off.

## **Operating System**

An operating system, such as XENIX, supplies services to application programs. The services include sending information to peripheral devices and receiving information from them. ("Peripheral devices" refers to terminals, disk storage, printers, etc.) The operating system also provides general coordination for the users, and library services for keeping track of files. Compare with Application Programs.

## **Password**

A secret word chosen by the user, which is then required by the system before it will allow access to that user's files.

## **Peripheral Devices**

A general term for equipment attached to the central computer in a computer system, and used for input, output, and storage of information. For example, terminals, disk storage, printers, magnetic tape drives.

## **Process**

An operating system's basic unit of execution.

## **Prompt, Prompt Character**

The prompt character shows that XENIX is available to perform the tasks you request. Different shells have different prompts:

```
#    UNIX Shell, Super-User status
$    UNIX Shell, user status
```

## **Quit**

End your individual session in the Business Shell or the ABS-586 Menu Shell; equivalent to Logoff or <Control-D> in XENIX.

## **Restoring Files**

Reading a backup copy of a file back into the computer system. See Saving Files.

## **Saving Files**

Making a copy of a file for backup, to use in case something happens to the original. See Restoring Files.

## **Shell**

The outer portion of the operating system; what the user works with. XENIX has more than one shell. See Business Shell and the ABS-586 Menu Shell.

## **Shutting Down**

Shutting down the computer system in such a way that other people using it have a chance to finish properly before the system actually quits. Can only be done from the Console. See Console, Starting Up.

## **Starting Up**

Starting up the computer system for general use by several users. Can only be done from the Console. See Console, Shutting Down.

## **Super-User**

In XENIX, the "Super-User" is allowed to do special functions that can affect all users, and has access to more information than regular users. Super-User status should be used with caution.

## **Terminal**

Used for working with the computer system. Has a display screen and a keyboard. See also Console.

## **UNIX**

An operating system developed by Bell Laboratories, originally used on large computers and then on mini-computers and now on micro-computers. See also XENIX.

## **Utilities**

Useful programs that provide particular services for users of the computer system, such as programs for backing up and restoring files, or programs for formatting text files on a printer. The difference between an application program and a utility program is that a utility program provides services pertaining to using the computer system, while an application program makes use of the computer system to provide some service such as accounting.

**XENIX**

A version of the UNIX operating system used for small business computers (16-bit microcomputer systems). Because of the growth in capabilities of these computer systems, XENIX is not much different than UNIX.

# Using Xenix 2

## USING XENIX

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The following procedures for using XENIX with the Altos 586 computer system are given in this section.

### **Installing XENIX**

How to install XENIX on your system.

### **Starting Up**

How to start up the computer system for general use.

### **Logging On**

How to identify yourself to the XENIX system so you can use it. (User "logging" allows the system to protect your information from wrongful use by others.)

### **Logging Off**

Ending your individual session.

### **Shutting Down**

Shutting down the computer system in such a way that other people using it can finish properly.



**Saving and Restoring Files**

Making backup copies of your files in case of trouble, and restoring your files from those backups.

**System Maintenance**

Procedures for maintaining system integrity.

## **INSTALLING XENIX**

---

### **Prior Steps**

Before you install XENIX, these two tasks must be done:

1. Run the system diagnostics. For instructions, see the **ADX Guide** (ADX stands for Altos Diagnostic Executive).

When the disk diagnostics are run, if any bad sectors are found on the hard disk that have not been flagged, they must be flagged using the procedures described in that manual. The XENIX installation procedure automatically handles any bad sectors that have been flagged.

2. Make copies of the installation diskettes, and hand-copy the label information. Store the originals in a safe place.

The ADX diskette has a copy utility that can be used. See the **ADX Guide** for information.

Before starting the installation procedure, assemble the copied set of XENIX installation diskettes. There are several installation diskettes, labeled as follows:

1. XENIX Root File System
2. XENIX Utilities #1 of n

#### **NOTE**

**The XENIX Run Time System only has two diskettes.**

3. XENIX Utilities #2 of n
4. XENIX Utilities ...
5. XENIX Utilities #n of n

If you are not familiar with handling floppy diskettes, the section in the **Operator's Guide** called **Handling Diskettes** will be useful. It covers such topics as preventing data loss when working with diskettes, and proper storage of diskettes.

If you experience system errors during installation, call your Altos dealer or Altos Field Engineering.

## Procedure for Installing XENIX

The procedure asks you a few questions, such as the size of your hard disk, and based on your answers, it configures the XENIX operating system to your specifications.

Be sure to allow sufficient time to complete this procedure. If you have to abandon it after you have begun working with the XENIX installation diskettes, when you start over you will get a message saying the system was not shut down properly. In such a case, see the notes at the end of this procedure for information on how to respond.

Allow approximately half an hour to an hour for this procedure the first time you do it. When you have done it once, you can do it more quickly.

Here is some information on correcting errors when entering data. In single-user mode, which is the mode you will be using during installation, a single character error can be corrected by using the Backspace key; a line can be erased by using the Rubout or Delete key.

1. Be sure that the terminal is plugged into serial port 1 at the back of your Altos 586.
2. Turn on the power switch on the rear panel. You will see the monitor sign-on message.

```
&screen
```

```
ALTOS COMPUTER SYSTEMS - 586
```

```
Monitor Version n.nn
```

```
Press any key to interrupt boot
```

```
Disk Boot Failed, Code: xx  
*
```

.

The error message appears because there is no operating system on the hard disk. The monitor goes to the hard disk looking for information. Note that the system may respond with "Booting from Hard Disk" instead of the error message. The results are the same.

## INTRODUCTION TO XENIX

3. If you **do not** get the monitor sign-on message, look in the **Altos 586 Operator's Guide** for the Appendix on "Cables, Terminals, and Printer Interfaces," and check that your console is properly set up and attached to the computer system.
4. Insert the diskette labeled "XENIX ROOT FILE SYSTEM".

### NOTE

**This diskette must be enabled for writing; that is, the computer system must be able to place information on it. If the diskette is write-protected, the system will give you a message. Consult "Diskette Handling", in the 586 Operator's Guide.**

5. Momentarily set the ON/OFF switch on the back panel to OFF, and prepare to press the Space Bar key as soon as you see this message:

```
&screen
```

```
ALTOS COMPUTER SYSTEMS - 586  
Monitor Version n.nn  
Press any key to interrupt boot  
<Space Bar>
```

If you press the Space Bar key in time, you will see the display below. If not, try again. When you see this display, enter 2 to "boot" from the floppy diskette.

```
&screen
```

```
Enter (1) to boot from Hard Disk  
Enter (2) to boot from Floppy Disk  
Enter (3) to boot from Monitor
```

```
Enter option: 2
```

After a delay of 35-40 seconds, the following message appears.

```
&screen
```

```
586 Xenix vn.na
```

```
mem = nnnK  
#
```

## INTRODUCTION TO XENIX

The "#" is the XENIX prompt for the Super-User. XENIX is ready for your commands.

### 6. Enter **fsck /dev/root<CR>**

This command causes the system to check and make sure that the file system on the floppy diskette is good before installing it.

```
&screen
```

```
# fsck /dev/root<CR>
/dev/root
** Phase 1 - Check Blocks and Sizes
** Phase 2 - Check Pathnames
** Phase 3 - Check Connectivity
** Phase 4 - Check Reference Counts
** Phase 5 - Check Free List
nn files nn blocks nnn free
#
```

7. If Step 6 is not successful, the "XENIX root file system" diskette is defective and must be replaced. Start over at Step 4 with a new diskette.

If Step 6 was successful, enter **make.hd<CR>**. This command prepares the hard disk.

```
&screen
```

```
# make.hd<CR>
```

8. The system begins to prepare the hard disk for XENIX.

```
&screen
```

```
Checking block nnnnn
.
.
Checking block nnnnn
```

The computer system will take 10-15 minutes for this step, and will give messages about what it is doing.

## INTRODUCTION TO XENIX

It may find disk sectors that the diagnostic program has flagged. The flag means the sectors should not be used, so the system will reassign that location. If this happens, it gives a message similar to:

```
&screen

err on dev 0/0
bn = xxxx cmd = xxxx sts = xxxx

Block nnnn is bad
Continuing on block nnnn+1
```

You may also see messages of the form:

```
Spare block nnnn is also bad
```

if there is a bad spot in the alternate location.

These messages are for information only, and do not indicate any problem.

After 10-15 minutes, when the preparation process is complete, XENIX displays the map for alternate locations.

The following message is then displayed:

```
isize = xxxxx
m/n   = x xx
```

After several minutes, you will see:

```
&screen

/dev/hd0b
** Phase 1 - Check Blocks and Sizes
** Phase 2 - Check Pathnames
** Phase 3 - Check Connectivity
** Phase 4 - Check Reference Counts
** Phase 5 - Check Free List
nn files nnn blocks nnn free
2 + 0 records in
2 + 0 records out
```

```
Now boot the hard disk and run 'load.hd' to
get the rest of the utilities.
** Normal System Shutdown **
```

You may see the error message:

```
***** FILE SYSTEM WAS MODIFIED *****
```

## INTRODUCTION TO XENIX

This indicates that you have bad disk sectors and the system has made necessary adjustments.

### NOTE

**If you see any error messages other than those described above, your hard disk has not been initialized correctly. Try repeating the installation process from the start. If this does not work, consult your Altos Dealer or call Altos Customer Service.**

9. So far, so good. The "XENIX Root File System" is installed on the hard disk. Remove the "Root File System" diskette to a safe place and proceed. We will now "boot" (start the system) from the hard disk.

Momentarily set the ON/OFF switch on the rear panel to OFF, and wait.

```
&screen
```

```
ALTOS COMPUTER SYSTEMS - 586  
Monitor Version n.nn  
Press any key to interrupt boot
```

10. If you don't press any key, the system will read information from the hard disk and, after a delay, give the XENIX display. Go to step 11.

If you did happen to press a key, you will see the message below. If that happens, you can enter 1 to "boot" from the hard disk.

```
&screen
```

```
Enter (1) to boot from Hard Disk  
Enter (2) to boot from Floppy Disk  
Enter (3) to boot from Monitor
```

```
Enter option: 1
```

After a delay of about 15 seconds, the XENIX display appears.

```
&screen
```

```
586 Xenix vn.na  
  
mem = nnnk
```

## INTRODUCTION TO XENIX

11. When you see the XENIX prompt (#), enter **load.hd<CR>**.

```
&screen  
  
586 Xenix vn.na  
  
mem = nnnK  
# load.hd<CR>
```

12. At this point, you have a basic XENIX system on the hard disk, and are going to load the rest. The procedure continues:

```
&screen  
  
Please insert the diskette labeled Xenix  
utilities #1 and press RETURN
```

13. Insert the diskette labeled "XENIX UTILITIES #1" and press the **Return** key.

As files are copied from diskette to hard disk, you will see messages of the form:

```
x "filename", nnnnn bytes, nn tape blocks
```

You will also see messages saying that a file has been linked to another file. These messages are for information only.

### NOTE

**Do not remove the diskette until the floppy diskette indicator light goes out and when prompted by the system to remove the diskette.**

After the last file has been copied to hard disk from the diskette, the display of filenames will stop. You will see the message,

```
&screen  
  
Remove diskette and store in a safe place.
```

14. Remove the diskette and store it. Meanwhile, the system is doing several minutes of internal processing. Do NOT do anything with the system until you see the prompt "#".



**NOTE**

**Be sure this prompt has appeared before you continue with the next step.**

15. When you see the prompt character, #, enter

```
&screen
```

```
# fsck /dev/root<CR>
```

This command causes the system to validate the consistency of the file system on the hard disk. It is the final check of the installation.

```
&screen
```

```
# fsck /dev/root<CR>
```

```
/dev/root
```

```
** Phase 1 - Check Blocks and Sizes
```

```
** Phase 2 - Check Pathnames
```

```
** Phase 3 - Check Connectivity
```

```
** Phase 4 - Check Reference Counts
```

```
** Phase 5 - Check Free List
```

```
nn files, nnn blocks, nnn free
```

```
#
```

This indicates that XENIX has been successfully installed. If you see errors other than those mentioned above, return to step 11 and do the **load.hd** procedure again. You may prefer to use another copy of the set of installation diskettes.

Remember, if during your installation you see a message saying the "system was not shut down properly", consult the notes at the end of this procedure "Resuming Interrupted Installation."

16. If the previous steps were successful, your XENIX Run-Time System is correctly installed.

If you purchased the XENIX Development System, refer to the **Altos 586 XENIX Development System Programmer's Reference Guide** for the additional steps required for installing the XENIX Development System.

If you purchased Altos communication network services, refer to the **Altos 586 UNET User Guide** for information on how to install the communication network services.

If you purchased the ABS package or other software packages, refer to the **Altos 586 XENIX Applications Software User Guide** for information on how to install the ABS-586 Menu Shell and the application programs.

If you wish to start XENIX up, see "Starting Up XENIX", later in this section. If the system has not been shutdown, skip steps 2 and 3.

If you don't plan on using your XENIX system at this time, you can shut the system down by entering:

```
&screen
# /etc/haltsys<CR>
** Normal System Shutdown **
```

### Resuming Interrupted Installation

You may receive the following message because you had to interrupt the installation procedure for some reason, or your system was shut down by a power failure or a system crash:

```
&screen
The system was not shut down properly, and
the root file system should be cleaned.
Proceed (y/n)?
```

#### 2. ALWAYS enter y.

XENIX validates the consistency of the disk file system, which may have been damaged, and automatically repairs it. If there is no damage, you will see the following output:

```
&screen
Proceed (y/n) y
/dev/root
** Phase 1 - Check Blocks and Sizes
** Phase 2 - Check Pathnames
** Phase 3 - Check Connectivity
** Phase 4 - Check Reference Counts
** Phase 5 - Check Free List
nn files nnn blocks nnn free
root structure was ok - proceeding with
bootup
#
```

## INTRODUCTION TO XENIX

The "#" prompt sign shows that all is well.

If the file system was damaged, XENIX will repair it automatically and display a log of the necessary corrections.

3. If you have any doubt whether the file system has been repaired satisfactorily, we recommend you start over with a new set of installation diskettes.

For more information, refer to the description of the fsck program, which is described in the System Maintenance subsection of this manual.

## GETTING STARTED WITH XENIX

After the system has been installed, it can be started up using a procedure given below, "Starting Up XENIX." When it starts, it may come up in any of these three shells, depending on how the system has been configured, and how the user logs in:

1. The ABS-586 Menu Shell
2. The Business Shell
3. The UNIX Shell

When logging in as **root** (super-user) or **unix** (regular-user), the UNIX Shell displays the following prompt characters:

```
#      (For super-user)
$      (For regular user)
```

When the ABS-586 Menu Shell is not installed, the menu, which appears when logging in as **admin** or **user**, is the standard Business Shell menu, which is explained in Section Three of this manual, "The Business Shell."

When the ABS-586 Menu Shell is installed, the menu, which appears when logging in as **admin**, is shown in Figure 2-1. The Master Control Services menu allows you to access the Business Shell menu, the Altos Business Solution menu, and perform other functions as listed. The menu, which appears when logging in as **user 1** through **user 6**, is shown in Figure 2-2. The Altos Business Solution menu allows you to access to the available application programs. The menu, which appears when logging in as **user**, is the standard Business Shell menu, which is explained in Section Three of this manual, "The Business Shell." The ABS-586 Menu Shell and ABS package are explained in the **Altos 586 XENIX Applications Software User Guide**.

### **Getting Started with the UNIX Shell**

More complete information is given later on the topics of Logging On, Logging Off, and Setting Up User Accounts. The information given here is for immediate use after you have started up the system and have found that you are in the UNIX shell. (You have "#" as the prompt.)

When the system starts up, it expects you to log in as an individual user or the system administrator. When

## INTRODUCTION TO XENIX

you first start up, there are no user accounts and therefore Altos XENIX makes available "login names" to help you get started. When you see the "login" message, reply with one of these names.

- usern** -- logs you into the Altos Business Solution menu (Figure 2-2), as a regular user  
(where "n" is any number from 1 through 6)
- user** -- logs you into the Business Shell menu (Figure 3-1), as a regular user
- unix** -- logs you into the UNIX Shell, as a regular user (\$ prompt)
- admin** -- when ABS-586 Menu Shell is not installed, logs you into the Business Shell Menu (Figure 3-1), as a super-user  
  
When ABS-586 Menu Shell is installed, logs you into the Master Control Services menu (Figure 2-1), as a super-user
- root** -- logs you into the UNIX Shell, as a super-user (# prompt)

No password is required for these login names.

If you only want to use the ABS or other application packages, log in as **usern**. For example,

```
login: usern<CR>
```

where n = 1 - 6

brings up the Altos Business Solutions menu.

The information in the **Altos 586 XENIX Applications Package User Guide**, and the tutorial and help information provided with the menu systems, will assist you.

If you have not worked with UNIX or UNIX-like systems before and you wish to access the XENIX utilities, log in as **user**. For example,

```
login: user <CR>
```

If you wish to explore the UNIX shell, log in as **unix**. Later, you can move to the ABS-586 Menu Shell or the Business Shell by logging in as **usern** or **user**. For example:

```
$ login usern<CR>
```

Do not log in as **root** unless, or until, you have some

knowledge and experience of XENIX or UNIX-like systems. The super-user powers are meant to be used only for the good of the system and your fellow users... Actually, a minor mistake from the level of super-user could do a great deal of damage. Instead, log in as **admin**, which allows you to perform the super-user functions and gives you the built-in protections of the Business Shell and the ABS-586 Menu Shell.

For example, to create user accounts, log in as **admin** and use the procedure called from the Administrator menu in the Business Shell. Logging in as **admin** can be done after you are in the Business Shell. Quit, and log in again as **admin<CR>**.

To protect your system, you should eventually provide passwords for **root**, **admin**, and **unix**. Setting passwords is discussed later in this section. Before setting passwords for **admin** and **root**, be sure that you understand how to set them and what the ramifications are. Setting a password on super-user functions and then losing the password has disastrous consequences.

## **Setting Up The Business Shell**

Before you make regular use of the Business Shell and the ABS-586 Menu Shell, it may be necessary to tell the system what kind of terminals are attached. The Business Shell makes use of special terminal capabilities. The terminal screen can sometimes appear to be confused, because the Business Shell is making mistakes in attempting to use these capabilities for a different terminal. There is a procedure for identifying your terminals to the system.

Here is how to use this procedure to prepare the Business Shell for use. Log in as **admin**. When the ABS-586 Menu Shell is installed, the Master Control Services menu will appear. Select "C-The Altos Port Configuration Utility." If the ABS-586 Menu Shell is not installed, the first menu you will see has a selection called "System Administration." Select it, and on that menu, choose "Port Configuration."

### **NOTE**

**You must shut down the system to use the pconfig (port configuration) program. That is, you must not be in multiuser mode.**

The Port Configuration Utility displays its current terminal assignments for the six serial ports. These

## INTRODUCTION TO XENIX

ports are at the back of the Altos 586, in a row of six connectors along the bottom. The ports are identified with the numbers 1-6.

All six ports are pre-configured and the code names will display. Should you need to change any port configuration for that port, supply a code name for the kind of terminal attached. Help information available to you lists the possible names. If a terminal you are using is not named, try picking the name of a similar terminal. If you need further assistance, contact your Altos dealer or Altos Customer Support.

[Admin] ← (A)  
User:admin ← (B)

(C) → Tue Jan 10 10:05 1983

MASTER CONTROL SERVICES

- a - The Altos Business Shell
- b - The Altos Business Solution
- c - The Altos Port configuration Utility
  
- d - Install Software Packages
  
- e - Disk Management
- s - Shutdown the System
  
- h - Help
- q - Quit (logout)

Please make your selection>

Notes:    A denotes the name of this menu  
          B denotes the name of the current user  
          C denotes the date

**Figure 2-1. Master Control Services Menu**



[Start]  
User: user

Wed Jan 12 10:06 1983

THE ALTOS BUSINESS SOLUTION

Applications

- a. Accountant
- b. Financial Planner
- w. Word Processor
  
- e. Electronic Mail
- b. Business Basic III
  
- k. Backup Important Files
- r. Restore Files
  
- h. Help
- q. Quit

Type a letter to make your selection>

**Figure 2-2. The Altos Business Solution Menu**

STARTING UP XENIX

---

The following procedure explains how to start up your computer system for general use of XENIX by several people. Starting up the system is also called "booting" a system.

During single-user operation, an error made when entering information can be corrected by using the Backspace, Rubout, or Delete key.

1. Be sure that your terminal is connected to serial port 1 at the back of the Altos 586.
2. Turn on the Power Switch at the rear or, with power on, momentarily set the power switch to OFF.

&screen

ALTOS COMPUTER SYSTEMS - 586  
Monitor Version n.nn  
Press any key to interrupt boot

If you don't press a key, the monitor will go to the hard disk and read in the XENIX system. This requires about twenty seconds or so. Go to step 3.

If you happen to press a key, within a few seconds you will see a choice of possible entries for "booting". If that happens, enter 1 to boot from the hard disk and go to step 3.

&screen

Enter (1) to boot from Hard Disk  
Enter (2) to boot from Floppy Disk  
Enter (3) to boot from Monitor

Enter option: 1

## INTRODUCTION TO XENIX

3. The XENIX message should appear. If you see this, all is well. Proceed to the next step.

```
&screen
```

```
Xenix vn.na
```

```
mem = nnnK  
#
```

Sometimes you may get a different message. It starts "The system was not shut down properly..." If you see this message, see the special procedure below, "Recovering from improper shutdown."

4. XENIX is now running in "single-user" mode. Only the console you are using is active. Now we will bring it up for multiple users by entering **multiuser**<CR>.

```
&screen
```

```
# multiuser<CR>
```

The system asks you to enter the current date and time, and then comes up "multiuser." The login prompt appears on all terminals.

If "multiuser" is not available, see the note at the end of this procedure.

5. Respond with your user name and password.

If you are starting up for the first time, enter **usern** <CR> (where n equals any number from 1 to 6), **user**<CR>, or **unix**<CR>. No password is required. "Usern" brings up the Altos Business Solution (if installed); "user" brings up the Business Shell; "unix" the UNIX shell. See the prior discussion, "Getting Started with UNIX" for more information.

### If "Multiuser" Is Not Available

If for some reason, "multiuser" is not available, enter the date and time with **date yymmddhhmm**<CR>, where

```
yy = current year  
mm = current month  
dd = current day of month  
hh = hour (24 hour clock)  
mm = minutes
```

After the next prompt, enter **<Control-D>** to bring XENIX up for multiple users.

### Recovering From Improper Shutdown

1. You may see the following message because the system was not shut down properly when last used; for example, it may have been shut down by a power failure or a system crash. If you see it, ALWAYS enter **y**.

```
&screen
```

```
The system was not shut down properly, and
the root file system should be cleaned.
Proceed (y/n)? y
```

XENIX validates the consistency of the disk file system, which may have been damaged, and automatically repairs it. If all is well, you will see the following output:

```
&screen
```

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

```
root structure was ok - proceeding with
bootup
```

```
#
```

If the file system was damaged, XENIX will repair it automatically, and display a log of the corrections. If you have any doubt whether the file system has been repaired satisfactorily, we recommend you restore the hard disk from recent saved files. (See "Saving and Restoring Files," later in this guide.)

For more information on file integrity checking, refer to the description of the fsck program, which is given in the System Maintenance subsection of this manual.

## LOG IN, LOG OFF, AND QUIT

---

### Logging In and Passwords

To make use of the XENIX system, you need to log in, and to protect files you own, you need to have a password. The system may ask you to log in:

```
login: robert<CR>
```

Or, you may log in on your own in response to a system prompt:

```
$ login robert<CR>
```

You may set a password by entering **passwd** and then typing it in. To maintain security, the password you type won't show on the screen:

```
$ passwd <CR>
```

Actually, **passwd mysecret** might have been entered.

The next time you log in, you have to give the password.

```
$ login robert<CR>  
password: <CR>
```

The password doesn't show.

If you forget your password, you can't read your own files. The system administrator can remove your password (without knowing what it is) and you can enter a new one.

### Setting System Administrator Passwords

As a matter of system security, it is important to set up passwords for the super-user functions, that is, to provide passwords for **root**, **admin**, and **unix**. Balancing the need of security is the basic need to run the system. Super-user status is required to set up new accounts, to shut the system down properly, and for many other basic functions.

Therefore, backup for performance of super-user functions is necessary. How this will be done is a matter of management which will be determined by the user. For example, several people might have the super-user password (perhaps a different password for **root** and

for **admin**) and in addition written copies of the passwords might be stored securely with other crucial records.

### Logging Off or Quitting

To end your session, enter **<Control-D><CR>**.

**\$ <Control-D><CR>**

If you are in the Business Shell or ABS-586 Menu Shell, choosing to Quit is the same as logging off.

A second login automatically logs off the prior one. If you log in under a different name, or someone else logs in on your terminal, your prior log in name is logged off.

For example, Alice has logged in (as **alice**) and is working on her files. A friend asks her to create an account for him. This requires super-user status, which can be gained by logging in as **admin**. Alice can either log off by entering **<Control-D>** and log in as **admin**, or simply log in with

**\$ login admin<CR>**

In either case, her log in name of **alice** is logged off the system.

## CREATING USER ACCOUNTS

---

The basic procedure called by the Business Shell, `ua`, can be called directly from the UNIX shell. It requires Super-User status to run. However, the easiest way to use it is to call it from the Business Shell. All that is necessary is to give a name. The system then does the rest.

There are a few very important points concerning the process of creating user accounts which apply to this process whether it is done directly or through the Business Shell:

1. When creating an account, the user name CANNOT have a space in it.

For convenience, a short name is recommended. The user will be entering it often.

The name will have to be entered always exactly as it was created, including upper and lower case letters. For that reason, many people use only lower case names. For example, "mcgregor" rather than "McGregor".

2. If a name is created with only upper case letters, XENIX assumes that the user has a terminal with only upper case letters, such as a Teletype. Strange things happen, and the use of the system is hampered. When you are creating an account for someone, do not use a name with only upper case letters unless that person actually has a terminal with only upper case letters.
3. The system administrator should not set a password when creating an account. A password set at time of creation is encrypted by the system, and neither the user nor the one who created it can access the account by entering that word again.

The exception to this rule is when the system administrator wants to "lock" an account. If the administrator does enter something in the password field, no one can use the account. The administrator can do this as a Change function to an existing account.

4. To unlock an account, or to remove a password that someone has forgotten, the administrator can simply Change the password to nothing. That is, enter only `<CR>` as a change for the password field.

## SHUTTING DOWN XENIX

---

Before powering off your Altos 586, use one of the following procedures to shut down XENIX gracefully. There is one procedure for the Business Shell, and two procedures for the UNIX shell, depending on whether or not other users are on the system.

During single-user operation, an error made when entering information can be corrected by using the Backspace, Rubout, or Delete key.

### **Business Shell Shutdown Procedure**

1. Log in as **admin** on the system console.
2. Select the "Shutdown" entry on the Master Control Services menu or on the System Administration menu. The system will ask:  
  
    &screen  
  
    Minutes till shutdown (0 - 15):
3. Enter the desired number of minutes. The system will send a message to all users to finish and log off because the system will shut down in so many minutes (the number you specified).
4. The shutdown procedure terminates with the message:  
  
    &screen  
  
    \*\* Normal System Shutdown \*\*
5. If there is a floppy diskette in your system's drive, remove it.
6. Turn the power switch to OFF.

### **UNIX Shell: Shutdown Procedure for Multiple Users**

1. Log in as **root** on the system console. This establishes Super-User mode.
2. Enter **/etc/shutdown<CR>**. The system will ask:



## INTRODUCTION TO XENIX

Minutes till shutdown? (0-15):

3. Enter the desired number of minutes. The system will send a message to all users to finish and log off because the system will shut down in so many minutes (the number you specified).
4. The shutdown procedure terminates with the message:  
  
    \*\* Normal System Shutdown \*\*
5. If there is a floppy diskette in your system's drive, remove it.
6. Turn the power switch to OFF.

### **UNIX Shell: Shutdown Procedure for Single User**

You can use the prior procedure, and enter 0 minutes, or this procedure.

1. Log in as **root** on the system console. This establishes Super-User mode.
2. Enter the commands:  
  
    **sync<CR>**  
    **/etc/haltsys<CR>**
3. XENIX responds:  
  
    \*\* Normal System Shutdown \*\*
4. If there is a floppy diskette in your system's drive, remove it.
5. Turn the power switch to OFF.

## SAVING AND RESTORING FILES

---

Altos recommends that you back up the file system on your hard disk regularly. The XENIX operating system has several utilities for copying files from hard disk to floppy disk and restoring them back to hard disk.

Of these programs, tar is especially useful and the easiest to use. The rest of our discussion will explain how to use it. tar originally stood for "Tape Archive", and on the ACS 8600 is used with cartridge tape and with floppy diskettes. On the Altos 586, it is used with floppy diskettes.

### Using Tape Archive Utility (tar)

The tar utility permits backing up and restoring single files and whole directories. Subdirectories are included, to whatever depth the user wishes. It is used in three major ways; to back up one or more files and/or directories, to restore one or more files and/or directories, and to obtain a list of files currently on a particular diskette.

### Formatting Diskettes

To save a file or a group of files, you will need a sufficient number of floppy diskettes that have been formatted for double-density operation. Use the format utility. (The ADX diskette also has a format utility, but this cannot be run with XENIX in operation.) The format utility will automatically format the diskettes properly, and will guide you through the operations. Just enter **format<CR>** after the prompt, and follow the directions.

As an aid in estimating the number of diskettes you will need, figure that each diskette can hold 1440 blocks (512 Characters per block.) Files are saved across diskette boundaries, so all diskette space can be used.

**Saving Files**

Insert a blank, formatted diskette, and enter the command:

```
tar cv "files"<CR>
```

where "files" is a list of any XENIX files, or directories, separated by spaces. All files specified in the list are saved, including subdirectories and associated files of any directories you have specified.

For example, the command:

```
tar cv /usr/john<CR>
```

may be used to save all files in the directory for /usr/john.

Similarly, the commands:

```
cd /usr<CR>  
tar cv *<CR>
```

may be used to save all the files under /usr. "cd" changes the directory to /usr, and "\*" means all files in the current directory. In this case, all files under /usr, such as /usr/john, /usr/alice, /usr/tom, and so on, will be saved.

You will be asked to remove and replace diskettes whenever another diskette is needed. Label and number the diskettes. (Be sure to give the total number, such as 1 of 5, 2 of 5, etc.) The sequence of diskettes is important, because files are being saved across diskette boundaries. The first part of a file may be on one diskette, the rest of it on the next diskette. They must be restored in the order they were written. When you are finished, store the diskettes in a safe place.

**Restoring Files**

To restore a directory, with all its sub-directories and files, proceed as follows. Insert the first floppy disk in the sequence, and change directory (**cd**) to the name of the directory to be restored. Enter

```
tar xv<CR>
```

For example, to restore the files under /usr/john,

## INTRODUCTION TO XENIX

check that there is a directory entry for /usr/john. Use the **mkdir** command to create one, if necessary.

Load the first diskette, and enter

```
cd /usr/john<CR>
```

Enter

```
tar xv<CR>
```

It is not necessary for the restore designation to match the designation used to save the files, so long as the file or files to be restored are among the saved files. In the example above, the /usr/john files could have been restored from files saved under, for example, /usr.

### Typical Session

Here is a typical file back-up with the options explained.

```
tar cv *<CR>
```

The two options are "c" and "v". Tar is told to back up all files and directories in the current working directory, "\*", onto floppy disk. The options "c" and "v" mean "create" and "verbose", respectively. The create option directs tar to copy the specified files from the system disk to the standard back-up medium, which is floppy diskette. The verbose option tells tar to display a line on the terminal for each file backed up.

One way to restore those files and directories is:

```
tar xv<CR>
```

In this example, the "x" option (for eXtract) and a null file list tells tar to copy every file from the floppy disk onto the system. The "v" (verbose) option operates as in the previous example; tar displays a line on the terminal for each file restored.

**Listing Saved Files**

The next example gets a list of the files on a floppy diskette.

```
tar tv<CR>
```

The "t" option displays a line of information about each file on a floppy. This line is similar to the information obtained by using the -l option with ls. The name of the file, its permissions, owner name, date of last modification, and size in bytes are displayed.

**Filenames and Directories**

The form of file and directory names used in the tar command is important. If a file or directory is specified with a complete path name, (that is, a name beginning with /), such as

```
/usr/john/tempest.c<CR>
```

tar will remember that a complete pathname was used and when time comes to restore this file, it will be put back as /usr/john/tempest.c, regardless of the working directory of the restorer. Tar will overwrite any previous file of that name, and, if necessary, create a directory in which to put it. Remember that a file name beginning with / is a complete pathname.

**Using tar to Move Files**

It is sometimes useful to be able to use tar to take a file or files from a specific directory and restore them in another directory. If, for example, there was a file named "tar.doc" in /usr/john, one might like to be able to place it in /usr/jim. If the file is specified without a path when creating it, it will be restored to the current working directory of the restorer. For example,

```
tar cv tar.doc alpha bravo charlie<CR>
```

will save the four files tar.doc, alpha, bravo, and charlie from the current working directory of the creator, and

```
tar xv tar.doc alpha bravo charlie<CR>
```

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will restore those same files into the working directory of the restorer. Notice that this would not work with a complete pathname, such as /usr/john/tar.doc.

### **Handling Diskettes**

Remember that diskettes should be labeled with a description of the files saved and the date, and a sequence number if more than one diskette or tape is used.

For information on diskettes, see "Diskette Handling" in the **Altos 586 Operator's Guide**.

**SYSTEM MAINTENANCE**

---

System maintenance involves ensuring system integrity, adding users, maintaining adequate disk space, configuring system capabilities, bringing the system up and down when necessary, etc. The goal of system maintenance is to make the system operate as smoothly as possible. The UNIX operating system provides tools that help in the day-to-day activities of such maintenance. Some of the more useful tools are listed below. Most system maintenance functions can only be performed by a super-user, as noted. Normally, the super-user is known as the system administrator.

**Adding Users (ua)**

Adding users to the system or changing their characteristics is done with an interactive program named `ua`. To use the `ua` program, log in as super-user (root) and then when prompted, type in `ua`. The `ua` program provides an effective means for maintaining the system password (`/etc/passwd`) and system group (`/etc/group`) files. For additional information, refer to "Creating User Accounts" in this manual.

**Checking and Cleaning up File Systems (fsck)**

The `fsck` program audits and interactively repairs inconsistent conditions for the named file systems. To use the `fsck` program, type in `fsck` and the file name to be checked. For example:

```
fsck /dev/root<CR>
```

If the file system is consistent and checks out as good, then the number of files, number of blocks used, and number of blocks free are reported. If the file system is inconsistent (i.e., bad disk sectors), you are prompted for concurrence before each correction is attempted. You should answer "Yes" to all prompted questions. Most corrections lose data; all losses are reported.

The `fsck` program should be run at the first hint of a file system problem; for example, when commands are not executing properly. Refer to the Procedures for Installing XENIX, Resuming Interrupted Installation, and Recovering from Improper Shutdown subsections of this manual for other examples of when and how to run

the `fsck` program. The super-user should run this program on a regular basis, with no other users on the system (single-user mode); once a day is recommended.

### **Checking Disk Space Available (`du`, `df`)**

These programs show how much hard disk space is being absorbed by each user (`du`) and how much space is available (`df`). The Business Shell allows you to display the disk usage in blocks (512 characters per block) by using the File Space selection under the System Administration menu. To use these commands directly with the available options, refer to **A User Guide to the UNIX System**, by Thomas and Yates.

It is recommended that you run these programs at least once a day. If you run out of disk space, for such reasons as running a lot of processes, you could lose what you are working on or, worse, get to a point where you can't clean up space. If the latter occurs, you will have to re-boot. If you are consistently reaching 100 blocks of available space, you should consider obtaining additional space by deleting no longer used files or by ordering an additional hard disk.

#### **NOTE:**

**The `du` and `df` commands are informative commands only. To remove files or directories, refer to the appropriate selection under the Business Shell. To remove (kill) active processes, refer to the appropriate selection under the Business Shell and the information below.**

### **Displaying and Killing Processes (`ps`, `kill`)**

All processes on the system are assigned a process identification (PID) number. PID numbers are displayed by using the `ps` command or the Display Processes selection under the System Administration menu of the Business Shell.

Occasionally, a program may go awry; it may loop forever, lock up your terminal, or in general, behave badly. If this happens, you should identify the process which is causing the problem by using the `ps` command (or Display Processes selection) and then kill that process by using the Kill Processes selection under the System Administration menu of the Business Shell or by using the `kill` command. If you are not



certain which processes are causing a problem, don't kill any process and seek help.

Refer to **A User Guide to the UNIX System**, by Thomas and Yates for additional information and tutorials on the ps and kill commands.

**NOTE:**

**Do not kill the init, cron, and the swapper processes. These processes must continue to run if the system is to operate properly.**

**Configuring Terminals (pconfig)**

The port configuration (pconfig) program is an interactive program used to configure terminals for the system. It should be run by the super-user. To access this program, log in as admin and select the Port Configuration selection under the Master Control Services menu or under the System Administration menu of the Business Shell. You must shut down the system to use the pconfig program.

**Shutting Down the System (shutdown, haltsys)**

When bringing the system down, usually to install a new system, or maintenance, the /etc/haltsys or /etc/shutdown programs should be used. The shutdown program warns other users that the system will be going down. The haltsys program will bring the system down without warning. Refer to the Shutting Down subsection of this manual for more information.

# The Business Shell 3

## INTRODUCTION

---

The Business Shell (or BSH) is a menu-driven package that runs under the XENIX operating system. It has been designed to allow you to use business application programs and utilities without the need to be especially knowledgeable of any computer languages or terminology.

A menu may be defined as a group of selections available to a user at a particular level within the Business Shell, and which are displayed on the terminal. The primary advantage of a menu structure is ease of use and clarity of relationship between the parts of the Business Shell. For example, all utilities for backing up and restoring from disks may be organized into a menu dedicated to that purpose.

The programs within the standard Business Shell menu (Figure 1) are divided into two categories:

- 1) Basic Utilities - which perform fundamental operations on files and collections of files (called directories).
- 2) System and Help Functions - which include system administration, electronic mail service, running programs, network services, and quitting (logout). In particular, the Help function in this section provides tutorial and explanatory information about various functions and capabilities within the Business Shell.

**Display Menus**

BSH contains Help menus for each of the menus in the system. To display a Help file for the menu in which you are working, simply enter **?<CR>**. This causes the Help description for the menu to be displayed. Here is a summary of the commands which give help information:

<b>?&lt;CR&gt;</b>	Help for current menu.
<b>Name?&lt;CR&gt;</b>	Help for the named menu (example follows).
<b>Mail?&lt;CR&gt;</b>	Help for the "mail" menu.
<b>?index&lt;CR&gt;</b>	Display an index of the available menus.

When asking for help for a named menu (**Name?<CR>**), the first letter of the name must be capitalized because a small letter might be interpreted by the system as meaning a menu selection. Menu item "r" (as shown in Figure 3-1) provides more information about the Help functions (see the Help paragraph below).

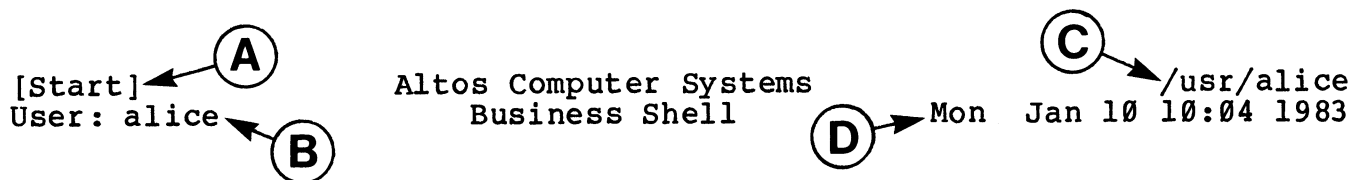
**Fast-mode/Slow-mode**

It is important to understand the distinction between using "fast-mode" or "slow-mode" within the Business Shell. Here is a brief explanation. In "fast-mode" the system responds to a lower case character by immediately executing the menu item associated with it. In "slow-mode" the system does not act upon a character or group of characters until a carriage return is entered. In either mode, when you wish to enter a command that does not begin with a lower-case alphabetic character, such as ?, ?? or Name?, it is always necessary to end the command with a carriage return.

Detailed discussions of each entry within the standard Business Shell menu are presented below under two subheadings: Basic Utilities, and System and Help Functions. Figure 3-1 shows the full Business Shell menu that first appears when the package is invoked.

The Business Shell has been organized in a hierarchical fashion, which means that general functions contain more specific functions that in turn contain still more specific functions. The philosophy of organization is illustrated in Figure 3-2.

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## Basic Utilities

- |                       |                            |
|-----------------------|----------------------------|
| a. Change Directory   | f. Edit a File (ed)        |
| b. Change Password    | g. Remove a File           |
| c. List Directory     | h. Copy &/or Combine Files |
| d. Create a Directory | i. Display Files           |
| e. Remove a Directory | j. Print Files             |

## System and Help

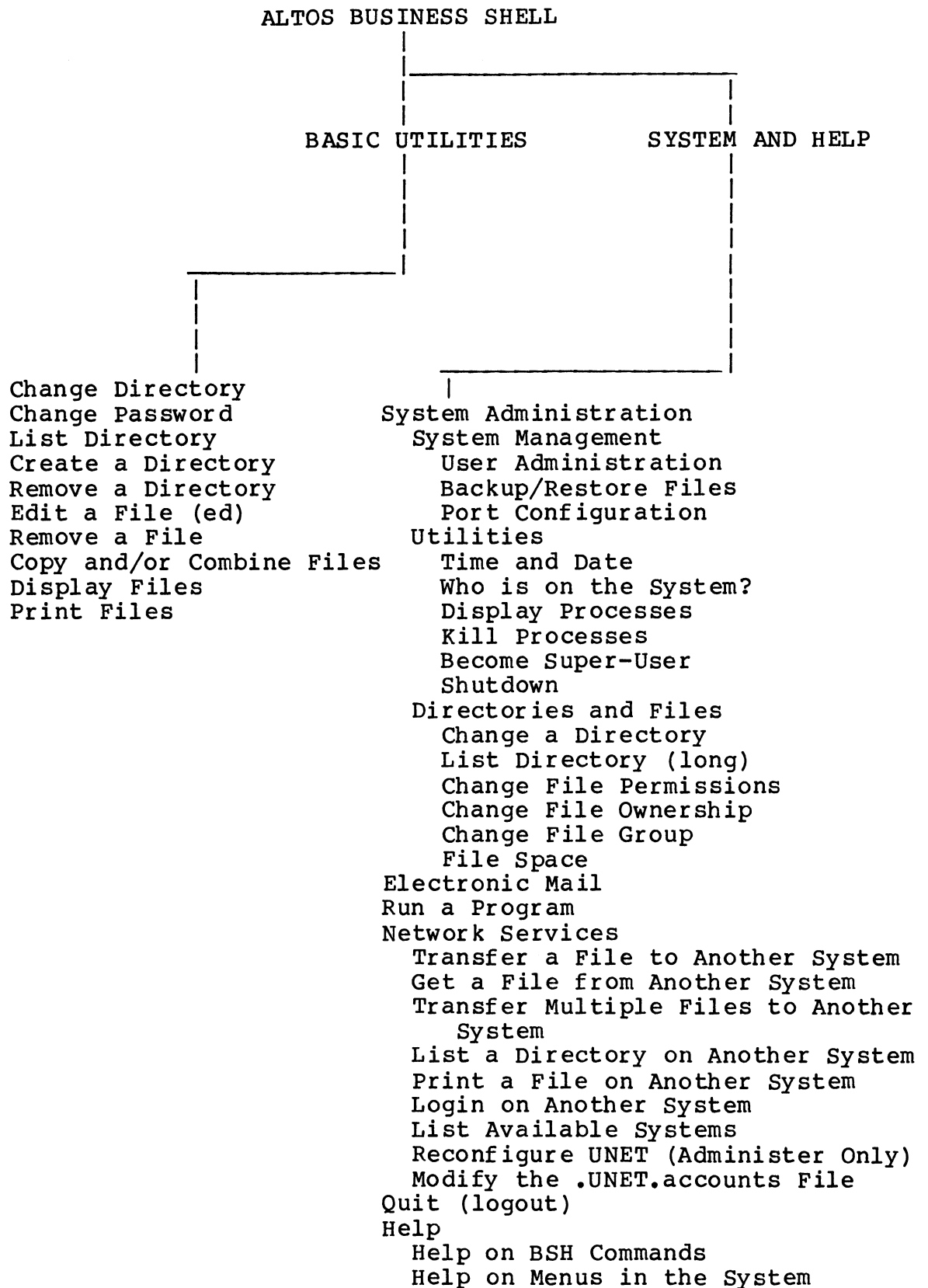
- |                          |                     |
|--------------------------|---------------------|
| k. System Administration | n. Network Services |
| l. Electronic Mail       | q. Quit (logout)    |
| m. Run a Program         | r. Help             |

Type a letter to make your selection>

- Notes:
- A denotes the name of this menu.
  - B denotes the name of the current user.
  - C denotes the complete pathname.
  - D denotes the current date.

**Figure 3-1. Business Shell Menu**

# INTRODUCTION TO XENIX



**Figure 3-2. Business Shell Organization**

## **BASIC UTILITIES**

---

The Business Shell utilities perform functions that are important in the daily operation of your system (see Figure 3-1). For example, the ability to determine the contents of file directories is provided. Since a significant portion of the utilities in this section pertain to files and directories, it would be useful to describe briefly these two concepts. A "file" may be thought of as a logical body of information with an identifying name. A "directory" may be thought of as a table of contents for a file system, designed to allow convenient access to specified files. An example of the directory structure is shown in Figure 3-3.

### **Change a Directory**

This function allows you to change the current directory to a specified directory. When directory entries are displayed on your terminal, those that end with a slash (/) are, in fact, subdirectories within the currently active directory.

### **Change a Password**

Allows you to change your password. A new password is requested. When the new password is entered the characters are not echoed (do not appear) on the terminal. This prevents someone from seeing your password as it is entered. After entering the password the system will ask for you to retype it in order to verify that it has been entered correctly. The second entry must be identical to the first entry for the password to be changed.

### **List a Directory**

Lists all file entries contained in the current directory.

### **Create a Directory**

Creates a new directory.

### **Remove a Directory**

Removes a directory and all files contained within it.

### **Edit a File (ed)**

Creates or modifies a file using ED, the UNIX text editor. For an explanation of how to use ED, refer to **A User Guide to the UNIX System**, by Thomas and Yates.

### **Remove a File**

Removes a file from a specified directory.

### **Copy &/or Combine Files**

Creates copies of a specified file, or will combine (append) files.

### **Display Files**

Displays the selected file on your terminal one page at a time. The "more" prompt at the bottom of the terminal screen allows you to do the following functions:

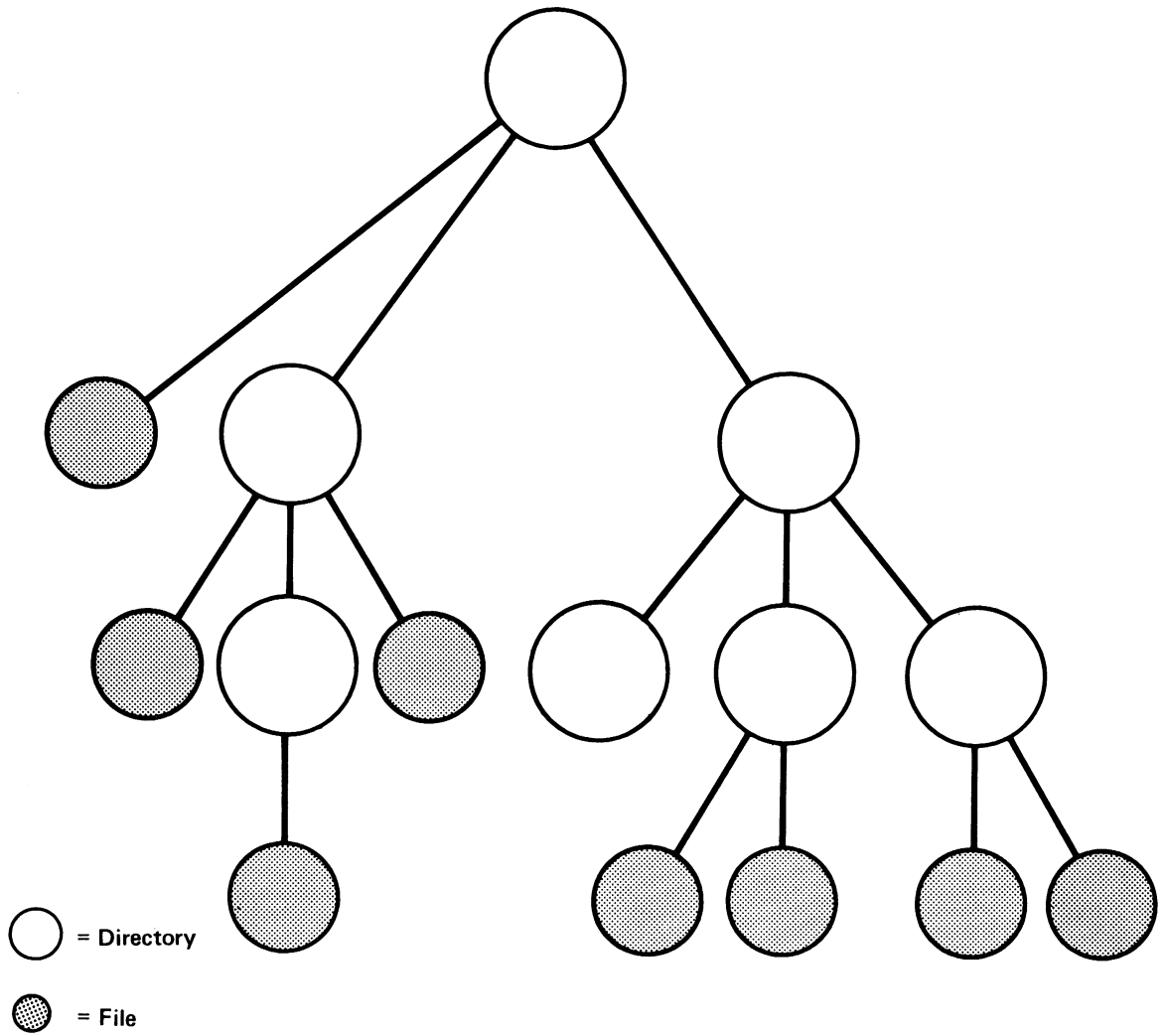
Display the next line of text:  
Enter a carriage return.

Display the next page:  
Enter a space.

Return to the first page of the file:  
Enter :p.

### **Print Files**

Prints the specified file on the printer.



**Figure 3-3. Directory Structure**



## **SYSTEM AND HELP**

---

This section contains the system management functions, utilities, and file utility commands. It also includes electronic mail, running programs, network services, quit (logout), and help functions.

## **SYSTEM ADMINISTRATION**

The function of this section, in general, is the management and coordination of system resources in a multiuser environment. See Figure 3-4 for an example of the menu. The section is divided into three subsections:

- 1) System Management - which contains system-related functions such as addition/deletion/modification of user login information; backup and restore procedures; and port configuration (the pconfig program).
- 2) Utilities - which contains general utilities such as setting the time and date, displaying who is currently using the system, displaying the state of all current processes, system shutdown, etc.
- 3) Directories and Files - which contains all file and directory-related utilities such as creation, deletion, renaming, showing file space in use, etc.

[SysAdmin]  
User: alice

SYSTEM ADMINISTRATION UTILITIES  
/usr/alice

System Management

Directories and Files

- a. User Administration
- b. Backup/Restore Files
- c. Port Configuration

- d. Change Directory
- e. List Directory (long)
- f. Change File Permissions
- g. Change File Ownership
- h. Change File Group
- i. File Space

Utilities

- j. Time and Date
- k. Who is on the System?
- l. Display Processes
- m. Kill Processes
- n. Become Super User
- o. Shutdown

What system administration function do you desire?>

**Figure 3-4. System Administration Menu**

**System Management**

The functions below are contained in the system management subsection of the System Administration menu. See Figure 3-4.

**User Administration**

This section deals with the control and administration of users on the system. The following functions may be performed:

- show** Allows you to view an individual user, all users, a group, or all groups
- add** Allows you to add a new user or group.
- delete** Allows you to delete a user or group.
- change** Allows you to change a user or group.

Note: Only the show command can be used on Users or Groups because you cannot make global changes, deletions, or additions to collections of users or to groups.

Examples of user and group listings are given below:

&screen

UID	USER NAME	GROUP	DIRECTORY	SHELL
0	root	other		
0	ruut	other		/bin/csh
0	admin	other		/bin/csh
1	daemon	other		
2	sys	sys	/usr/sys	
3	bin	bin	/bin	
4	uucp	uucp	/usr/spool/uucppublic	/usr/libluucp/
5	altos	other	/usr/altos	/bin/csh

GID	Group Name	Members
1	other	
2	sys	sys
3	bin	bin
4	uucp	

### **Backup/Restore Files**

This section deals with file maintenance from the viewpoint of the system as a whole. File backup and restoration are the primary responsibilities. The items listed below are the submenu items that appear on your terminal when the Backup/Restore function is selected.

- a. Backup file(s) and/or directory(s)
- b. Restore file(s)
- c. Restore the entire disk
- d. Display floppy disk directory

### **Port Configuration**

Allows you to configure the system for the terminals you plan to use. This lets some programs make use of special terminal capabilities. The program must be run by a Super-user, so log in as admin. To run the port configuration program (pconfig), the system must be shut down. The program will prompt you whether you want to continue (shutdown) or abort.

### **Utilities**

The utilities section of the menu allows the system administrator to monitor system activities (See Figure 3-4). Processes (which are requests for system resources - either application programs, utilities, or system programs) may be examined or terminated. For certain commands, such as Time and Date or Display Processes, anyone may have access to the command. For other cases, such as Killing Processes, only the System Administrator (super-user) has the ability to execute the command if it involves killing another user's processes. The items listed below are the submenu functions that appear on your terminal when the utilities function is specified.

**Time and Date** -- Allows you to check or reset the time and date.

**Who is on the System?** -- Shows you the other people currently using the system.

**Display Processes** -- Allows you to display the processes currently running on the system. This

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includes processes you have generated, the processes of other users, and system processes.

**Kill Processes** -- Allows you to cancel or kill the execution of a process currently running on the system. Note that anyone can kill his own processes but only the system administrator can kill another user's processes.

**Become Super-User** -- Allows you to become the Super-user: this gives you full access to system routines and files as well as other privileges.

**Shutdown** -- Allows you to initiate an orderly shutdown of the entire XENIX operating system. You will be asked to specify how soon the shutdown of the system should occur (from 0 to 15 minutes). When you have entered a time, the system will broadcast a message to all users currently on the system that shutdown will occur. A message will be sent to each user at one minute intervals.

## Directories and Files

This section contains additional functions that can be performed on the system. The functions are listed below:

**Change Directory** -- Allows you to specify another directory within which to work.

**List Directory (long)** -- Will produce a detailed description of the files contained within the specified directory. An example of a directory listing is provided below:

```
&screen
```

```
Directory /usr/wilson
```

```
Total 1
```

```
-rwxrw-r-- 1 wilson 13341 Nov 1, 1982 myfile
```

Here is a brief explanation of the listing. The first dash designates this as a file. A "d" in that field designates a directory. The next nine locations designate the permissions for the owner, the group, and other users. The first three characters, "rwx", show that the owner can read, write and execute the file. The next three, "rw-", designate the group permissions; "-" means "no permission." The last three, "r--", designate the permissions for anyone

else wishing to access this file. See "Change File Permissions" below for a discussion of file usage options.

The file number an owner designation follows next; in this example it is file 1 for "Wilson". See the "Change File Ownership" below for a discussion of file usage options. The next field is the size of the file in bytes, 13341. The date field shows when the file was last modified. The last field is the name of the file.

### **Change File Permissions**

Allows you to change a file's access permissions. There are three levels of access: owner, group, and other. Within each of these categories there are three types of access: read, write, and execute. An example of file permissions is presented above, under "List Directory". Read permission allows reading the file; write allows writing (changing), or even deleting the file; and execute allows executing the file. For more information, see the Change Mode command (chmod), in **A User Guide to the UNIX System**, by Thomas and Yates.

### **Change File Ownership**

Allows you to change the ownership of a file. Note that you must be the system administrator to change ownership. See the directory listing provided above under "List Directory".

### **Change File Group**

Allows you to change the group designation of a file.

### **File Space**

Displays the disk usage in blocks (512 characters per block). A period (.) in the name field denotes the current directory.

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See the example below:

```
&screen
Free Blocks
/dev/root  49916
Disk Usage
6 .
```

Here is a brief explanation: /dev/root is the name of the complete file system for the primary disk. The number of available free blocks in the system is 49916. The current directory, specified by ".", uses 6 blocks. The directory includes all files and subdirectories within it.

## ELECTRONIC MAIL

This application uses the standard UNIX mail utility to provide the capability for sending and receiving messages. Messages can be sent to and received from users on the system. For more information, see the discussion of mail in **A User Guide to the UNIX System**, by Thomas and Yates.

## RUN A PROGRAM

This entry contains three options used for executing a program:

- 1) Execute the program in file "a.out"
- 2) Help on Running Programs
- 3) Run an Arbitrary Program

The help entry function, item #2, explains items #1 and #3.

Item #1 refers to a default file, called "a.out", that typically contains the results of the most recent compilation. For convenience, you can execute that program without having to provide a specific file name.

Item #3 allows you to run programs that already exist in the system (that is, reside within XENIX). The programs may be purchased software packages or may be programs that you or someone on your staff has

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created.

To execute a program that resides within XENIX, simply enter the program name:

**!program-name<CR>**

Because many programs require some type of arguments or parameters, you can provide them after the program name.

**!program-name parameters<CR>**

The parameters are a string of values used by the program. For example:

**!send -n afile bfile**

## NETWORK SERVICES

This selection under the Business Shell menu accesses the network services menu. See Figure 3-5 for an example of the network services menu. These optional network services allow communication between computer systems over a communication network. These services include transferring a file to another system, getting a file from another system, transferring multiple files to another system, listing a directory on another system, printing a file on another system's printer, log in on another system, listing available systems, reconfiguring UNET, and modifying the .UNET.accounts file.

For more information on how to use your communication network, refer to the **Altos 586 UNET User Guide**.

## QUIT (LOGOUT)

This function is used to exit from the Business Shell to the XENIX shell, or if your login shell is the Business Shell or the ABS-586 Menu Shell, then the function will log you off the system.



[Network]

Network Services

- a - Transfer a file to another system
- b - Get a file from another system
- c - Transfer multiple files to another system
- d - List a directory on another system
- e - Print a file on another system's printer
  
- f - Log in on another system
  
- g - List available systems
- h - Reconfigure UNET (admin only)
- i - Modify the .UNET.accounts file

Select desired function>

**Figure 3-5. Network Services Menu**

**HELP**

Provides an explanation of the major functions within the Business Shell. The menu for this function is shown below.

The Business Shell allows non-computer professionals simple, rapid access to the full capabilities of Altos hardware without requiring them to become especially knowledgeable regarding the intricacies of the UNIX command language. The Business Shell is abbreviated as BSH when referred to on the menu screens.

<u>TYPE</u>	<u>TO SEE</u>
a.	A list of BSH commands
b.	A list of menus in the system

Information on commands and menus follows.

**Business Shell Commands**

The following commands are available in the Altos Business Shell. They are listed by the "a" response.

<u>COMMAND</u>	<u>SHORT EXPLANATION</u>
prompt<CR>	Execute the function associated with the menu entry (e.g. a,b,c).
Menu<CR>	Go to the named menu.
<return>	Return to the immediately preceding menu. By entering successive <return>s, you can retrace the path through the menus.
?<CR>	Show the help menu for the current display. The "?" by itself is the equivalent of entering <current menu>?. Returning from a help menu is accomplished in the same way as any other menu, by entering <return>.

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<u>COMMAND</u>	<u>SHORT EXPLANATION</u>
??<CR>	Display the command menu.
name?<CR>	Display help information for the named menu.
!command<CR>	The "!" causes immediate exit to UNIX. The rest of the line is executed in a sub-shell. An "!" alone initiates a sub-shell which is terminated in the normal UNIX manner (control-D). By using "!sh" or "!csh" one may select the specific shell to be used.
?index<CR>	Display the name of every menu in the current menu system. The "Dir" menu contains a short version of the index.
?mode<CR>	Set mode as either fast-mode or slow-mode.
Quit<CR>	Terminates the Business Shell or ABS-586 Menu Shell, and returns control to UNIX (XENIX).

### **Business Shell Menus**

The "b" response lists the menus in the system:

Backup	Execute	Mail?
Backup?	Execute?	Start
Commands?	Help	Start?
Dir	Help?	SysAdmin
Dir?	Mail	SysAdmin?

## APPENDIX A

### SERIAL LINE PRINTER AND SPOOLER

#### STANDARD PRINTER CONFIGURATION

In the Altos implementation of XENIX, serial port 6 is configured for a serial printer operating at 9600 baud. The logical device name `"/dev/lp"` may be used to refer to this port, and the `lpr` utility references this device automatically for printing and spooling.

The `lpr` utility assumes that only one printer, `/dev/lp`, is attached to the system. If you want to connect more than one printer, refer to the "Connecting More Than One Printer" section of this appendix.

Printer spooling is a technique that mediates printer activity in a manner that allows all users of the system to share a printer without conflict. Files to be printed are copied to a spool directory (`/usr/spool/lpd`) and a background process moves those copies to the line printer device. This device is found in `/dev`, and is called "lp" (`lp1`, `lp2`, etc). Files in `/dev` are known as "special files", and are the interface to UNIX I/O. For an expanded discussion of special files in specific and I/O in general, see sections 29-32 of the **UNIX Programmer's Manual**, Volume 2B. A great deal of this material is specific to the PDP-11, however the mechanisms are the same as those for the Altos 586 computer system.

Any of several programs may be used to copy material to printer devices. For example:

```
cat /usr/john/doc > /dev/lp
```

This command copies the file `"/usr/john/doc"` directly to the default printer. If you have more than one printer, the default printer is the one that is most used. This has three possibly undesirable effects:

1. If `/usr/john/doc` is a big file, this command may take some time to complete.
2. If another user is copying a file to the printer at the same time, the result is probably not what

anyone intended.

3. Since the `cat` program knows nothing about printers, and therefore nothing about baud rates, page sizes, margins, etc., the result may not be what is expected.

The `lpr` utility program is used to control printer requests. This program knows something about printers, how to set baud rates, etc.

To invoke the `lpr` utility, enter:

**`lprN [file_list]`**

Where: "N" is a digit from 0 to 5 and selects one of 6 printers.

`Lpr` may be invoked without entering a value for "N" by entering:

**`lpr [file_list]`**

This command assumes the default printer, `lp`, and has the same effect as entering:

**`lpr0 [file_list]`**

The `lpr` program copies the files in `[file_list]` to a spool directory and returns immediately to the invoker. Sometime later, perhaps up to 10 seconds, a printer (if not already busy) will begin printing. The printers themselves are physically connected to serial ports.

## **HARDWARE CONNECTIONS**

The connection between the 586 computer system and a printer is a cable which has 25-pin subminiature D-type connectors. The computer's port hardware is "female", which requires that the computer side of a cable have a "male" connector. Most printers also have "female" port connectors; a compatible cable should have a "male" connector on each end. The most commonly used cables have at least pins 2, 3, and 20 connected from end to end.

Printer control of computer output is accomplished by either of two methods:

1. The printer should be configured to use the X-ON, X-OFF protocol, because XENIX uses this protocol to control the flow of data to the serial printer. This method requires that the printer send an X-OFF control code to the computer when overrun is

about to occur. An X-ON control code is sent when it is safe for output to the printer to continue.

2. The second method controls the RS232C DTR (signal 20) signal to accomplish the same result. If you wish to use this method, be sure that the cable which connects the printer and the computer has this conductor.

### **CONNECTING MORE THAN ONE PRINTER**

If you want to connect more than one printer, you should:

1. Log in as super-user (root).
2. You need to create appropriate device files in /dev. This is done with the `ln` command. First, select which printer is to be the default printer. This printer should be the most-used printer in the system.

To make the default printer device available for reassignment, enter:

```
mv /dev/lp /dev/olp
```

Next, select the port to which this printer is to be connected, by entering:

```
ln /dev/ttyP /dev/lp
```

Where: "P" is the port number of the serial port.

Next, configure the system for the additional printers to be supported, selecting which printer number (1-6) they are to be, and the number of the serial port which they are to be connected, and enter:

```
ln /dev/ttyP /dev/lpN
```

Where: "P" is the serial port number, and "N" is the printer number. It is suggested that "P" and "N" be the same number to alleviate the confusion that occurs when printer 5 is connected to port 3.

Next, repeat the above `ln` command for each printer to be supported.

3. You need to make file names for invoking the `lpr` program. For each printer device file made in the previous step, enter:

```
ln /bin/lpr /bin/lprN
```

Where: "N" is a printer number.

4. You need to create spool directories. These directories are used to hold copies of material to be printed for each printer. For each printer device file made, enter:

```
mkdir /usr/spool/lpdN
```

Where: "N", as above, is a printer number.

NOTE: The default directory is already installed, do not try to create it. If any of the printers have baud rates other than 9600, refer to the next section "Changing/Setting Baud Rates".

### **CHANGING/SETTING BAUD RATES**

If you want to change or set a terminal or printer to a different baud rate than 9600, you should perform the following steps.

The /etc/ttys file contains entries of the form:

```
l2ttyP
```

The above line is interpreted by various system programs. The first digit ("1" in the above example) tells the system to attempt to log on ttyP ("P" is a serial port number). The second digit specifies the baud rate for that particular terminal (see Baud Rate list below or GETTY(8) in volume I of the **UNIX Programmer's Manual** for the baud rates associated with these values.) For each printer to be supported, type a "disable" command for the corresponding serial port. This ensures that the system will not attempt to log on a port which is dedicated to a printer.

For example, if a printer is set up for port 6, enter:

```
disable tty6
```

Now, for each printer to be supported, add a line to file /etc/ttys that has the following format:

```
0B1pN
```

This line may be anywhere in the file. No spaces are permitted between portions of the line. "B" is a baud rate argument from the list below. "N" is the printer number.

If the default printer's baud rate is other than 9600, add:

**0B1p**

NOTE:

Printers whose baud rate is 9600 do not require a corresponding line in /etc/ttys.

Baud Rates

<u>"B" VALUES</u>	<u>BAUD RATE</u>
0 . . . . .	300
1 . . . . .	150
2 . . . . .	9600
3 . . . . .	1200
5 . . . . .	300
6 . . . . .	2400
7 . . . . .	4800

**CONFIGURING SYSTEM WITHOUT A PRINTER**

If you wish to support six terminals (with no printer), you should:

1. Log in as super-user (root).
2. Remove the lp entry in /dev by entering  
**rm /dev/lp<CR>**
3. Enable the login and shell on port 6 by editing the line referencing tty6 in the file /etc/ttys from "02tty6" to "12tty6", before going multiuser.



## APPENDIX B

### SAMPLE LISTING OF XENIX RUN TIME UTILITIES

The following is a sample listing of the utilities provided in a XENIX Run Time System. Most of these utilities can be accessed via the BusinessShell menus.

You can obtain a list of your XENIX operating system's utilities by entering:

```
login: root
# cd / <CR>
# ls -FCR | lpr <CR>
```

#### Sample List Of XENIX Run-Time Utilities

bin	lib	lost+found	make.hd	usr
etc	load.hd	make.floppy	tmp	
./bin:				
bsh	du	login	ps	su
cat	ed	lpr	pwd	sync
chgrp	expr	ls	rm	tar
chmod	find	mail	rmdir	test
chown	fsck	mkdir	sed	tty
cp	grep	multiuser	sh	who
date	kill	mv	sleep	
df	ln	passwd	stty	
./etc:				
asktime	inir	newuser	termcap	wall
checklist	init	passwd	ttys	
getty	menusys.bin	rc	ttytype	
group	motd	shutdown	update	
haltsys	mtab	systemid	utmp	
./etc/newuser:				
./lib:				
remove.this				

## Sample List of XENIX Run-Time Utilities (Cont)

./lost+found:  
remove.this

./tmp:  
remove.this

./usr:  
adm    altos        bin        lib        spool        src    sys        tmp        unix        user

./usr/adm:  
messages        msgbuf                wtmp

./usr/altos:  
qa.test

./usr/bin:  
Mail    disable        enable    fcopy    format    more        reset    ua

./usr/lib:  
Mail.help                bsh                fmt                more.help  
Mail.help                bsh.messages    lpd

./usr/spool  
lpd        mail

./usr/spool/lpd:  
remove.this

./usr/spool/mail:  
remove.this

./usr/src:  
cmd

./usr/src/cmd:

./usr/sys:  
remove.this

./usr/tmp:  
remove.this