

**- BOS -**

**Bob's Operating System for the Apple ///**

**Guide For Installation And Use**

## Apple /// BOS User's Guide

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BOS, all of its associated program and this User's Guide was written by **Bob Consorti**.

## **Apple /// BOS User's Guide**

Special thanks go to Dave Ottalini, Paul Campbell, Washington Apple Pie and ATUNC for the support needed to make this project possible.

BOS comprises over 60,000 lines of source code and 2.4 million typed characters. Please don't steal from me.

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## Apple /// BOS User's Guide

### Introduction

Thank you for purchasing this copy of BOS - *Bob's Operating System* for the Apple ///. It has been designed to help you use your Apple /// more effectively by bringing some of the features of the newer style computers to the venerable old Apple ///. BOS provides a built-in program switcher, disk caching, print spooling, a screen saver, automatic uncopyprotection of AppleWriter, VisiCalc and Advanced VisiCalc, startup and individual program password protection and allows you to set a program to automatically run upon booting up your Apple ///.

- + If you are familiar with Selector or Catalyst the BOS Program Switcher will seem familiar yet more powerful than what you're used to. A program switcher lets you place your programs on a hard disk (or large capacity floppy) and switch from one to another by selecting it from a menu, without restarting your computer each time or typing in complex program pathnames.
- + Disk caching allows you to set aside a portion of your Apple ///'s memory to use to hold frequently accessed disk information. This dramatically speeds up access to your hard disk and slows wear and tear on your disk drive. Since many programs frequently access the disk drive, your programs will appear faster because it takes much less time to retrieve information from the cache than from the disk drive.
- + Print spooling sends information to be printed to a temporary file on your hard disk and sends the information to your printer in the background. This allows you to use your computer while it is printing something, letting you do more in less time.
- + BOS has a built-in screen blanker which can turn your Apple /// monitor screen off to prevent phosphor burn-in which can leave shadows on your screen. The BOS Blanker can also show a variety of soothing patterns and with the optional BOS Blanker Pack you can have sophisticated displays at a variety of times or on your command.
- + BOS provides automatic uncopyprotection of AppleWriter, VisiCalc and Advanced VisiCalc, removing the need for the .UNCOPYPROTECT driver.
- + BOS provides security for your Apple /// by giving you the ability to set a startup password that must be typed in upon starting up your Apple ///. Additionally, you can have BOS ask for passwords on specific (or all) programs so you can prevent unauthorized use of your Apple /// and the programs on your hard disk.
- + BOS is fully compatible with programs requiring SOS 1.3 and SOS 1.3(S). It works with the Desktop Manager and other popular programs designed for the Apple ///.
- + BOS has improved memory management routines to make available more memory for many of your programs. In some instances, up to 31.75K more memory than Selector or Catalyst.

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### Installation Instructions

Before doing anything else, please make a copy of the supplied disk. Note that it has information on both side. Label the first disk 'BOS Startup Disk' and the second disk 'BOS Extras'. In the instructions that follow use only the copies. If they ever become damaged you can make new copies from your original - if you damage your original you will have to send it back for repair.

The BOS Startup disk is configured for an Apple ProFile hard disk in slot 4. If this is not your configuration use the System Utilities program to appropriately reconfigure the SOS.DRIVER file. Because the disk is packed full of BOS related utilities you may have to temporarily delete one or more drivers that you won't need in order to proceed with the installation.

If you are installing BOS on a system that previously held Selector you will not have to reinstall any of your programs. Just follow the instructions below and you'll be up and running in no time. If you're using Catalyst you should backup your files and reformat your hard disk to setup for installing BOS.

Startup your Apple /// with the BOS Startup Disk and in a few moments your the BOS Program Switcher Main Menu will be displayed. Use the up/down arrow keys to highlight the item named 'BOS Utilities (.D1)' and then press RETURN. In a few moments the BOS Utilities Main Menu will be displayed. Highlight item #3, 'Install BOS' and press RETURN. Here you will enter the name of the device to install BOS onto. The very first time you startup BOS the default name will be .D1. You should change that to .PROFILE and press RETURN to begin the installation. The selected disk must have at least 475 free blocks in order for BOS to have the room it needs to be correctly installed.

✦ All of the menu items are setup to use a disk named .PROFILE and if you like you can select a different device name but you will have to edit each menu item to point to your new device name. This is tedious and best to be avoided. It is far easier to use the System Utilities program to rename your device to .PROFILE. Some programs require the device they are running from be named .PROFILE so it is far easier to do this and have your programs work correctly than to try and figure out why they won't.

BOS will proceed to install itself on your disk and in a minute or so it will ask you to insert the BOS Extras disk. This is the back side of the supplied disk (the one you made a copy of - remember). Place the copy in the internal drive and press RETURN to continue the installation. In a minute the BOS Utilities program will have completed copying the files and will now ask you to insert the BOS Startup disk back into the built-in disk drive. Do this and press RETURN when it asks you.

That's all you need to do. BOS is now installed and you can begin using it. At this point we recommend that you exit the BOS Utilities program and select the Quit item on the main menu. Then

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press CONTROL-RESET to restart your Apple ///. This is not essential and you can begin to immediately use the BOS Program Switcher but it is best to restart now. When you do this continue with the section titled 'Installing Your Programs' below.

### Using the BOS Program Switcher

After starting up your Apple /// with the BOS Startup Disk you will see the BOS menu. Using it to select and switch to your programs is very easy. Simply use the arrow keys to highlight the name of the program you want to use and press RETURN to switch to that program. In a few moments the program will be displayed - exactly as if you started up your Apple /// with that programs' startup disk. Now comes the exciting part. When you quit your program you will be returned to the BOS Program Switcher menu and can select and switch to another program without restarting your Apple ///.

You can press ⌘-? while the BOS Program Switcher menu is displayed and a list of helpful information will be displayed. Many of the features displayed will be explained later on as they are used with some of the more advanced features of BOS.

Since you may have a larger number of programs than could be displayed on a single menu, BOS provides up to 4 different menus to accommodate up to 180 different programs. To switch to a different menu press the TAB key. That will move you forward in the list of menu screens. To move backwards press ⌘-TAB.

To rapidly move around the menus you can press ESCAPE to immediately move to the top left menu item. If you press ⌘-ESCAPE you will be returned to the first menu screen from any other menu. These commands can be useful with a macro utility such as the Desktop Manager's Macro Manager feature to automatically switch to another program from a different one - no matter where on the menu screens the programs are.

A key item on the BOS Program Switcher menu is the one named Quit. If you are using the built-in print spooler of BOS you need to select this item when you want to shut your Apple /// off. It will save information regarding the spooler queue (explained later) so that the next time you restart your Apple ///, BOS can pickup right where you left off. If you fail to shut your Apple /// down in this manner, BOS won't automatically know what files need to be printed next and you will have to run the BOS Utilities program (described later) and have the Spooler Utilities portion of that program 'find things'.

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Note that if you use the BOS supplied utility program to switch to the Apple II Emulation mode things will also be correctly saved for the next time you startup your Apple ///.

### Installing Your Programs

BOS expects to find programs in certain places on your hard disk. If they aren't in the place BOS wants them you can either tell BOS where they are or copy them to the right place. As shipped BOS recognizes dozens of programs. If you are upgrading to BOS from Selector ///, many will be in exactly the same place and you can begin to use them immediately. If you're just starting out, continue with this section and you will learn exactly where to put your programs.

✦ This manual assumes that you have an understanding of how to copy files from one disk to another using the System Utilities program. If this is not the case, please read over the Apple /// Owner's Guide for instructions on this and then return here.

BOS installed a copy of the latest version of the Apple /// System Utilities program and you should use that to copy the files to your hard disk as described below. Switch to the System Utilities program and in a moment the System Utilities program main menu will be displayed. Use the file handling commands as described below to copy your programs to the hard disk so BOS can switch to them when you request to.

The files to be copied will be listed under each program heading. For brevity, complete descriptions on how to copy each file will not be included here, simply copy the files as outlined under each program heading and you'll be set.

### Apple Access /// (Pascal version)

<u>Copy the file (from the program disk):</u>	<u>To the file:</u>
.D1/ACCESS3.CODE	.PROFILE/PROGRAMS/ACCESS3/ACCESS3.CODE
.D1/ACS3FONT	.PROFILE/CHARACTER.SETS/ACS3FONT
.PROFILE/PROGRAMS/SYS.UTILITIES/SYSTEM.MISCINFO	.PROFILE/PROGRAMS/ACCESS3/SYSTEM.MISCINFO

### Apple Access 3270

<u>Copy the file (from the program disk):</u>	<u>To the file:</u>
.D1/SOS.INTERP	.PROFILE/PROGRAMS/ACCESS.3270/SOS.INTERP
.D1/ACS3FONT	.PROFILE/CHARACTER.SETS/ACS3FONT

### Advanced VisiCalc

<u>Copy the file (from the loader disk):</u>	<u>To the file:</u>
----------------------------------------------	---------------------

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.D1/SOS.INTERP

.PROFILE/PROGRAMS/ADV.VISICALC/SOS.INTERP

Copy the file (from the program disk): \_\_\_\_\_ To the file:

.D1/VISICALC.OVL

.PROFILE/PROGRAMS/ADV.VISICALC/VISICALC.OVL

.D1/HELP.TEXT.FILE

.PROFILE/PROGRAMS/ADV.VISICALC/HELP.TEXT.FILE

To return to the BOS Program Switcher menu, type /SQY.

### Apple II Emulation

To install Apple II Emulation under BOS you will need a copy of the Apple II Emulation disk. Quit the System Utilities program and select the Installing II Emulation program on the second switcher menu screen. You will be asked to insert the Apple II Emulation disk into the built-in disk drive and the utility program will automatically install the Apple II Emulation mode on your hard disk. When completed you will be able to switch to the Apple II Emulation mode just like a regular Apple /// program with one important exception - once you switch to the Apple II Emulation mode you will have to restart your Apple /// to get back to the BOS Switcher menu.

### AppleFile ///

Startup your Apple /// with the AppleFile /// installation disk and have it install AppleFile in the subdirectory: .PROFILE/PROGRAMS/APPLEFILE

### Apple Speller ///

Copy the file (from the program disk): \_\_\_\_\_ To the file:

.D1/SYSTEM.STARTUP

.D1/SYSTEM.MISCINFO

.D1/SYSTEM.LIBRARY

.D1/SPELLER.SETUP

.D1/SPELLERUTL.BIN

.D1/SPELLER.BIN

.D1/SPELLER.AWL

.PROFILE/PROGRAMS/SPELLER3/=

Copy the file (from the dictionary 1 disk): \_\_\_\_\_ To the file:

.D1/=

.PROFILE/PROGRAMS/SPELLER3/=

Copy the file (from the dictionary 2 disk): \_\_\_\_\_ To the file:

.D1/=

.PROFILE/PROGRAMS/SPELLER3/=

Select Apple Speller /// from the BOS Program Switcher menu. Choose the Utilities Program (U) from the Speller Main Menu. Choose Speller Setup (S) from the Speller Utilities Menu. Choose Change Speller Setup (C) from the Speller Setup Menu. Change the pathname of the Main Dictionary (B) to .PROFILE/PROGRAMS/SPELLER3/RANDOM.HOUSE.1 Change the pathname of the Auxiliary Dictionary (B) to .PROFILE/PROGRAMS/SPELLER3/RANDOM.HOUSE.2 Quit Apple Speller /// by typing R to return to the Speller Startup Menu, R to return to the Utilities Menu, Y to save your changes, Q to quit the Utilities Program, Q to quit Apple Speller ///.

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### Apple /// Pascal Development System

Copy the file (from the PASCAL1 disk): \_\_\_\_\_ To the file:

.D1/SOS.INTERP  
.D1/SYSTEM.PASCAL  
.D1/SYSTEM.MISCINFO  
.D1/SYSTEM.FILER

.PROFILE/=

Copy the file (from the PASCAL2 disk): \_\_\_\_\_ To the file:

.D1/=

.PROFILE/=

Copy the file (from the PASCAL3 disk): \_\_\_\_\_ To the file:

.D1/LIBRARY.CODE  
.D1/LIBMAP.CODE  
.D1/AIIFORMAT.CODE  
.D1/SETUP.CODE  
.D1/SYSTEM.LIBRARY  
.D1/PMOVE.CODE

.PROFILE/=

Select Installing Pascal from the BOS Program Switcher menu. Press N so it doesn't give you directions, type in .PROFILE for the name of the device and press RETURN. When asked for the disk containing SOS.INTERP type .PROFILE and press RETURN.

Copy the file: \_\_\_\_\_ To the file:

.PROFILE/SOS.INTERP

.PROFILE/LANGUAGES/PASCAL/SOS.INTERP

Delete the files:

.PROFILE/SOS.INTERP  
.PROFILE/PMOVE.CODE

To quit from Pascal back to the BOS Switcher menu, type QY if using version 1.1 or later of Pascal or X.PROFILE/LANGUAGES/PASCAL/Q and press RETURN if you are using version 1.0.

### Apple Writer ///

Copy the file: \_\_\_\_\_ To the file:

.D1/SOS.INTERP  
.D1/HS  
.D1/STANDARD.CHR

.PROFILE/PROGRAMS/APPLEWRITER3/=  
.PROFILE/CHARACTER.SETS/STANDARD.CHR

Next copy the following files:

From the AppleWriter disk:

.D1/SYS.TAB  
.D1/SYS.PRT  
.D1/HELP  
.D1/STARTUP (If it exists)  
.D1/START (If it exists)

To your BOS Startup disk:

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Select the Apple Writer /// item from the BOS Program Switcher menu. When the Apple Writer /// screen comes up, press RETURN. Then type CONTROL-P and enter the following line followed by a return: DO.PROFILE/PROGRAMS/APPLEWRITER3/HELPMOVER

When you are asked to type the device name enter .PROFILE and press RETURN three times. When you are finished press CONTROL-Q and quit Apple Writer.

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### Backup ///

Copy the file:

.D1/SYSTEM.STARTUP  
.D1/SYSTEM.MISCINFO

To the file:

.PROFILE/PROGRAMS/BACKUP3/=

### BPI

Follow the instructions in the BPI manual for installing BPI on your ProFile, then return here.

Copy the file (from the BPI install disk):

.D1/SYSTEM.STARTUP  
.D1/SYSTEM.STAR.LIB  
.D1/BPI.CNF

To the file:

.PROFILE/BPI/INSTALL/=

Copy the file (from the BPI System disk):

.D1/SYSTEM.STAR=

To the file:

.PROFILE/BPI/SYSTEM.STAR=

Quit the System Utilities program and select BPI - Install from the BOS Program Switcher menu. If you get an error here, don't worry, just press the spacebar to cancel it. Select option 3 from the BPI Installation menu and follow the directions until you are back at the installation menu. Select option 4 from the BPI Installation menu and follow the directions until you are back at the installation menu. Select option 5 to end the installation. If you get an error here, don't worry, just press the spacebar to cancel it but follow the directions when asked to insert your BPI Install and BPI System disks. Again, if you get an error here, press ⌘-E to cancel it.

### Apple /// Business Basic

Copy the file (from the Basic startup disk):

.D1/SOS.INTERP

To the file:

.PROFILE/LANGUAGES/BASIC/SOS.INTERP

Copy any of the Business Basic support utilities that you may want to use such as the BGRAF.INV and RENUMBER.INV files also.

To quit from Business Basic back to the BOS Program Switcher type BYE and press RETURN from version 1.2 or later or RUN .PROFILE/LANGUAGES/BASIC/Q from earlier versions.

### Apple /// Business Graphics

Copy the file (from the B.G. Master disk):

.D1/PLOT.CODE  
.D1/SYSTEM.LIBRARY

To the file:

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.D1/SYSTEM.MISCINFO \_\_\_\_\_ .PROFILE/LANGUAGES/BUS.GRAPHICS/=

Copy the file (from the B.G. DATA disk): \_\_\_\_\_ To the file:

.D1/= \_\_\_\_\_ .PROFILE/LANGUAGES/BUS.GRAPHICS/=

When you run Business Graphics you must have the Apple /// Business Graphics Master disk in any disk drive. After the first screen comes up, press RETURN. In response to the prompt (an arrow), set the default volume by typing: SET DEFAULT VOL % and press RETURN. To return to the BOS Program Switcher menu type QUIT and press RETURN.

### Apple /// Cobol

Copy the file (from the Cobol boot disk): \_\_\_\_\_ To the file:

.D1/SOS.INTERP \_\_\_\_\_ .PROFILE/COBOL/SOS.INTERP

The Apple /// Cobol Introduction and Operating System Manual gives instructions (page 4) for copying the Cobol system files to a large disk like a ProFile. Simply copy the files listed in Table 1-1 and you will be done. To return to the BOS Program Switcher menu type Q.

### The Communications Manager

Copy the file (from the TCM startup disk): \_\_\_\_\_ To the file:

.D1/SOS.INTERP  
.D1/TCM.DATA \_\_\_\_\_ .PROFILE/PROGRAMS/COMM.MANAGER/=

### Disk-Directory-File-Fixer ///

Copy the file (from the DDF3 startup disk): \_\_\_\_\_ To the file:

.D1/SOS.INTERP \_\_\_\_\_ .PROFILE/PROGRAMS/DDFF3/=

### Draw ON ///

Copy the file (from the Draw ON /// Program disk): \_\_\_\_\_ To the file:

.D1/SYSTEM.STARTUP  
.D1/SYSTEM.MISCINFO  
.D1/DRW3.DIR \_\_\_\_\_ .PROFILE/PROGRAMS/DRAW.ON.3/=

To quit Draw ON ///, press ⌘ Apple Q. When you are asked if you are sure type Y for Yes.

### EasyTerm

Copy the file (from the Easyterm disk): \_\_\_\_\_ To the file:

.D1/SOS.INTERP  
.D1/TERM.DEFAULT \_\_\_\_\_ .PROFILE/PROGRAMS/EASYTERM/=

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The file `TERM.DEFAULT` may not exist on your Easyterm disk. If not, follow the directions in the Easyterm Owners' Manual for saving the terminal configuration.

### Go Back ///

Copy the file (from the Go Back startup disk): \_\_\_\_\_ To the file:

`.D1/SOS.INTERP`

`.D1/GO.BACK.OPTIONS` \_\_\_\_\_ `.PROFILE/PROGRAMS/GO.BACK/=`

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### Graph'n Calc

Copy the file (from the Graph'n Calc boot disk): \_\_\_\_\_ To the file:

.D1/BARFIL.INV  
.D1/BGRAF.INV  
.D1/MXSCREEN.INV  
.D1/DOWNLOAD.INV  
.D1/REQUEST.INV  
.D1/SCRNPRNT.INV  
.D1/GNCFONT  
.D1/HELLO \_\_\_\_\_ .PROFILE/PROGRAMS/GRAPH.N.CALC/=

Copy the file (from the Graph'n Calc program disk): \_\_\_\_\_ To the file:

.D1/GNC001  
.D1/GNC002  
.D1/GNC003  
.D1/GNC004  
.D1/GNC006  
.D1/GNC007  
.D1/HELP  
.D1/DATA  
.D1/USERROOT \_\_\_\_\_ .PROFILE/PROGRAMS/GRAPH.N.CALC/=

Make sure that you do not copy the file VOLNAME from the boot disk or the file VOLNAMES from the program disk. If you do the program will no work correctly. To return to the BOS Program Switcher menu, press ⌘-Q, then type A.

### Haba Merge

Copy the file (from the Haba Merge boot disk): \_\_\_\_\_ To the file:

.D1/SOS.INTERP  
.D1/MERGE.SYSTEM  
.D1/MERGE.INFO  
.D1/MERGE.LABELS \_\_\_\_\_ .PROFILE/PROGRAMS/HABBA.MERGE/=

### Lazarus ///

Copy the file (from the Lazarus /// Start-up disk): \_\_\_\_\_ To the file:

.D1/SYSTEM.MISCINFO  
.D1/SYSTEM.STARTUP \_\_\_\_\_ .PROFILE/PROGRAMS/LAZARUS/=

### Multiplan

Copy the file (from the Multiplan disk): \_\_\_\_\_ To the file:

.D1/SOS.INTERP  
.D1/MP.HLP  
.D1/MP.SYS  
.D1/MP.CODE  
.D1/MP.DATA \_\_\_\_\_ .PROFILE/PROGRAMS/MULTIPLAN/=

### Nexus

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Copy the file (from the Nexus disk): \_\_\_\_\_ To the file:  
.D1/SOS.INTERP  
.D1/CONFIG \_\_\_\_\_ .PROFILE/PROGRAMS/NEXUS/=

To return to the BOS Program Switcher menu, select the Exit terminal emulator option from the SET-UP MENU.

### **PFS: File**

Copy the file (from the PFS: File disk): \_\_\_\_\_ To the file:  
.D1/SYSTEM.STARTUP  
.D1/SYSTEM.LIBRARY  
.D1/SYSTEM.MISCINFO \_\_\_\_\_ .PROFILE/PROGRAMS/PFS.FILE/=

Because PFS programs are copy-protected, you must insert the PFS disk into the built-in disk drive before selecting it from the BOS Program Switcher menu. To return to the BOS Program Switcher menu, type E for the SELECTION NUMBER at the main menu and press ENTER.

### **PFS: Graph**

Copy the file (from the PFS: Graph disk): \_\_\_\_\_ To the file:  
.D1/SYSTEM.STARTUP  
.D1/SYSTEM.LIBRARY  
.D1/SYSTEM.MISCINFO \_\_\_\_\_ .PROFILE/PROGRAMS/PFS.GRAPH/=

Because PFS programs are copy-protected, you must insert the PFS disk into the built-in disk drive before selecting it from the BOS Program Switcher menu. To return to the BOS Program Switcher menu, type E for the SELECTION NUMBER at the main menu and press ENTER.

### **PFS: Report**

Copy the file (from the PFS: Report disk): \_\_\_\_\_ To the file:  
.D1/SYSTEM.STARTUP  
.D1/SYSTEM.LIBRARY  
.D1/SYSTEM.MISCINFO \_\_\_\_\_ .PROFILE/PROGRAMS/PFS.REPORT/=

Because PFS programs are copy-protected, you must insert the PFS disk into the built-in disk drive before selecting it from the BOS Program Switcher menu. To return to the BOS Program Switcher menu, type E for the SELECTION NUMBER at the main menu and press ENTER.

If you are using any of the ON THREE copyable versions of the PFS programs you will not need to first insert your original disk before switching to those programs.

### **Quick File ///**

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Copy the file (from the QuickFile program disk):    To the file:

.D1/SYSTEM.STARTUP

.D1/SYSTEM.LIBRARY

.D1/SYSTEM.MISCINFO \_\_\_\_\_ .PROFILE/PROGRAMS/QUICKFILE3/=

Regardless of what the program says, pressing \$ will return you to the BOS Program Switcher menu rather than the Pascal command line.

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### Script ///

Copy the file (from the Script /// program disk): \_\_\_\_\_ To the file:

.D1/SCRIPT.CODE

.D1/SCRIPT.LIB \_\_\_\_\_ .PROFILE/PROGRAMS/SCRIPT3/=

To return to the BOS Program Switcher menu, type ESCAPE and then RETURN when the program prompts you with the line Files:.

### Senior Analyst

Delete the file .PROFILE/SA3. Make a copy of the Senior Analyst Boot (startup) disk. Startup your Apple /// with this copy. Insert the Senior Analyst Master disk into .D1 and press RETURN. Place your copy of the Senior Analyst Boot disk into .D2. When prompted for MODE in the top left corner, press ESCAPE and type QY in response to the prompt. Type X/BOOT/BIGCONFIG and press RETURN. When prompted for the SOS device name type .PROFILE and press RETURN. When the Command: prompt reappears on the top line, restart your Apple /// with the BOS Startup disk and...

Copy the file (from the Senior Analyst Master disk): \_\_\_\_\_ To the file:

.D1/SYSTEM.MISCINFO \_\_\_\_\_

.PROFILE/SA3/SYSTEM.MISCINFO

### VisiCalc

Copy the file (from the VisiCalc disk): \_\_\_\_\_ To the file:

.D1/SOS.INTERP \_\_\_\_\_

.PROFILE/PROGRAMS/VISICALC/SOS.INTERP

To return to the BOS Program Switcher menu, type /SQY.

### /// E-Z Pieces

Copy the file (from the /// E-Z Pieces Boot disk): \_\_\_\_\_ To the file:

.D1/SOS.INTERP

.D1/SEG.00 \_\_\_\_\_ .PROFILE/THREE.EP/=

Copy the file (from the /// E-Z Pieces Program disk): \_\_\_\_\_ To the file:

.D1/= \_\_\_\_\_

.PROFILE/THREE.EP/=

## Installing Other Programs

BOS comes pre-configured for the most common Apple /// programs. It also allows you to install almost any kind of program on your Apple /// and run it from the hard disk. Note that some programs are copy protected and may not be used with BOS (or similar utilities programs).

However, virtually every Apple /// program ever written will run with BOS, including assembly language, Business Basic and Pascal programs too. To install these kinds of programs you must do two things. First you must copy the files that the program uses to the hard disk then you must tell BOS where they are and how it should switch to them (run them).

The procedure and what files you need to transfer is slightly different depending on the kind of program you want to install. You must begin by determining if the program you want to install is a Business Basic, Pascal or assembly language program. Use the System Utilities, LIST FILES command to see what files are on the program disk.

- If there's a file called `SYSTEM.STARTUP`, it's a Pascal program.
- If there's a file called `HELLO`, it's a Business Basic program.
- If it only has a file named `SOS.INTERP`, it's an assembly language interpreter program.

If the program is not on a disk that will startup by itself when you turn your Apple /// on, you probably have to type `RUN (filename)` after the Business Basic prompt or `X (filename)` from the Pascal prompt, so you should know what kind of program it is.

## Installing a Pascal Program

The first thing to do is make a unique subdirectory for the program and place it in the `PROGRAMS/` subdirectory on your hard disk. For example, if you wanted to install a Pascal program that you called 'Turtles' you would use the System Utilities program (or equivalent) to make a subdirectory with the name `.PROFILE/PROGRAMS/TURTLES`. Then copy all of the files from your program disk to this subdirectory except `SOS.KERNEL`, `SOS.INTERP`, `SOS.DRIVER` and `SYSTEM.PASCAL`.

At a minimum you should have two files in this subdirectory, one named `SYSTEM.STARTUP` and the other named `SYSTEM.MISCINFO`. If your program is named `TURTLES.CODE` or something similar, that's fine but you will still need the `SYSTEM.MISCINFO` file. If your program is not named `SYSTEM.STARTUP` or end with `.CODE` you will need to add a period at the end of the filename such as `'FILE.'`

When finished you will need to tell BOS that you have a new program available. Do this by switching to the BOS Utilities program and adding a new program. This is described later on in detail but for now we'll just say that after you tell the BOS Utilities that you want to add a new program it will ask you information about that program. For our example use the following information.

Name to display on the menu: `Turtle Demonstration`

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PROGRAM file: `.PROFILE/PROGRAMS/TURTLES/SYSTEM.STARTUP`

LANGUAGE file: `.PROFILE/LANGUAGES/PASCAL.RTINTERP`

DATA prefix: `.PROFILE/PROGRAMS/TURTLES`

The LANGUAGE file for all Pascal programs will always be: `.PROFILE/LANGUAGES/PASCAL.RTINTERP`

The DATA prefix for Pascal programs will vary, sometimes you will have to point the prefix to the subdirectory the program is in, other times set it to `.PROFILE`.

### Installing a Business Basic Program

The first thing to do is make a unique subdirectory for the program and place it in the PROGRAMS/ subdirectory on your hard disk. For example, if you wanted to install a Business Basic program that you called 'Crude' you would use the System Utilities program (or equivalent) to make a subdirectory with the name `.PROFILE/PROGRAMS/CRUDE`. Then copy all of the files from your program disk to this subdirectory except `SOS.KERNEL`, `SOS.INTERP` and `SOS.DRIVER`.

When finished you will need to tell BOS that you have a new program available. Do this by switching to the BOS Utilities program and adding a new program. This is described later on in detail but for now we'll just say that after you tell the BOS Utilities that you want to add a new program it will ask you information about that program. For our example use the following information.

Name to display on the menu: `Crude Demonstration`

PROGRAM file: `.PROFILE/PROGRAMS/CRUDE/HELLO`

LANGUAGE file: `.PROFILE/LANGUAGES/BASIC.RTINTERP`

DATA prefix: `.PROFILE/PROGRAMS/CRUDE`

The LANGUAGE file for all Business Basic programs will always be:

`.PROFILE/LANGUAGES/BASIC.RTINTERP`

The DATA prefix for Business Basic programs will vary, sometimes you will have to point the prefix to the subdirectory the program is in, other times set it to `.PROFILE`.

Please note that if the program disk is self-starting the program name will always be HELLO.

However, if you have to run a different program after starting up your Apple /// with the Business Basic disk simply enter that program name when you add the program in the BOS Utilities program.

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### Installing an Interpreter Program

The first thing to do is make a unique subdirectory for the program and place it in the PROGRAMS/ subdirectory on your hard disk. For example, if you wanted to install an Interpreter (assembly language) program that you called 'Speedy' you would use the System Utilities program (or equivalent) to make a subdirectory with the name .PROFILE/PROGRAMS/SPEEDY. Then copy all of the files from your program disk to this subdirectory except SOS.KERNEL and SOS.DRIVER.

When finished you will need to tell BOS that you have a new program available. Do this by switching to the BOS Utilities program and adding a new program. This is described later on in detail but for now we'll just say that after you tell the BOS Utilities that you want to add a new program it will ask you information about that program. For our example use the following information.

Name to display on the menu: Speedy Demonstration  
PROGRAM file: .PROFILE/PROGRAMS/SPEEDY/SOS.INTERP  
DATA prefix: .PROFILE/PROGRAMS/SPEEDY

The LANGUAGE file for all interpreter programs will always be blank.

The DATA prefix for interpreter programs will vary, sometimes you will have to point the prefix to the subdirectory the program is in, other times set it to .PROFILE or just leave it blank.

### Installing Programs Written in Other Programming Languages

If you have a program written in COBOL, Fortran, FORTH or some other Apple /// programming languages, consult the manufacturer for details on installing those programs on a program switching utility.

## Using the BOS Utilities Program

The BOS Utilities program allows you to change your menu, setup the disk caching and spooling configurations, install BOS on your hard disk, select and change the passwords and adjust the screen blanking options. It is quite a complex part of the entire BOS package. There is quite a great deal of information in the next few pages so please reread anything you're not completely sure about.

To begin, select the BOS Utilities item from the BOS Program Switcher menu. After the program has loaded in you will be presented with a menu listing all of the various functions you can use. Use the UP or DOWN arrow key to move the highlight over the options you would like to use and press RETURN to select it, or type the number (1-9) corresponding to the item you want and press RETURN to select it. The rest of this section will follow the menu in the order listed.

### Editing Your Menu

You may not like the appearance of your menu and want to change it, or you may want to remove some programs on the menu that you don't have or you want to add new programs. In any case selecting the 'Edit Menu' option from the BOS Utilities main menu will allow you to accomplish this. Immediately after pressing RETURN to select it the message 'Setting up the menus. Please wait...' will appear.

✦ The Apple ///'s technology was designed in the late 1970's - early 80's and while it has sufficient power for a great many things it takes a couple of seconds to process a hundred item linked list (the BOS menu) so you will see this message often while editing the menu.

In a moment you will see a replica of the BOS Program Switcher menu. You have a variety of options available to customize your menu. The key presses and their actions are listed below.

TAB - Will cycle through the 4 available menu screens.

UP/DOWN arrows - Will move the highlight over the 45 locations on each menu screen.

⌘ UP/DOWN arrows - Will 'drag' the highlighted item in the direction of the arrow key.

RETURN - Over a blank line allows you to enter a line of text or a new program.

RETURN - Over a line of text allows you to edit that line of text.

RETURN - Over a program allows you to edit information about that program.

⌘ R - Over a line of text or a program REMOVES that item from the menu.

⌘ C - Over a line of text or a program makes a COPY of that item.

⌘ X - Over a line of text or a program first makes a COPY of that item, then REMOVES it.

⌘ P - Over a blank line PASTES the most recently COPIED item.

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⌘ S - Allows you to change the screen name in the bottom left corner of each menu screen.

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␣ V - Allows you to VIEW the currently selected 'Quick-List' and 'boot' programs.

␣ 0 to ␣ 9 - Adds the highlighted program to the 'Quick-List'.

␣ B - Selects the highlighted program to automatically be run upon booting up your Apple ///.

When you add a program to the 'Quick-List' and exit the BOS Utilities program you can immediately switch to that program by pressing ␣ 0 to ␣ 9 (the number you used to add it to the 'Quick-List'.

You don't even have to be on the same menu screen, just press the appropriate key and BOS will switch to that program. The program you select as the boot program (␣ B) will automatically be run when you startup your Apple /// with BOS so if you always run /// E-Z Pieces or another program when you startup your Apple ///, select it as the boot program and you won't even have to press a key and the program will come up running.

When you press RETURN over a blank line, the BOS Utilities program will ask you if you want to add a line of text or a program. Lines of text appear on the BOS Program Switcher menus but they are for information only - you can't run a line of text. When you add a program you will be asked for six pieces of information, not all of which are required. Combined they inform BOS what files it needs to load in order to switch to the program.

The first is the name you would like to be displayed for this program on the BOS Program Switcher menu. You can type in up to 26 characters for this item and it is only descriptive, nothing in this field is used by BOS to load or setup things for the program you want to run. You can also specify the password (if any) to be used when switching to this program by pressing ␣ W while the highlight is over this field. Passwords will be explained in detail later on.

✦ While entering pathnames a feature called file selection is available to speed up finding the files to use. Instead of having to remember where you installed a particular program and all the subdirectory names, just have the Utilities program show you the files. If you type in a device or volume name like .PROFILE and press the ␣ UP/DOWN arrow, a window will be displayed in the upper right corner of the screen listing the files on that disk. All subdirectories will be displayed with a trailing slash "/". To look in a subdirectory, use the UP/DOWN arrow keys to highlight the subdirectory and press the RIGHT arrow key to select it. Pressing RETURN will return you to the menu screen and the name you selected will be appended to your original pathname. You can keep doing this until you find the file you are looking for. If you change your mind about selecting a file, pressing the LEFT arrow will deselect that file as long as the highlight is over it. If not press ␣ Z and whatever file you selected will be deselected and you can select another one. Note that if you have a lot of files the highlight can scroll up and down so you can see all of the files in the list. To automatically move to the top or bottom of the list press ␣ UP or ␣ DOWN arrow respectively. Pressing ␣ DELETE or ␣ \ will automatically 'pop-off' a directory level and free you from having to remove a character at a time. You can also use wildcards in file selection such as .PROFILE/PROGRAMS/BAS= which will display all files starting with 'BAS'.

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The next item is the pathname of the program BOS should run when it is selected. You can enter a name such as `.PROFILE/PROGRAMS/GO.BACK/SOS.INTERP` or any other valid Apple /// pathname.

The next item in the list is the language file that BOS should use when switching to the program specified just above. If the program is an assembly language program (an interpreter) you should leave this field blank. However, if the program is written in Pascal the language file should be `.PROFILE/LANGUAGES/PASCAL.RTINTERP` and if the program was written in Business Basic, the language should be `.PROFILE/LANGUAGES/BASIC.RTINTERP`.

The next item is the prefix that BOS should set before switching to the program. Unless your program requires this to be set you can leave it blank. Many programs expect to find files in certain places so you must set the prefix to that subdirectory before switching to that program or it won't be able to find the files it needs to operate. An example program that requires the prefix to be set to a certain location is /// E-Z Pieces. You must set the prefix to the subdirectory the program is in. If you are using the defaults, the prefix should be `.PROFILE/THREE.EP`. Note that you don't have to type a trailing `"/`.

✦ You can save room in your menu by using something called the partial pathname. If you use a DATA prefix in the list of program information you can just enter the partial program name. For our /// E-Z Pieces example above the complete program file pathname would be `.PROFILE/THREE.EP/SOS.INTERP`. However, since the DATA prefix is set to `.PROFILE/THREE.EP` you can just enter `SOS.INTERP` for the program file and BOS will correctly add the two together before switching to the program. As you fill up your menu you may one day run out of room and this technique can help you save space.

The next two items are used to load in an alternate character set or keyboard layout for a program. Few programs require this but if they do, just enter the correct pathname and BOS will set things up correctly before it switches to the program.

While entering the information for a new program you can press RETURN to move to the next field (it will wrap to the top when you get to the bottom), or you can press the UP and DOWN arrows to move to the previous or next field respectively. When you are finished editing your program press ESCAPE to exit back to the previous screen.

When you are finished adding new programs or otherwise changing your menus press ESCAPE to go back to the BOS Utilities main menu.

### Saving Your Menu

After editing your menu you have a number of options. You can exit the BOS Utilities program completely disregarding the changes you made, you can make them temporary so they will be used this session only - the next time you startup your Apple /// the previous menu configuration will be

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used. Lastly you can make the changes permanent so that the next time you startup your Apple /// the changes you made will be there.

To leave the BOS Utilities without using the changed menu configuration select item #9 on the main menu. If you changed your menu you will be asked if you want to make the changes temporary or permanent. At this point if you press ESCAPE you will be returned to the BOS Program Switcher menu with your original menu. If you press 'T', BOS will let you use your changed menu but will not save the changes to disk. If you press 'P', BOS will save the menu to disk so that the changes will be there the next time you startup your Apple ///.

You can also select option #2 to Save the menu changes. No matter which option you choose, if you change your menu the BOS Utilities program will make sure to ask you what you want to do before exiting.

### Installing BOS

This option was explained earlier in this guide when it stepped you through installing BOS on your hard disk. If you are here you should have already successfully installed BOS on your system. If not go back to the beginning of this guide and follow the directions for installing BOS.

### Selecting the Menu Location

BOS will look for the menu information in a certain place on your hard disk. The default location is .PROFILE but can be changed if you really want it to be somewhere else by using item #4 on the BOS Utilities main menu. Starting up will be quickest with the menu file in the default location so unless you have a good reason to put it somewhere else please don't change this location.

### Disk Caching Utilities

One of the advanced features that BOS provides your Apple /// is the ability to keep frequently accessed information on your hard disk in the memory of your Apple ///. Instead of having to go back to the hard disk each time it needs this information BOS looks up the information in the memory inside your Apple ///. This occurs much faster than the information could be looked up on the hard disk, speeding access and general program use and it saves wear and tear on your hard disk because it doesn't have to continually go back to the hard disk.

BOS provides very significant disk caching options that will be explained below. If you are at all unsure about anything below please reread this section. Note that *nothing* you can do with regards to disk caching will cause damage to your hard disk or the programs or data stored on the hard disk so feel free to experiment.

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BOS can cache up to 11 non-removable block devices (disk drives). The SOS/BOS limit of block devices is 12 but the system will always have at least the built-in disk drive (.D1) which is a removable disk. The reason BOS can't cache removable disks is that there isn't a reliable way of detecting when a disk in a Disk /// drive has been switched, thus resulting in the possibility that BOS could have incorrect information in the cache and could potentially damage the information on your disks. Because BOS will only cache non-removable devices this is never a concern.

When you select item #5 on the BOS Utilities main menu the Caching Utilities menu will be displayed. The Apple /// is not a fast enough machine to dynamically figure out what should be in the cache so BOS implements a feature called SmartCache. This allows your Apple /// to use features common in more modern computers with far greater horsepower (speed). SmartCache figures out what should be cached and this information is saved along with the menu information so the Apple /// doesn't get bogged down trying to figure out what should be in the cache and what shouldn't.

The BOS Utilities program provides a number of options when using the cache and each will be explained below. On the left side of the Cache Utilities menu is the list of available non-removable block devices that BOS can cache along with information about how many blocks need to be cached and the type of cache currently being used.

First off, what type of information should be cached? Well, anything that would normally be frequently accessed on the hard disk is a candidate for caching. The most common item for the cache is something called the main directory. Each time you load or save a file BOS has to look in the main directory for the information concerning that file. This information consists of where the file is physically located on the disk as well as time, date and the kind of file it is. A hard disk is a mechanical device and it takes time to move from one section of the disk to another. Without a disk cache, the disk will frequently move all over the place as it looks for the needed information. You have probably noticed this in the series of tiny clicks the drive makes when you load or save a file. With a disk cache the hard disk doesn't have to search so much and things happen much faster.

Not all of your files are stored in the main directory on your hard disk. The Apple /// has a marvelous feature called subdirectories which lets you logically (or illogically if you wish) group your files. When files are stored in subdirectories the subdirectories themselves become a good candidate to be cached because they are frequently accessed as well as the main directory.

BOS allows you to not cache a disk, cache the main directory only or cache the main directory and all subdirectories that contain files. That accounts for the type 0 (no cache), type 1 (cache main directory only) and type 2 (cache main directory and subdirectories containing files). There is a type 3 cache which should only be used if you have recently backed up your hard disk with the Go Back hard disk backup/restore utility, formatted it and then did a full volume restoration. After doing this a type 3

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cache will act just like a type 2 cache (it will cache the main directory and subdirectories containing files) but will work even faster than a normal type 2 cache.

Now that we're finished with the basics of disk caching, what does it cost? By cost I mean in terms of the Apple /// main memory usage required for your holding the cache information. A block of cache information consumes 0.5K of Apple /// main memory. BOS can automatically hold a certain number of cache blocks without using any additional memory but if you have a large number of files on your hard disk BOS may have to reserve more memory to hold the cache information. Fortunately the BOS Utilities makes this pretty much automatic. Before we continue a little background information of the way memory is used in the Apple /// is in order.

The Apple /// uses something called bank-switched memory to access up to 512K of main memory. On a 512K Apple /// there are 15 32K banks of memory, on a 256K machine there are 7 32K banks. Simple multiplication will show that in each case we're missing 32K of memory. The other 32K is not bank-switched. BOS resides in this non-bank-switched memory and one extra bank of memory. If you have the Desktop Manager installed it always reserves the highest bank of memory for itself. Below that BOS loads in the drivers located in your SOS.DRIVER file. Below that is the free memory where your programs are loaded.

This is shown pictorially by pressing 'V' in the Cache Utilities menu to view the memory map. Each bank holds 32K of memory and you will be able to see the way memory will look with your currently selected cache configuration. What you want to do is to avoid the situations where you will have a bank with 1K of memory reserved for the cache and 31K free.

The reason for this is relatively simple. Most of the programs that BOS can switch to want to take up an entire bank for themselves. If you have a bank with 1K reserved for cache BOS won't be able to load the program in that bank and you will effectively lose 32K of memory. Even though 31K in that bank is available it is fragmented. Most Apple /// programs can't deal with fragmented memory, only the largest available block of memory. BOS has a special technique that aids in recovery of the memory lost through this fragmentation effect and it will be described in the *Advanced Techniques* section of this guide but with careful planning on your part you can avoid this memory losing phenomena.

If you press ESCAPE to go back to the main Cache Utilities screen you will see that each disk device has a minimum and maximum number of blocks needed to cache that disk. A type 1 cache uses just the minimum number of blocks while a type 2 or 3 will use the maximum number. The total number of cache blocks needed (depending on the cache type) is shown on the bottom left. Immediately below that is the number of cache blocks available.

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This is the number of blocks that can be stored in the BOS Switcher bank of memory and immediately after the device drivers. You can use up to this number of blocks to cache the disks configured into your system without losing memory due to the fragmentation effect. By pressing the RIGHT/LEFT arrow keys you can increase or decrease the available cache memory one 32K bank at a time (64 cache blocks). This is the most efficient way to allocate cache memory.

To setup a device with a particular type of cache, use the UP or DOWN arrow keys to highlight the device you would like to change and press 0, 1, 2 or 3 to select that type of cache. Note that if the selected cache type would consume more cache blocks than what is currently available the Cache Utilities won't let you select that cache type. If a type 2 or 3 cache won't fit but a type 1 cache will the Cache Utilities will change it to a type 1 cache. If it won't fit at all the solution is to increase your cache memory allocation as described above, then select the desired cache type.

All of this has probably confused the heck out of you and to make up for my rambling I'll give you the good news, the BOS Utilities program makes setting up the cache automatic. If you press 'A', the cache will be automatically configured within the currently available cache blocks. If you press 'M', the cache will be configured using any memory needed. The 'M' option will use more memory than the 'A' option and you can visualize how much memory the cache is taking by pressing 'V' to view the memory map with that cache configuration. You can also exit and save your menu changes and then run some of your programs to see how much memory you have available in them to get a feel for the memory used by the disk cache.

Note that you can have one type 2 or type 3 cache and up to ten type 1 caches. To support more type 2 or type 3 caches would require using even more memory and the cost to benefit ratio would fall on the wrong side. A type 2 and type 3 cache take up more memory than a type 1 cache but provides better performance benefits.

When you have chosen the SmartCache configuration you would like to use press RETURN and you will go back to the BOS Utilities main menu. If you would like to exit with your previous SmartCache configuration intact just press ESCAPE. When you quit the BOS Utilities the BOS Program Switcher will load the new SmartCache configuration.

Note that if you change your driver files around you may get an error loading the SmartCache configuration. If this happens you should rerun the BOS Utilities program and reset things in the Cache Utilities. Additionally, you should not tell BOS to cache disks that you don't have online as BOS will get an error when it tries to load the SmartCache configuration and will still reserve the memory needed to cache that disk until you remove it from the SmartCache configuration in the Cache Utilities portion of the BOS Utilities program.

## Spooling Utilities

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One of the advanced features that BOS provides your Apple /// is the ability to quickly 'spool' information to be printed to a file on disk and then send it to your printer while you are doing other things with your Apple ///. Thus, you could spool a 50 page report and instead of waiting hours for it to print before you could use your Apple ///, you could be back working in minutes. BOS allows you to spool up to 26 documents at a time and print them in any order. If you like you can even remove items from the queue of spooled files or reprint certain items.

✦ Spool printing requires a clock in order to work most efficiently. If you don't have one I suggest that you obtain one if you want to use the print spooling feature of BOS. The Spooler will automatically work with a printer connected to the built-in serial printer port on the back of the Apple ///, a printer connected to an Apple /// serial card or an Apple /// UPIC (Universal Parallel Interface Card). If you have a different type of interface card, the BOS spooler can do something called 'blind spooling'. In this instance it simply sends a certain number of characters to your printer each second without first determining if the printer is ready to receive new characters. This type of spooling isn't very useful because if you set the number of characters per second too high the Apple /// will have to wait for the printer and will cause the program running in the 'foreground' to slow unacceptably. To use 'blind spooling' effectively you will have to set the number of characters per second lower than what the printer can accept, thus slowing your printouts, although you will be able to use your Apple /// at the same time.

To spool print you must first tell BOS what the destination printer is. Select the Spooling Utilities item (#6 on the BOS Utilities main menu) and you will be presented with a list of printer devices on the left side of the screen. Use the UP and DOWN arrow keys to highlight the printer device you would like BOS to send the spooled information to and press RETURN to select it. The currently selected printer will appear below the available printer list.

Pressing 'S' will toggle spool printing ON and OFF. When spool printing is OFF you can still print to the BOS Spooler, however the information will not start to be sent to your selected printer until you enable spool printing.

Pressing 'B' will toggle the beacon ON and OFF. When ON, spooling will result in a flashing asterisk in the upper left corner of the text screen when the spooler is either saving the spool information on your hard disk or when it's sending the previously spooled information to your printer. The beacon is only displayed on text screens. If you are working in a graphics program the beacon will not be visible.

If you are spool printing multiple documents at a time you may find that the second one begins printing right where the first one left off. If you toggle the FORM FEED item ON, the spooler will add a form feed at the end of each printout, ensuring that subsequent printouts will start on the beginning of their own page. If your program automatically supplies a form feed toggle this option OFF otherwise you will get an extra blank page between printouts.

Use the RIGHT and LEFT arrow keys to adjust the number of characters the spooler sends to the printer each second. Note that if the spooler detects that the printer isn't ready to receive more information it will wait until the printer is ready before sending anything else. This is not the case

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with the blind spooling option and while using blind spooling it is possible for the Apple /// to be forced to wait while the printer prints, slowing the foreground application.

If you have an external printer buffer or if your printer has a large buffer you can select a greater number of characters to be sent to the printer each second. However, with most printers 80 characters per second is about the right speed. Depending on the speed of your hard disk and printer trying to send more than 80 characters per second will result in a noticeable slowing of your Apple ///. Again, nothing you can do will harm your Apple /// so test it out with different numbers and options.

After all of this useful information about spooling the basic question arises, how do you actually spool? The answer is simple. On the BOS Startup disk, in the SOS.DRIVER file is a driver named .SPOOL. In your programs when you want to spool print print to this device and BOS will take care of spooling it to disk and route it to the selected printers while you are using your Apple /// for more productive things. Note that some programs like that the printer device name be .PRINTER. If you have such a program use the System Configuration program to rename the .SPOOL driver to .PRINTER and then rename the printer driver you want the spooler to send the spooled information to a different device name.

One of the powerful spooler options is the ability to edit the spooler queue. As stated previously the spooler can handle up to 26 documents at a time. You may one day find yourself spooling a large number of documents and decide that you really want to see the last one you spooled before the others. Since you can edit the spooler queue you can have that document print out first or change the order of printing of any of the documents in the queue.

To edit the spooler queue of documents waiting to be printed, enter the BOS Utilities program and select the Spooling Utilities item. Then press 'Q' to edit the spooler queue. A list of up to 26 items will be displayed in the order they will be printed. Note that while editing the spooler queue, spool printing is temporarily suspended. As soon as you exit it will restart printing.

If you find that you don't want to print a file you've spooled use the UP or DOWN arrow keys to highlight the one you want to remove and press ⌘ R to remove it. Now you might have a good number of files spooled and waiting to be printed and you ask how do you know which one is which? Well, BOS provides the answer! Just highlight any of the documents in the queue and press ⌘ I. The program that created the document will be displayed along with its size.

To change the printing order, 'drag' the files into the desired order by pressing ⌘ UP or ⌘ DOWN arrow over the highlighted file to move it into the proper position.

If you ever get a paper jam and have to restart printing, rather than reprinting the document, have BOS begin printing it again by pressing ⌘ P while editing the spooler queue. The reprint option will

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then be turned ON. If you use this you should manually set the top of form so when it begins reprinting (when you press ESCAPE to exit the edit the spooler queue option) it will start printing at the correct place on the page.

As previously stated, when editing the queue, spool printing is suspended until you exit. If you remove the item that is currently printing you must manually issue a form feed before exiting the edit spool queue so the next item to be printed starts at the top of the page.

✦ When you change the spooler size (# of chars/sec.) it will be recognized when you save the menu upon exit from the BOS Utilities program and not before. Likewise, changing the spooler beacon or form feed options will only take effect when you exit the BOS Utilities program.

✦ You can force blind spooling by pressing ␣ RETURN when you select the printer device name to send the spooled information to. This will cause the spooler to do blind spooling without first checking if the printer is ready to receive new characters.

If you are in the middle of spool printing and decide that you want to shut down for the day (or lunch for that matter), selecting the Quit item from the BOS Program Switcher menu will save information concerning the spooler status so that the next time you startup your Apple /// BOS will know where in the spooled document to restart printing from as well as the number of spooled documents are in the queue to be printed. Leaving the Apple /// mode by switching to the Apple II Emulation mode will likewise save the spooler information.

However, every now and then your Apple /// may crash, hang up or you may inadvertently press CONTROL-RESET to restart your Apple ///. If this ever happens, the next time you startup your Apple /// it won't know about any spooled files and consequently won't print them. BOS provides an option in the Spooler Utilities program to correct this. If you ever 'lose' the spooler queue information by not shutting down your Apple /// properly, press 'Q' from the Spooler Utilities in the BOS Utilities program to edit the spooler queue. You will be presented with a message saying that there aren't any spooled files. If you press RETURN at this point the spooler queue will be 'rebuilt' and you will be able to restart printing. Note that the information on the program that created the particular spooled document will be unavailable when the spooler queue is rebuilt. Regardless, it is possible to restart any suspended spool printout in this manner.

Note that when you want to leave the Spooling Utilities and return to the BOS Utilities main menu you need to press ESCAPE to exit with any changes you've made and ␣ ESCAPE to leave with no changes. This only applies to the spooler options on the first page. Any changes you've made to the spooler queue are not reversible except by reediting the queue.

✦ When spool printing and the printer is not attached or is offline the computer may occasionally halt the foreground operation until you attach the printer or turn it back online. This will only happen when you have spool printing enabled but don't have the printer online or attached or if the printer runs out of paper and you switch to a program which does a close of all open files. When the printer driver is closed it will wait for the printer to come online before sending the last characters. This causes the foreground application to stop. I have only noticed this when switching to

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Pascal program under the conditions outlined above. It should not be seen in normal use of the spooler. In any case the solution is to turn the printer on for a second and then turn it off again. That will restart the foreground application.

### Setting the Password Options

You can set BOS up to ask for a startup password to prevent unauthorized users from starting up your system and individual program passwords to protect 'sensitive' programs that you want to limit access to. This can be accomplished in the BOS Utilities program using item #7, Set Password Options. Once you select it you will be given the password options screen.

The default condition is all passwords are off until you turn them on. You can toggle startup and individual program passwords ON and OFF by pressing 'S' and 'P' respectively. When startup passwords is ON and you have entered a password, BOS will ask you to type the password before it displays the BOS Program Switcher menu the first time. While typing in the password upon startup the characters you type will not be echoed to the screen so nobody can 'steal' your password by looking over your shoulder.

If you have program passwords enabled, BOS will ask for the password (if you have entered one) before switching to the program. Again, while typing in the program password the characters you type will not be echoed to the screen. Note that you can have a different password for each program for the ultimate in protection (or confusion as the case may be!).

To enter the startup password press ⌘ W on the Set Password Options screen in the BOS Utilities program. You will be able to enter up to 15 characters for the password. While in the BOS Utilities program the passwords *will* be echoed and displayed so you can be sure of what you typed.

To enter a password for a particular program you have to edit the menu and select the program you want to add a password for. While the cursor is on the first field (display name) press ⌘ W and you will be able to enter up to 15 characters for the password. When finished entering the password press RETURN to accept it.

✦ If you forget your passwords you can use the BOS Utilities program to view them but if you forget your startup password there is no way to get to the BOS Utilities program to see them and you will have to recopy the BOS.MENUS file from your original BOS Startup disk to your hard disk so you can 'get into' your system again. For this reason we recommend that you select a password that offers protection but is fairly easy to remember. Since the BOS Utilities program lets you view and change the passwords it would be wise to password protect it so someone with a little knowledge won't be able to find out all of your passwords if you accidentally leave your Apple /// unattended.

### Screen Blanking Utilities

Yet another of the powerful options that BOS brings to your Apple /// is the ability to 'blank' your screen to prevent phosphor burn-in that will cause 'ghosting' of images on your screen. Many of the

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newer computers have sophisticated screen blankers/savers and with BOS your Apple /// now has the same capabilities.

✦ Screen blanking is available only while the BOS Program Switcher menu is being displayed. If you are using a different program there is no way for BOS to know when to blank the screen. Screen blanking requires that your Apple /// have a clock chip for optimum use.

You can have BOS blank the screen after a set period of inactivity (30 to 65520 seconds) or on command by pressing ⌘ B while the BOS Program Switcher menu is being displayed. You can also have BOS randomly run one of the available screen blanking utilities or have BOS run the one you select. This is all setup in the BOS Blanker Options of the BOS Utilities program. If you select this item you will be able to set all of these options.

You can disable screen blanking entirely by pressing 'B' to toggle it ON and OFF. The LEFT and RIGHT arrow keys will adjust the time BOS waits before it automatically blanks the screen (if blanking is ON). To randomly select a blanker to use press 'R' or use the UP and DOWN arrow keys to highlight the blanker you want and press RETURN to select it. The currently selected blanker will be displayed below the blanking ON/OFF message on the bottom right portion of the screen.

Once you've selected the new blanker options press ESCAPE to accept these new options or press ⌘ ESCAPE to exit without changing the blanker options.

You can have up to 26 different assembly language screen blankers and up to 26 Business Basic screen blankers. The format for screen blankers is described in the *Advanced Techniques* section later in this guide.

### Advanced BOS Program Switcher Options

If you are working on a shared hard disk system you may periodically need to reload the information in the disk cache. You can do this from the BOS Program Switcher menu by pressing ⌘ C. If you don't have any disks configured to cache this command will have no effect.

You can force the BOS screen blanker ON by pressing ⌘ B while the BOS Program Switcher menu is being displayed.

You may want to break for lunch and not have anyone use your Apple ///. If you are using a startup password you could turn your Apple /// off and nobody could restart it unless they knew your password or you could just press ⌘ P while the BOS Program Switcher menu is being displayed. If you have entered one, this will cause BOS to ask for the startup password regardless of if you have startup passwords on or off. Thus, you could 'lock-up' your Apple /// while you were at lunch to prevent unauthorized use.

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If you press ⌘ M while the BOS Program Switcher menu is being displayed, a list of the currently used memory segments will be displayed. It will be shown in Apple /// segment address notation and is useful for setting up a Ramdisk driver.

Pressing ⌘ 0 through ⌘ 9 will run the items you setup in the Edit Menu portion of the BOS Utilities program to be in the 'Quick-List'.

The item with a display name of 'Quit' will prepare the Apple /// to be shut down. You can give it any valid menu display name such as 'Shut it off' or anything else by editing the display name in the edit menu portion of the BOS Utilities program. Note that if you ever accidentally delete the 'Quit' option just enter a new program and enter 'QUIT!' into the PROGRAM file field. This signals BOS to prepare to be turned off rather than to switch to another program.

### Advanced Techniques to help Avoid Memory Defragmentation

BOS has a special feature to help you gain the largest amount of free memory for your programs by eliminating the memory fragmentation effect. This feature will only work with some programs but it is useful for squeezing the last byte of memory from the Apple ///. SOS, Catalyst and Selector all load interpreter programs in the highest available bank in memory. This can result in memory fragmentation as described previously.

BOS allows you to force the interpreter to be loaded into bank 0. This results in a worst (or best depending on how you look at it) case scenario of gaining up to 31.75K of memory lost due to the fragmentation affect. Not all programs will work with this option which is why it isn't the way BOS switches to all interpreters.

Any program that requires graphics can't be run from bank 0 since that's where graphics memory is located. All Pascal programs refuse to run from bank 0. Basic programs that don't use graphics work perfectly from bank 0. /// E- Z Pieces and VisiCalc work very nicely when run from bank 0 but Advanced VisiCalc locks the system up if you try and run it from bank 0. AppleWriter 4 won't work from bank 0, neither will Go Back. Disk Directory File Fixer /// (DDFF3) will run from bank 0. The easiest way to see if a program will run using this option (or give you more available memory) is to try it as you can't damage anything by trying.

Bank 0 loading of a program is accomplished by putting a '0' as the first character of the program file pathname. Simply run the BOS Utilities program and use the edit menu option to change the program file pathname item of the program you want to run from bank 0.

### BOS Technical Details

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As you may imagine, the development of BOS has been a very large project. For compatibility with the majority of Apple /// programs many of the internal locations inside BOS are the same as SOS 1.3 and SOS 1.3(S). BOS provides a number of enhancements over the earlier versions of SOS and they are presented below.

BOS takes the highest available bank of memory and reserves it to hold the program switcher, cache, spool and screen blanking handlers. Drivers are loaded in the next bank down in memory. During the startup process the event queue is disabled until after BOS sets up the cache. This allows drivers such as .DESKTOPMANAGER to load in after the cache, speeding its loading time and for drivers such as the .RAM driver to be able to obtain the memory that it needs to operate without interfering with the cache manager.

Note that if you are using the .RAM driver you should first setup any disk cache that you want to use, then check the memory usage from the BOS Program Switcher main menu by pressing ⌘ M and then setting up the ramdisk below the memory the cache manager uses. Otherwise there will be a conflict and the .RAM driver will not be able to function properly. If you make changes to your cache configuration you may have to change the .RAM driver to take memory from a different place so use the .RAM driver with care if you also use the disk cache feature of BOS.

The BOS initialization code also checks for and patches the .DESKTOPMANAGER driver so it doesn't 'step on' memory reserved for disk caching.

BOS adds a few new defined items to the SOS/BOS global page (\$1900). The ones which are new are defined below.

```
BOS_Spooler .EQU 1937 ;Vector to the BOS spooler entry point. Called by .SPOOL driver.
CACHELIST .EQU 19DE ;Device cache information (24 consecutive bytes)
                    ;Lower nibble = (bitmap blocks-1) -- If '0' the device isn't cached.
                    ;Bit 7 = Cache type
                    ;      1 = (Cache main directory/bitmap and subdirectories)
                    ;      0 = (Cache main directory/bitmap)
                    ;Bit 6 = 1 means it's a type 3 cache (takes precedence over bit 7)
```

### **BOS Screen Blanker Information**

BOS loads and executes screen blankers located in the DATA/ subdirectory on the disk where you have installed BOS. The blankers are named BLANK.A through BLANK.Z. They are loaded in at \$A000 and may be up to 6K long. They run in an assembly language interpreter environment and may use the lower half of zero page (\$00-\$7F). To add a new assembly language screen blanker, copy it to the DATA subdirectory with the next name in the sequence BLANK.A to BLANK.Z and

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then run the BOS Utilities program and select item #8 - BOS Blanker Options to let BOS know that there is a new screen blanker available.

The first instruction must be a JMP to the beginning of your code. The next byte must be the length of the name of the blanker (up to 16 characters) and the name itself immediately following the length byte.

Upon entry the .CONSOLE driver is open and the .CONSOLE driver reference number is located on zero page location \$B8. \$B9 contains the device number for the .CONSOLE driver. \$BA holds a random tic counter from 0 to the max blanker available. \$BB-BC holds a 16 bit tic counter. Location \$2096 of the currently switched in bank holds a word (16 bit) counter that should be zeroed upon a keypress so a blanker isn't immediately rerun after your blanker exits.

Screen blankers should exit with a simple RTS. You can also do a SOS Terminate call if you desire. Your blanker is guaranteed to have at least 64K of memory available starting in banks 0 and 1. If you want to use it your program should allocate it via a memory manager call and release it when finished. Likewise if you open any files you should close them before exiting but be sure to not close the .CONSOLE driver or to inadvertently do a global close all. Note that if your program changes the bank register it should restore it upon exit.

If you are going to use graphics space be sure to set bit of SCRNMODE (\$1906) to indicate you are using graphics and also setup GRAFMEM (\$1907) with the number of pages of graphics memory you are using. The .GRAFIX driver will fail to operate unless you follow these guidelines.

Business Basic screen blankers are located in the DATA/BAS.B/ subdirectory with the names BAS.BLANK.A through BAS.BLANK.Z. To add new Business Basic screen blankers save your blanker with the next available name such as BAS.BLANK.B... and change line #100 of the HELLO program in that subdirectory to indicate how many Business Basic screen blankers you are using. The supplied program randomly selects a Business Basic screen blanker but you can change the HELLO program in any way as long as you issue a BYE or END statement when your blanker is finished operating to return control to the BOS Program Switcher.

Below is the source code for the 'Blackout' assembly language screen blanker included with BOS. You should use the Apple /// Pascal assembler to assemble it and then the MAKEINTERP program to remove the Pascal header blocks, just as if this was an interpreter program.

```
; =====  
; BOS Screen Blanker                               Written by: Bob Consorti  
; -----  
; (c) 1993 by Bob Consorti: ON THREE, Inc.        Version 0.a1  
; -----  
; This blanker does a simple screen blackout and waits for the user to press  
; any key before waking up, restoring the screen and returning to BOS.  
; -----
```

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```
; Started: Sep-05-93      Last modified: Sep-17-93
;
; Sep-17-93: Converted to Apple /// TLA format.
; =====
;
; .ABSOLUTE
; .PROC   BOS_Blanker_A
;
; .ORG    0A000                ;BOS Aux files are loaded here
;
; JMP     Begin                ;And it jumps to here
;
; .BYTE   08                    ;Length of the following string
; .ASCII  "Blackout"
;
; =====
;
; General equates follow
;
; =====
Status      .EQU    082          ;SOS Device Status call #
Control     .EQU    083          ;SOS Device Control call #
;
Read        .EQU    0CA          ;SOS File Read call #
Write      .EQU    0CB          ;SOS File Write call #
;
Sec_Count   .EQU    2096         ;Global second count in the
;                               ;switcher bank
;
; =====
;
; Zero page equates follow...
;
; =====
Glob_C_Ref  .EQU    0B8          ;Global console ref #
Glob_C_Dev  .EQU    0B9          ;Global console device #
;
Tic_Small   .EQU    0BA          ;Random tic counter from 0 to
;                               ;the max random blanker
;
Tic_Counter .EQU    0BB          ;Word random counter
;
; =====
;
; Macros follow
;
; =====
;
; .MACRO   ClrPort
; .BYTE   28.
; .ENDM
;
; .MACRO   ResetViewPort
; .BYTE   01.
; .ENDM
;
; .MACRO   SOS
BRK
; .BYTE   %1
; .WORD   %2
; .ENDM
```

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```

; =====
B1_Data      ResetViewPort      ;Open to the full screen and
              ClrPort            ;clear it

B1_Len  .EQU  *-B1_Data

Blnk_List  .BYTE  03
W_Ref_01   .BYTE  00
              .WORD  B1_Data
              .WORD  B1_Len

; =====

Strobe     .BYTE  04
Input_R2   .BYTE  00
              .WORD  KeyPress
              .WORD  0001
Strobe_Count .WORD  0000

KeyPress   .BYTE  00

; =====

Get_A_Key   SOS      READ,Strobe
              LDA      Strobe_Count
              BEQ      Get_A_Key

              LDA      #00          ;Clear our timer so the blanker
              STA      Sec_Count    ;doesn't immediately call us on
              STA      Sec_Count+1  ;exiting

              LDA      KeyPress     ;Load the key and exit.
              RTS

; =====

Begin       LDX      Glob_C_Ref     ;Setup the reference #'s
              LDY      Glob_C_Dev
              STX      W_Ref_01     ;For clearing the screen
              STX      Input_R2     ;For getting a keypress

              STX      FS_O_Ref     ;To open the screen up
              STY      S_S_Dev      ;To save/restore the status list
              STY      S_P_Dev      ;To save/restore the screen

              SOS      STATUS,S_S_List ;Save the status table
              SOS      WRITE, Sel_FS_Open ;Open to the full screen
              SOS      STATUS,S_P_List ;Save the viewport

              SOS      WRITE,Blnk_List ;Blank the screen

              JSR      Get_A_Key     ;Wait for a key and exit...

              SOS      WRITE, Sel_FS_Open ;Open to the full screen
              SOS      CONTROL, S_P_List ;Restore original screen
              SOS      CONTROL, S_S_List ;Restore the console status

              RTS                    ;All done!

; =====

```

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```
S_S_List      .BYTE    03
S_S_Dev       .BYTE    00
               .BYTE    01                ;Save status list
               .WORD    Stat_List

Stat_List     .BYTE    90.
               .BLOCK  90.,00            ;90 byte buffer

S_P_List      .BYTE    03
S_P_Dev       .BYTE    00
               .BYTE    18.            ;Preserve viewport
               .WORD    FS_Buf

FS_List       .EQU     *

ResetViewPort                ;Open screen to full size

FS_Len        .EQU     *-FS_List

Sel_FS_Open   .BYTE    03
FS_O_Ref      .BYTE    00
               .WORD    FS_List
               .WORD    FS_Len

; =====

FS_Buf        .EQU     *                ;Leave enough room for a full
                                       ;screen (80x24)+3 (1923 bytes)

; =====

               .END
```