THE SNAPSHOT SHUTTLE

A Multi-tasking System for Apple II, II+ and //e by Bob Sather

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Contents

Section	Title/Subject	Page
1.	Overview	
2.	Getting Started	
	Backing up the Shuttle disk	i
	The Shuttle configuration system	ii
	Configuration for the Apple II+	ii
	80-column card configuration	iii
	Configuration for the Apple //e + 64K	iii
3.	Exploring the Shuttle Screens	
	Selecting a workspace	i
	Moving around the Menu	i
	Selecting options	ii
	Returning to the Menu Screen	ii
4.	Using the Shuttle Menu Options	
	Booting a disk	i
	Setting the video mode on the Apple II+	i
	Resuming a program	ii
	Programs larger than 64K	ii
	Dealing with multi-access programs	iii
	Saving "screen-memory"	iii
	80-column programs on the Apple II+	iv
5.	Trouble-shooting	
	Compatibility	i
	Testing the Snapshot system	i
	Interrupt/resume test	i
	Snapshot hardware test	ii
	Technical service	ii

1. Overview

The Snapshot Shuttle lets you use several programs at a time without the need to swap disks or reboot. It is the most effective and least expensive method of adding multi-tasking capabilities to your microcomputer.

Before the Shuttle became available, you were forced to buy expensive and complicated concurrent operating systems or integrated software if you wanted your computer to perform more than one task without the hassle of a lot of disk shuffling. Now, the Shuttle gives you all the advantages of multi-tasking with the software that you own - and know how to use - already.

The Shuttle can be used to load your data-base, spreadsheet, communications package and word-processor (or any other combination of programs) into your computer and instantly switch back and forth between them. You can suspend a letter to look up an address in the data-base or to take an incoming message from the modem, then resume the letter at the exact point of interruption without touching a single floppy disk.

If you use both CP/M and Apple-DOS programs, they will happily co-exist within the Shuttle system. You will no longer be forced to close down a program which uses one operating system in order to run a program which uses another.

The Shuttle will work with virtually all Apple-compatible programs whether they are copy-protected or not. It requires an Apple II+, //e or compatible with at least one floppy disk drive and a hard disk or a minimum 128K RAM. If no hard disk is installed, 64K RAM is needed for every program loaded into the computer at any one time. This RAM can be provided by any standard memory expansion card (e.g., Saturn/Titan, Ramex, Apple //e extended 80-column card etc.).

2. Getting Started

It seems to be axiomatic in the world of personal computing that manuals are read only as a last resort. While we make every effort to ensure that our products are as easy to use as possible, this manual does contain essential information and you should have it close by when you get your first "hands-on" experience with the Shuttle.

This manual assumes that you have already installed your Snapshot card in your computer. If you have not, please do so before proceeding further. (If necessary, refer to the installation instructions which accompany the Snapshot card.)

If you don't know which slot(s) you are using for your extended memory card(s), you should remove the cover from your computer and make a note of its (their) location. You will need this information when you configure the Shuttle for your system.

Before using <u>any</u> program, it is important to back it up if possible. Your Shuttle disk is not copy-protected in any way, so the first thing to do is copy it using the "COPYA" program on your DOS System Master or a similar copying utility.

If you have 2 drives, you can use the copy program supplied with the Shuttle. Insert the Shuttle disk in Drive 1, boot it up and, after a few seconds, a screen message will appear. Ignore it for now. Instead of answering the on-screen question, simultaneously press the <CTRL> and <RESET> keys on your computer keyboard to bring the "]" cursor on-screen.

(Incidentally, it's worth noting for future reference that whenever single-key keyboard commands are referred to in this manual, they are written between the "<" and ">" symbols - like <CTRL> and <RESET> in the previous paragraph - to differentiate them from instructions which you are required to type in full.)

Now that you are in BASIC, you can now call up a program on the Shuttle disk which is similar to the COPYA utility on Apple's DOS 3.3 System Master. To do so, type BRUN DISKCOPY <RETURN>. Your screen should then display something like this:

```
INSERT SOURCE DISK IN SLOT 6 DRIVE 1

INSERT TARGET DISK IN SLOT 6 DRIVE 2

FORMAT TARGET DISK? (Y, N, Q)
```

Your "source" disk, in this case, is the Shuttle disk and this is already in place in Drive 1. Place a blank disk in Drive 2 and press "Y" to start copying. We recommend that you make at

least 2 backups of your Shuttle disk to start with.

When you have made your copies, put your original disk away for safe keeping. Now, put a backup of the Shuttle in drive 1 and boot it up for configuration to your system.

The Shuttle Configuration System:

Whenever you boot up a Shuttle disk for the first time, the configuration program will run automatically. Once you have entered details of your system and that information has been saved to disk, the Shuttle will automatically load itself into your Snapshot card each time you boot it. If, in future, you wish to alter your configuration, press <ESC> while the disk is booting. This will automatically load the configuration data and you can reconfigure the Shuttle as necessary.

Configuration for the Apple II+ and compatibles:

If you own an Apple //e with an extended 80-column card, you should skip to the section (below) which deals with the Shuttle's configuration for your system. If you have any other kind of computer (including a //e with a "RAMless" 80-col. card), read on.

The Shuttle assumes that your computer has a basic memory of 64K RAM. For owners of the Apple II+ and imitations thereof, this means having a Language/16K RAM card in Slot 0. If you don't have one, you must get one in order to use the Shuttle, even if you use Slot 0 for a larger RAM card at present.

When the Shuttle first boots, your screen will display a numbered list of RAM cards. Below it, an illuminated line will read: "SLOT = 1" and you will be asked if you want the Shuttle to use RAM in that slot. We don't assume that you want it to use all your RAM cards because you may want to assign the memory in one of your slots for some other purpose (e.g., an "expanded" spreadsheet).

If you answer "Yes" (Y <RETURN>) when asked if you want the Shuttle to use the RAM in a particular slot, you will then be prompted to enter the number from the on-screen list which corresponds to the type of card you have. If your card is not listed, it is probable that it is a Saturn-type memory expansion and you should therefore enter the number for the Saturn 128K card.

When you have entered the type of RAM card you wish the Shuttle to use in a particular slot, or if you have answered "No" to the original question, you will be asked if you want to use a RAM card in the next slot. This process is repeated until all the slots have been "set up". When you have been through all the slots, you will be told how many 64K "workspaces" you have

available for storing individual programs and asked whether the entered data is correct. (Typing N <RETURN> will send you back to the beginning of the configuration program.)

80-Column Card Configuration:

Assuming that you have assigned the RAM slots correctly, the screen will display a list of 80-column cards and you will be asked to enter the number corresponding to the type of card you have installed.

If you don't have an 80-Column card, select number 1. If you own an Apple //e, the chances are you have an Apple //e 80-Column card. By that, we mean any 80-Column card (with or without extra RAM on board) which sits in the //e's auxiliary slot 3. If yours is one of these, press 2 <RETURN>.

Apple II+ and compatible owners are likely to have one of the others. If your 80-Column card is not one of these, you shouldn't worry too much. Most 80-column cards are copies of one of those in our list. Try configuring for one of them and, if you find later that the Shuttle doesn't handle 80-Column screens properly, give another one a try. If none of these cards appears to work satisfactorily, select the "OTHER 80-COLUMN CARD" option for now and get in touch with the people at Dark Star Systems' Technical Department. They will be very pleased to help you out if it's within their power.

Configuration for the Apple //e with extended 80-column card:

When you boot the Shuttle disk, the screen will display a message which asks you if you have any additional RAM cards. If you answer "No" (N <RETURN>), the Shuttle will give you 2 x 64K "workspaces" and load itself into the Snapshot card.

If you do have extra RAM, responding with Y <RETURN> will display a numbered list of RAM cards on-screen. Below it, an illuminated line will read: "SLOT = 1" and you will be asked if you want the Shuttle to use RAM in that slot. We don't assume that you want it to use all your RAM cards because you may want to assign the memory in one of your slots for some other purpose (e.g., an "expanded" spreadsheet).

If you answer "Yes" (Y <RETURN>) when asked if you want the Shuttle to use the RAM in a particular slot, you will then be prompted to enter the number from the on-screen list which corresponds to the type of card you have. If your card is not listed, it is probable that it is a Saturn-type memory expansion and you should therefore enter the number for the Saturn 128K card.

When you have entered the type of RAM card you wish the Shuttle to use in a particular slot, or if you have answered "No" to the

original question, you will be asked if you want to use a RAM card in the next slot. This process is repeated until all the slots have been "set up". When you have been through all the slots, you will be told how many 64K "workspaces" you have available for storing individual programs and asked whether the entered data is correct. (Typing N <RETURN> will send you back to the beginning of the configuration program.)

Once the configuration data has been saved to its disk, the Shuttle will ask you the number of the slot in which the Snapshot card sits. After you have pressed the appropriate key, the Shuttle will boot itself into the Snapshot RAM and ask you to press the trigger. When you do so, the Shuttle menu will appear on screen.

3. Exploring the Shuttle Screens

Let's take a moment to examine the screen before we continue. As you can see, it's divided fairly equally into two halves by a broken line which runs across its width. The top half of the screen is occupied by a list of options. We will refer to this half of the screen in future as the "Menu Screen".

The lower half of the screen is empty now, but whenever you instruct the Shuttle to do something, it will display messages which let you know if it needs more information or tell you what it expects you to do. For the purposes of our tutorial, we will refer to this half of the screen as the "Message Screen".

Looking at the Menu Screen, you will notice that the top line is composed of numbers only. There will be at least 2 of them and possibly more.

These numbers denote the "workspaces" which are available within the Shuttle for use by your programs. When we refer to a work-space, we mean one 64K block of memory. A workspace will obviously be capable of containing any program up to 64K in size. If you own an Apple //e with an extended 80-column card and you want to use a 128K program with the Shuttle, you will need to leave two work-spaces available for its use.

Selecting a workspace:

You can see that the figure 1 at the top of the Menu Screen is illuminated. Try pressing 2. All being well, the Message Screen will display a "PLEASE WAIT" message for a short while and the number 2 at the top of the Menu Screen will light up. The contents of Workspace 1 have now been "shuttled" to one of your RAM cards while the contents of Workspace 2 have been transferred to your computer's motherboard RAM. (At the moment, you won't have anything of worth in these workspaces, but when they actually contain programs, the value of this "shuttling" process will become very clear.) If you have a third - or even a fourth - workspace available, try pressing 3 or 4. This will give similar results.

It really is as simple as that. When you want to switch from a program in one workspace to a program in another, or boot or load a program into a particular workspace, you just press the appropriate number. (We'll deal later with how you are able to tell what program occupies - or is going to occupy - a workspace.)

Moving around the Menu:

The next line of the Menu - the "BOOT A PROGRAM DISK" option -

is illuminated by a cursor. Try pressing the left-arrow key (i.e., the <- key) and see what happens. The last option from the Menu Screen - the "SET SHUTTLE DISK DRIVE" option - should now be illuminated. Press the left-arrow key a few more times and note how, each time it is pressed, a different option is highlighted. The right-arrow key sends the cursor in the opposite direction.

Selecting options:

Now you know how to move around the Menu, selecting one of its options is easy. You simply press the <RETURN> key. Move to the last option on the Menu Screen - the "SET SHUTTLE DISK DRIVE option - and try pressing <RETURN>. You'll see that a question is displayed on the message screen.

Returning to the Menu Screen:

Ignore what's on the Message Screen for the moment and press <ESC>. The option selection cursor should reappear on the Menu Screen and the Message Screen should be empty again.

Let's just summarize what we have learned so far:

1. You select a workspace by pressing its number.

2. You move to an option on the Menu with the left- and right-arrow keys.

3. You select an option from the Menu by pressing <RETURN>.

4. You return to the Menu Screen by pressing <ESC>.

4. Using the Shuttle Menu Options

You should now be familiar with the way in which the various options from the Shuttle Menu are selected. The next thing to do is try booting or loading a program into each of the available Shuttle workspaces. For the moment, try to choose small, simple memory-resident programs which only use the 40-column screen of your computer. That way, you can get used to operating the Shuttle one step at a time. (When we talk about programs being "memory-resident", we mean that they don't need to use their disk again once they are in your computer's memory. Programs which constantly look at their disk(s) while running are referred to in this manual as "multi-access programs".)

You needn't be influenced in your choice by the operating system a program uses. The Shuttle doesn't discriminate, and it will happily work with DOS 3.3, Pascal, ProDOS and CP/M programs all at once.

Booting a disk:

It doesn't matter which one happens to be active at the moment; you don't have to use the available workspaces in any particular order. Move to, and select the "BOOT A DISK" option. (You'll notice that the workspace referred to in the option line is the one that is currently active.) This option is the means by which the Shuttle allows you to boot a disk and you should <u>never</u> use any other method of booting while you are using the Shuttle.

Remove the Shuttle disk from drive 1 (if you haven't already done so) and insert your first program disk. Enter the name of the program as prompted. (You are allowed a name of up to 9 characters in length. You can enter more characters than this, but only the first 9 will be accepted and displayed.) Answer each of the questions which appear in the Message Screen in turn and the disk will eventually boot. When you have your program up and running, interrupt it by pressing the Snapshot trigger.

Setting the video mode on the Apple II+ and compatibles:

If you own Apple //e only, you can skip this bit and go on to the "Resuming a program" section below.

Before the Shuttle can resume running a program, an important bit of information it needs is the proper setting of the video screen "soft switches". These are memory locations that control whether the screen is showing text or graphics, graphics page 1 or page 2, etc.

When you use the Shuttle with an Apple II+ or compatible, it

will have a Menu option entitled "SET VIDEO MODE". Select it and use the arrow keys as instructed to "flip" through the various graphics and text screens until you come to the one that was displayed at the time of interrupt. Press <ESC> to get back to the Menu. (This entire process is automatic on the Apple //e and, consequently, there will be no SET VIDEO MODE option if you use the Shuttle on that computer.) It is essential that owners of II+-type computers set the video mode immediately after interrupting a program for the first time (unless it uses the 80-column card - see below).

Resuming a program:

Now, select the "RESUME RUNNING" option to check that your program has not been adversely effected by its temporary suspension. It should resume running from the exact point of interruption. Press the Snapshot trigger to return to the Shuttle Menu and type the number of an empty workspace.

Repeat the procedure described above until all the available workspaces are occupied. You should now be able to switch from one program to another by simply interrupting one, typing the number of the workspace occupied by another and then selecting RESUME. Each switch can be accomplished in just a few seconds and, providing the programs you are using are memory-resident, you don't need to touch another disk for the rest of the session. (See below for instructions on dealing with multi-access programs.)

If you are a Snapshot Copykit owner, it is very likely that you will be working with backups rather than your original program disks. For you, we have provided a "LOAD A BACKUP DISK" option which is functionally identical to that on your Copykit menu. Use it instead of the BOOT A DISK option but, remember, it will work only with Copykit backup disks. (If you were to use the BOOT A DISK option with Copykit backups, you would erase the Shuttle software from the Snapshot card when you told the backup what slot it was in. So, with backups, always use the LOAD option.)

Programs larger than 64K:

Apple //e users who own an extended 80-column card will almost certainly have one or two 128K programs. If you are one and you do, you can use them with the Shuttle as well as your smaller programs.

When you boot or load a program, you are asked whether it will use 64K or 128K. If you select the latter, the Shuttle will look at available memory to make sure there is enough room for it. As long as you have an empty workspace additional to the current one available, it will be earmarked for use by the second 64k of your 128K program. If you don't, you will have to use the "CLEAR

WORKSPACE" option to erase one of the other programs in the Shuttle system before you can continue.

It doesn't matter which 2 workspaces you use to hold a large program. You can utilise 1 and 4, 2 and 3, 1 and 3 or whatever. The current workspace will be designated as the one which contains the 128K program and it will be marked with an asterisk to differentiate it from its fellows. The number of the work-space containing the second half of the program will disappear from the Menu Screen.

Owners of Apple II+ and compatible computers do not usually enjoy the option of running programs larger than 64K because these generally require the presence of an "extended" 80-column card. However, there are some utilities which "expand" spread-sheet programs so that they can use large memory cards. If you have one of these, you can still use it with the Shuttle providing you have the memory available. Here's how:

When you tell its configuration program what RAM cards you want the Shuttle to use, omit the RAM card that your "expander" program uses. Specify only that RAM which you want the Shuttle to use. When you boot up the spreadsheet expansion software from the Shuttle Menu, it will ask you where the RAM that you want it to use is located. Specify the RAM card which the Shuttle is not using. Doing so will ensure that the Shuttle will only move around that part of the program which it knows about (the first 64K) and leave the rest of it alone.

Dealing with multi-access programs:

A program which does not load all at once and repeatedly refers to its disk for more information is called a multi-access or a multi-load program. During a session with such a program, you have to leave its disk in the drive. Consequently, when you come to resume running such a program, you will need to ensure that its disk is in place. If you do not, the program won't be able to access essential data from the disk and it may well crash.

Saving "screen-memory"

Because of the way in which Apple-compatible 80-column cards store screen-data, a program which is nominally 64K or 128K in size is, in fact, 66K or 130K. The extra 2K sits in the RAM of your 80-column card and contains what we call "screen-memory".

When you switch out of a workspace containing a program which uses this screen-memory, the shuttle quickly scans through that program looking for a space into which it can tuck the contents of the 80-column card RAM. Nine times out of ten there is ample room available within a program for this purpose. There are, however, exceptions and, if yours is one of these, you will be asked to place a Shuttle disk in the currently specified drive

onto which the contents of screen-memory can be dumped. (It is generally a good idea to select the "SET SHUTTLE DISK DRIVE" option and switch to drive 2 so that you can leave the Shuttle disk permanently in place in that drive for dumping and loading of screen-data.*)

Be sure that you have removed the write-protect tab from your Shuttle disk when you use it for saving screen-memory!

When you switch back to a program that has its screen-memory saved on disk, you will be asked to insert the Shuttle disk in the currently specified drive so that the screen-memory that it contains can be re-loaded into your 80-column card.

* Note that the BOOT option always uses drive 1 but the LOAD A BACKUP option uses the specified Shuttle drive.

80-column programs on the Apple II+ and compatibles:

If you have an Apple II+ or compatible and your 80-column card was not on our configuration list, odd things may happen to the 80-column text screen when you try to interrupt and resume programs which use it. The problem is caused by the unique way in which each brand of card stores the information needed to generate the 80-column screen. There is no standard method (except for Apple //e computers) and no way in which we can provide software which will support all the different cards on the market.

We may be able to help you overcome this problem if you are willing to help us. Get in contact with our Technical Department directly if you wish to give it a try. Otherwise, you may still be able to use the Shuttle with most programs which utilise the 80-column card.

No matter what 80-column card you have, you may encounter difficuties when you try switching from your program's 80-column display to the Shuttle's menu (which is in 40 columns). Try booting your program from the Shuttle menu in the usual manner. Once it is running, interrupt it by pressing the Snapshot trigger. The Shuttle will display its menu on the 40-column screen, but you may not be able to see it because the 80-column card is still showing the 80-column screen.

Depending on which card you own, you should be able to get the Menu on-screen. Some manufacturers (e.g. Videx) will supply a switch which mounts onto the back of the computer and allows you to enable the 40-column screen without the need for plug-pulling. Simply use this switch to view the Shuttle menu. If you don't have a switch, unplugging the monitor from the 80-column card lead and plugging it into the the video output jack at the back of the computer will have the same effect. If all else fails, try pressing <CTRL><RESET>.

Once you have the Menu on-screen, skip "SET VIDEO MODE" and go straight to the "RESUME" option to test whether or not the program will resume okay. (There is no need to set the video mode, because you have already told the Shuttle that your program uses the 80-column display.)

Upon resumption of your program, you may have to re-enable the 80-column card by reversing the step(s) you took to display the Shuttle Menu.

When you return to an 80-column program having switched from one in another workspace, you should be able see it running from the point of interruption. However, if your 80-column card is not one of those that the Shuttle recognizes, the text which was on the screen at that time may be lost. This is unavoidable. 80-column cards have their own on-board RAM to store the 80-column screen. Unless it supports your particular card, the Shuttle has no way to read that RAM and save the screen-memory.

Don't worry! Just because the screen-memory is lost doesn't necessarily mean that the information that was in it has gone forever. It's likely that there's a command which will make your program redraw the screen. If the program in question is a word-processor, a command which changes menus will usually do it. With ZARDAX, for example, <ESC> M will do this. Check your program's manual for the correct sequence of keystrokes.

Finally, here are the "3 Golden Rules" which you will need to remember for successful operation of the Shuttle:

1. Always use the BOOT option from the Shuttle menu to start up a program from its original disk. Never use any other means.

2. Always use the LOAD option from the Shuttle menu to start up a Copykit backup, never the BOOT option.

3. If you make a mistake and one of your programs "hangs" or "freezes", don't press the Snapshot trigger. Press <CTRL> <RESET> first, or you may freeze the Shuttle as well.

5. Trouble-shooting

Compatibility:

The Snapshot Shuttle is compatible with almost all Apple-compatible cards and hardware. The only exception is the Accelerator card (which, unfortunately, is compatible with hardly anything). If you have one, make sure it is disabled or removed.

When this manual went to press there were, to our knowledge, no Apple-compatible software packages which would not work with the Shuttle. If you find one that you can't operate properly with our system, please contact our Technical Support Department as soon as possible.

Testing the Snapshot system:

If you find that the Shuttle just won't run, try, try again. Reread the tutorial to make sure you are following the instructions. If you have already used the Shuttle with some success, it is very unlikely that anything is wrong with the Snapshot system. Remember, 90% of all problems can be resolved by carefully reading this manual.

If the Shuttle normally works well but cannot on occasion be activated, or it activates spontaneously or gets confused, check your hardware. The most likely causes of hardware problems are interference from other electrical equipment via the power lines, an improperly seated card in one of the peripheral slots, or the Snapshot trigger having been accidentally pressed before the Shuttle was loaded into it.

If you suspect that the Shuttle software or Snapshot hardware is responsible for a problem, you can test both with the help of programs on your original Shuttle disk.

Before you do anything else, eliminate potential sources of trouble by removing every all the other peripheral cards from your computer apart from the Snapshot card itself and the disk drive controller. Some computers, especially older Apple II+s, can behave somewhat unpredictably when loaded with large or unusual cards. This is because a fully loaded Apple II+ is at the limit of its reliability. Even swapping slots may have an unpredictable affect.

Interrupt/resume test:

The first test determines whether or not the Snapshot card is interrupting and resuming programs properly.

Turn on the computer and boot the Shuttle disk. Press the Snapshot trigger and the Shuttle menu will appear. Using the arrow keys, move the cursors to the first "Load" option. Press the <RETURN> key, and the test program will load. Move the cursors to the "Resume" option and press the <RETURN> key. The test program will run, slowly repeating sentences on the screen.

Press the Snapshot trigger again. The Menu should reappear.

Press the <RETURN> key again. The test program should resume running. Alternately press the trigger and the <RETURN> key (but do not hold down either one). This should switch back and forth between the Menu and the test program, which should continue printing text on the screen.

Snapshot hardware test:

The second test will ascertain whether or not your Snapshot card is functioning correctly.

Take your original Shuttle disk and place it reverse side up in Drive 1. Boot it up and enter the number of the slot in which your Snapshot card sits when prompted to do so. Press the Snapshot trigger and observe the display. If a "NO ERRORS" message appears, repeat the procedure a few times to ensure consistency.

Any errors in your Snapshot card will be displayed on-screen. Make a note of the error number(s) and any digital codes displayed alongside.

Technical service:

If you have installed the Snapshot hardware correctly, are confident that your computer and disk system are both working correctly, and have carried out the test procedures, and the Snapshot system does not work as described, please contact your dealer or Dark Star Systems for technical assistance.

If you need to return your Snapshot system for servicing, you must send it to the supplier from whom you purchased it. If it's sent to Dark Star Systems, a Returned Merchandise Authorization number must be assigned beforehand. This can be obtained from Dark Star Systems' Customer Service Department by writing or telephoning. Unauthorized returns will not be accepted.

You can backup your essential software

Even if you are an experienced computer professional, you cannot be sure you will never accidentally corrupt or erase your original program disks. And, of course, disks have been known to wear out!

If you are lucky, a damaged disk may mean weeks, sometimes months, of waiting for a costly replacement. If you're not so lucky, the company which produced the program you rely on has gone out of business.

The only effective way to safeguard your software investment is to make backups, but software protection makes this difficult. That's why thousands of Apple users around the world, from multi-national corporations to backroom hobbyists, have invested in some protection of their own – the Snapshot Copykit.

The Snapshot Copykit is a powerful, fast and (dare we say it?) "user-friendly" system that enables you to copy 'memory-resident programs. It takes around 11 seconds to backup a program which uses 64K of RAM, and 25 seconds for one which uses 128K. When the copying process is complete, you have an unprotected, bootable disk containing a working copy of your "protected" software.

Copykit backups are made up of binary files which can be easily transferred to other storage media like hard-disk, 8" disk, 3.5" disks, 80-track disks, and even bubble-memory.

If you just have standard Apple disks, you can use the Copykit's highly efficient compression option to reduce the amount of space your programs take up. That leaves you room to keep several different programs on a single floppy.

But making backups is just the beginning! With creative use of the Copykit, you can:

- *Inspect and modify off-the-peg software to suit your own needs*
- *Save hours of loading and saving data files by suspending one program while you run another*
- *Load and save the largest spreadsheets in 25 seconds*
- *Freeze-frame arcade game action, print out high scores and plan strategy*
- *Save your favourite games at hard-to-reach high levels and return to them again and again*
- *Print out any 40- or 80-column text screen or graphics (if you have a graphics card) and resume running your program instantly.*

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You can take complete control of your printer

There are always occasions when the program you are running displays a screen which you would like to keep for reference or include in a print-out produced by another program. It may be a help-menu, on-screen instructions, a graph, bar-chart or just a great picture.

Unfortunately, conventional printing utilities suffer from some major drawbacks. In order to use them with anything other than text or graphic files, you have to be able to suspend work on a running program. The trouble is, there are a lot of protected programs out there which won't allow you to interrupt them by the usual methods; they'll either "freeze" your Apple or simply reboot. Even if you can interrupt a running program to print its display, it's unlikely that you'll be able to resume it at the point where you left off.

The Snapshot Printerrupt, with its automatic interrupt-and-resume features, is the perfect solution to these problems. At the press of a button, it gives you the most powerful set of printing utilities available. Take a look at these features . . .

- *Easy selection of any graphics or text page (including 80-col) for printing*
- *Sophisticated on-screen cropping of graphics or text pages*
- *Independent enlargement up to 8 times of vertical (y) and horizontal (x) axes*
- *Clockwise and anti-clockwise rotation*
- *Inversion and Enhancement*
- *Shading of white or black areas*
- *Auto-centering, and left and right margin setting in any density*
- *Chart recorder mode*
- *Quick changing of international character sets and fonts*
- *Single key-press resumption of interrupted program*

The Printerrupt automatically supports all the popular printers, printer-interface cards and 80-column cards. If your equipment is unusual, Dark Star Systems offers a unique, free configuration service which will get your Printerrupt up and running.

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Your Apple can do more than one job at a time

No matter what you use your computer for, the chances are that you need to switch between several different tasks many times during the course of a typical working day. Repeatedly closing down your current program, booting another and then finding the place where you left off wastes your valuable time and disrupts your flow of work.

Lumping several different applications together on the same disk doesn't always solve the problem. So called "integrated" programs don't necessarily combine the applications you want and, even if you find one that does, it won't give you the sort of power that you're used to. Besides, you have probably invested a great deal of time, money and effort in getting to grips with the programs you use now; do you really want to start all over again with something completely different?

The Snapshot Shuttle is a multi-tasking system which allows you to combine the applications which you actually want to work with – the ones you own already. So, if you want to interrupt your spreadsheet program to use your modem, or to word-process a letter, or just to zap a few aliens, you can do so without swapping program disks or re-booting. When you want to return to the spreadsheet, the Shuttle can resume it exactly where it was interrupted – instantly. The Shuttle will even let you switch between programs which use differing operating systems like ProDOS, PASCAL, CP/M and DOS 3.3.

You will need at least 64K of RAM for every program you wish to have loaded into the Shuttle system at any one time. This extra RAM can be provided by any standard expansion card (e.g., Ramex, Saturn, Titan, Apple //e extended 80-column etc.)

If you don't have enough RAM at the moment, our RAMrod 128 card gives you 128K of extra memory for about half the cost of its competitors. It comes complete with RAMdisk software and is fully compatible with the popular spreadsheet expansion packages.

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