

THE SNAPSHOT COPYKIT

Program Backup Software by Robert Sather

DarkStar
SYSTEMS

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Contents

Section	Subject	Page
1. Overview		
	Restrictions	11
	Software updates	11
2. Getting Started		
	Backing up the Copykit	1
	The Copykit configuration system	11
	80-column card configuration	11
3. First Steps to Successful Backups		
	Moving around the Copykit menu	1
	Selecting an option from the menu	1
	Returning to the menu	1
	A trial backup	1
	Booting a disk	11
	Interrupting a running program	11
	Setting the video mode	111
	"Dumping" to a Copykit disk	111
4. Digging Deeper		
	Making a screen-dump	11
	Entering the monitor	111
	Specifying another drive	111
	DOS and BASIC functions	iv
	Backing up unprotected disks	iv
5. Making the Most of Your Disk Space		
	BHIGH and BLOW	1
	LOWHIGH	1
	Transferring backup files to other media	1
	Compressing files	11
	Dealing with compressed and uncompressed files	111

Section	Subject	Page
6. Appendices		
A -	Programs Which use the 80-column Card	i
B -	Backing up Multi-Access Programs	ii
C -	Dealing With Disk Latch Protection	v
D -	Making BASIC LISTable	vii
E -	Special Locations The user utility area	viii x
F -	How the Copykit Works	x
G -	Trouble Shooting	xi
	Running backups without Snapshot	xi
	Running backups made on a different computer	xii
	Compatibility	xii
	Testing the Snapshot System	xii

1. Overview

Snapshot is the most useful card, after the disk controller, that you will ever have in your computer. With the Copykit loaded into its 8K of on-board RAM, Snapshot makes it possible to interrupt a running program, examine and manipulate it, save it to disk and resume running it from the point of interruption. The Snapshot Copykit will backup programs that can't be copied by any bit/nibble copier. It is an essential tool for debugging or analysing programs in assembly and other languages.

With the Snapshot Copykit you can:

- Make a backup copy of most Apple-compatible programs. You can back up any memory-resident program up to 128K and many other programs besides.
- Break into, list and examine programs that load from protected disks.
- Move protected programs from 13-sector disks to 16-sector disks.
- Suspend a running program in order to use the computer for something else and then resume your program from the exact point of interruption.
- Move a protected program to hard disk and other disk formats as a binary file.
- Put several backups on one disk, saving expensive disk space!
- List most "unlistable" Basic programs.
- Interrupt a running program, manipulate it (see below) and resume running it from the point of interruption or any other point.

You can manipulate an interrupted program in any of the following ways:

- Disassemble the program in memory to screen or printer.
- Examine or modify the contents of memory and registers.
- Examine the graphics screens in memory: "freeze-frame" a program.
- Dump text- or graphic-screens to your printer.

Restrictions

Programs that require a Z-80 card can only be interrupted by Snapshot during a disk I/O operation or other operation that uses the 6502 micro-processor.

Apple-compatible programs are generally of two types. Most are loaded into RAM by booting or loading from a disk which may then be removed from the drive and put away. The program may allow the user to initialize and use a separate data disk. A program of this type is known as a memory-resident program and poses no problems to the Snapshot Copykit.

A few programs however, require you to leave the disk in the drive during the run. For example, some large "Adventure" games consult their program disk after every move. Some accounting packages load a new program from disk whenever a menu selection is made. Since the Copykit dumps only the current contents of memory to disk, it does not capture that portion of the program that remains on the disk. We call programs of this sort "multi-access programs" and special procedures are required to back them up. (See the Appendix on multi-access programs for details.) Such procedures will present very few problems to the average Apple user.

Software Updates

Members of our technical staff are continually improving the Copykit with new features, often in response to suggestions from existing owners. You become eligible for software updates at a nominal cost by filling in and returning the Warranty Registration that accompanies this manual.

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 as you begin to get your first "hands-on" experience with the Copykit.

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.)

Backing up the Copykit:

Before using any program, it is important to back it up if possible. Your Copykit 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 Copykit. Boot up your DOS System Master and replace it with the Copykit disk in Drive 1. You can now call up a program which is similar to COPYA. To do so, type BRUN DISKCOPY <RETURN>.

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 <RETURN> in the previous paragraph - to differentiate them from instructions which you are required to type in full.

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 Copykit 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 Copykit disk to start with.

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

The Copykit Configuration System:

Whenever you boot up a Copykit 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 Copykit will automatically load itself into your Snapshot card each time you boot it. If, in future, you wish to alter your configuration, boot the disk and press <ESC>.

80-Column Card Configuration:

When the Copykit runs its configuration program, 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 the appropriate number. 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, select the //e 80-column card option.

Apple II+ and compatible owners are likely to have one of the others in the list. If your 80-Column card is not one of these, you shouldn't worry too much. Most Apple II+ 80-column cards are clones of either the Videx Videoterm, the M & R Sup"R"Term or the Vision-80. Try configuring for one of them and, if you find later that the Copykit doesn't handle 80-Column screens properly, give each of the others a try. If none of the configuration files for these cards appears to work satisfactorily, 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.

Once details of your configuration have been saved to its disk, the Copykit will ask you to tell it which slot the Snapshot card is in. It would be as well for you to configure all your Copykit disk backups before continuing. However, if you have made an adequate number of copies at this stage, enter the appropriate number and you will be asked to press the Snapshot trigger. As soon as you do so, the Copykit Menu will appear on-screen.

3. FIRST STEPS TO SUCCESSFUL BACKUPS

Moving Around the Copykit Menu:

Let's take a moment to examine the screen before we continue. As you can see, the Copykit Menu provides many options from which to choose and lists them row-by-row on the screen. You will notice that the first option - the "BOOT A DISK" option - is illuminated by a cursor bar. Try pressing the left-arrow key (i.e., the <- key) and see what happens. The last item on the Menu - the "COPY AN UNPROTECTED DISK" option - should now be highlighted. 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 an option from the Menu:

Now you know how to move around the Menu, selecting one of its options is easy. You simply press <RETURN> when the option you want is highlighted by the cursor bar. It's of no importance where the cursor happens to be right now, try pressing <RETURN>. You'll find that the lower half of the Menu has disappeared altogether and has been replaced with an instruction or a question. The lower half of the screen has become what we call the "Message Screen", and this is the means by which the Copykit obtains from you the information it needs to operate.

Returning to the Menu:

Ignore what's on the screen for the moment and press <ESC>. The full Menu should now be back on-screen. If it's not, try pressing <ESC> again. (Some Copykit options require you to press <ESC> twice to return to the Menu because the first press may be interpreted by your computer as a signal to do something else.)

To summarize:

1. You move to an option from the Menu with the left- and right-arrow keys.
2. You select an option from the Menu by pressing <RETURN>.
3. You return to the full Menu by pressing <ESC> once or twice.

A Trial Backup:

Remove the Copykit disk from your drive and put it to one side. Now, you should select a software disk from your collection to try backing it up. We'll call this the "subject program". For

your first attempts, a simple program like an arcade game is most appropriate. (If you are an Apple II+ owner, it would be better if you didn't for the moment, select a program which uses the 80-column display. We'll get onto dealing with those later.) Better put a write-protect tab on your disk (if it needs one), in case you make a mistake. Now, place it in your drive.

Note that if the program that you've selected is on an old 13 sector disk, you should place the BASICS disk (rather than the program disk) in the drive at this stage.

Booting a Disk

When you're ready, move the cursor to the topmost menu option "BOOT A DISK" and press <RETURN>. The Message Screen should now appear at the lower half of the screen. You will be asked if it is okay to clear memory. (You may have nothing of importance in memory at present, but this kind of "error-trapping" question gives you a chance to cancel your current activity in case you accidentally select a "destructive" option when you don't really want it.)

If you are using an Apple II+, you will also be asked if the subject program uses your 80-column card. (The Copykit can tell if you have an Apple //e 80-column card, and whether or not it's being used.)

The Copykit assumes that your disk drive controller card is in slot 6 unless you specify another slot when you are prompted to do so.

Having given the Copykit the information it asked for, do whatever you would normally do to get your program running. (Many programs will automatically start running after a boot; some, you will have to RUN or get going with a menu selection. It all depends on the program you have chosen to copy.)

The BOOT A DISK option is the means by which the Copykit allows you to get a program running in memory without clearing Snapshot's memory. You should never use any other method to boot up a program which you want to interrupt and resume. Also, it makes sense to use the Copykit method of booting if, like us, you use the combination of a printer buffer and a CP/M word-processor with other, DOS 3.3 programs. You can't normally switch between operating systems while your buffer is sending a file to the printer because "cold-starting" will clear all memory (including the buffer's). Using the Copykit's BOOT A DISK option however, you are able to switch to another operating system without disturbing the contents of the buffer.

Interrupting a Running Program:

As soon as your program is loaded and running and is past the

point (if any) at which it accesses the disk for more data, press the Snapshot trigger. At once the Copykit interrupts the subject program, takes control of the Apple and displays the Menu. The Copykit has taken a "snapshot" of your computer's main memory: a process which is much like putting the program it contains in suspended animation.

Setting the Video Mode:

If you own an Apple II+ or equivalent, the snapshot you just made includes everything needed to "revive" the subject program except for one thing: the mode of the video screen setting (hi-res graphics, text, etc.). You are about to supply it with that information. (Apple //e users may skip this bit because, for you, video mode setting is automatic.)

Move the Menu cursor to "SET VIDEO MODE" and press <RETURN> to select it. Now press the arrow keys some more times. One of the different screens which come up will look exactly as it did at the moment when you pushed the trigger to activate the Copykit. When you see it, press <ESC> to return to the menu. The Copykit now knows which screen mode to select if you ask it to restart the subject program.

"Dumping" to a Copykit Disk:

A "dump" is simply the transfer of data from all or part of your computer's memory to another medium (a floppy disk or a printer, for example.)

Remove your program disk from the drive and re-insert the Copykit disk. Use the arrow keys to move the cursor to the option labelled "DUMP: SAVE PROGRAM FROM MEMORY TO DISK" and press <RETURN>. If you have an Apple //e with an extended 80-column card, you will be asked if the program you want to backup uses 64K or 128K of memory. (If your subject program runs under ProDOS, it is probably safe to assume that it uses the full 128K.)

The subject program will be copied from memory to a reserved area on the Copykit disk. (Remember, if you ever want to interrupt this or any other Copykit activity, just press <ESC> to return to the menu.)

Note that the dump operation should only write to a Copykit disk, to prevent you from accidentally overwriting an original. If the disk in the drive is not a Copykit disk, you will be immediately returned to the menu. (We certainly don't guarantee that one of your expensive program disks could not be a Copykit "look-alike" however, so always write-protect disks that don't need to be written to!)

After 11 seconds (or 25 seconds, if your subject program uses

128K), you should be the proud owner of your first Copykit backup. At this point, you may wish to test it out by booting it up. (Remember that if you intend keeping the Snapshot card installed, it is a good idea to use the BOOT A DISK option. Cold starting a program from power-off will clear the Copykit from Snapshot's RAM, so try and get into the habit of getting your programs running from the Copykit menu.) If you have backed up a 128K program, you should use the "LOAD: COPY BACKUP FROM DISK TO MEMORY" option followed by "RESUME RUNNING PROGRAM IN MEMORY" to test your backup. This is because a 128K dump overwrites all the code on a disk which would normally make it auto-booting.

As you can see, the backup runs on your computer in much the same way as the original. It's stored on a 16-sector unprotected disk, so you can copy it with any 16-sector disk copy program. If for some reason the disk does not boot or run, carefully go over all the previous steps. You may have made a simple mistake. If things still don't work, turn to the Appendices at the back of this manual and take a look at the section which deals with "Trouble Shooting".

Backup a few more simple programs until you feel comfortable using the Copykit. Then try using the other menu options. They are explained in the next section. You should also try, if you own an Apple II+, experimenting with a program which uses the 80-column card. If you experience any difficulty, you should investigate the Appendix which explains the attributes of 80-column programs.

If you find that one of your backups just won't run, try, try again. Re-read this and the Snapshot Installation section to make sure you have followed the instructions properly. If you have already made successful backups of other programs, it is very unlikely that anything is wrong with your Snapshot hardware or Copykit software. (90% of the problems referred to Dark Star Systems' Technical Department in the past have been resolved by careful reading of the manual.)

4. Digging Deeper

Remember that, in order to use the Copykit system, you must boot a Copykit disk at the beginning of each session! If you think you may want to use it to interrupt or copy a running program, the Copykit software must already be in RAM. If you use it often, it is a good idea to get into the habit of loading the Copykit software into RAM every time your computer is turned on. Pressing the Snapshot trigger when the Copykit software has not been loaded will probably "crash" your system (i.e., it will cause whatever is running on your computer to come to a grinding halt).

By now, you should be used to selecting menu options by repeatedly pressing either of the arrow keys (until the cursor illuminates the desired option) and then pressing <RETURN>. Let's just recap on the options that you will have used so far:

"BOOT A DISK" deactivates the Copykit, clears memory, and (yes!) boots the disk you wish to study or copy.

"SET VIDEO MODE" lets the Apple II+ user complete the Copykit's information on the program in memory by specifying the video display mode (hi-res, text etc.) which was active when the program was interrupted. This option can also be used to examine the various video screens used by the program. If you own a II+ or compatible and don't set the video mode with this option, the Copykit will assume that Text Page 1 is the specified video mode.

"DUMP: SAVE PROGRAM FROM MEMORY TO DISK" copies the program in memory to the reserved area on the Copykit disk. Any backup already on the disk is replaced, so it's a good idea to try transferring backups to ordinary DOS 3.3 disks when it is possible to do so. For information on how this "file transfer" is accomplished, see the Appendix entitled "Making the Most of Disk Space".

Now, let's take a look at 2 of the other menu options - those which are related to the backing up procedures already described:

"LOAD: COPY BACKUP FROM DISK TO MEMORY" loads the backup on disk into memory and returns to the menu. Any program already in memory is replaced. The backup includes the video mode settings that were selected when it was made.

"RESUME RUNNING PROGRAM IN MEMORY" reconstitutes the subject program from the snapshot, deactivates the Copykit, restores the screen and resumes execution of the subject program in memory from the point of its interruption.

It is worth experimenting with the LOAD and RESUME options to

find out if they can save you any significant amount of time when it comes to restarting your backups. Often, you will find that using them is much faster than using the BOOT A DISK option or "cold-booting" programs.

Much time can be saved by users of the popular spreadsheet programs in particular. Spreadsheets are notoriously slow when called upon to save and load even the smallest files. The Copykit, on the other hand, dumps the computer's entire memory in just a few seconds, so it doesn't really matter what the size of the file is - you get it all and the spreadsheet program in one go. In effect, this means that you need never use two disks (the program disk and the file disk) again - just a single Copykit disk will do the job of both.

So far, we have discussed only those menu options which are essential for successfully backing up your valuable programs. But as you can see, making backups is just the beginning! There are plenty of other features which the Snapshot system can offer to help make computing more rewarding:

Making a screen-dump

"PRINT SCREEN" lets you make a hard copy (i.e. a printed copy) of whatever appears on your video screen at any one time. Provided you have been able to configure the Copykit for your particular 80-column card, this option will enable you to dump all 80 columns of text to your printer. If you don't have a supported configuration, you can still dump 40 columns of text.

This option is particularly useful if you need a printed copy of instructions or "help" menus to refer to while you run a program. It can also be used in word processing to insert a printed section from one file into a document produced by another.

You merely have to get whatever it is you wish to print on-screen, then press the Snapshot trigger to display the menu. Then, selecting the PRINT SCREEN option will bring up a Message Screen display instructing you to enter the command which your printer card expects for graphics dumping (e.g., <CTRL>I G <RETURN> for The Grappler), or simply to press <RETURN> if you wish to print a text screen. Be sure that your printer card is installed in slot 1, that your printer is "on-line" and that you have paper loaded ready for printing before you respond.

(Remember that you must have a graphics type card like the Cirtech Champion, the Epson 8132 or the Grappler in order to print a graphics screen. Apple II+ and compatible owners will also need to tell the Copykit which screen to print by using the "SET VIDEO MODE" option in exactly the same way as you would when making a backup. If you don't set the video mode beforehand, the Copykit will assume you want to print Text Page 1.)

When it has finished printing the screen, the Copykit will return to the menu and you may then continue to run the interrupted program by selecting the RESUME option. If, for any reason, you wish to stop the printer before the screen has been fully printed out, just press <ESC> to return to the menu.

If you like the PRINT SCREEN feature, you'll love the Snapshot Printinterrupt. The Printinterrupt will give you the ability to print any screen at any time, using any printer card (whether it has built-in graphics capabilities or not), on any dot matrix printer with bit image graphics. It also allows you to alter a printed display by cropping it on-screen, enlarging its height or its width (or both), rotating it, shading it, changing its dot density, inverting it, or mixing it with another screen. In short, if your printing needs can't wait, you can't do without the Printinterrupt!

Entering the monitor:

"EXIT TO MONITOR" puts the user in the monitor. The monitor functions are explained in the reference guide which came with your computer. By selecting this option, you may examine or modify the program in memory. Pressing <ESC> will return you to the menu. Upon entering the monitor, the screen displays the saved register contents and the address at which the subject program was interrupted. (See the "Special Locations" section in the Appendices at the back of this manual for more information.)

Specifying another drive:

"SPECIFY BACKUP DISK DRIVE" lets you specify which drive is used by the DUMP and LOAD menu options. The current drive is displayed alongside the option title. The default is slot 6, drive 1.

This option can save you a bit of disk swapping in some circumstances. If you're working on a large spreadsheet or word-processor file, for example, and you wish to take frequent backups, you could save memory to your backup disk in drive 2 while working with your program disk in drive 1.

You may also want to alternate between 2 different programs many times during a session with your computer. If you're working with programs like spreadsheets which take an eternity to close down and restart, this can be a very time-consuming business. The answer is to keep a Copykit backup of one program in drive 1, and a Copykit backup of the other in drive 2. When you want to switch from one to the other, simply DUMP memory to disk, SPECIFY the other drive, LOAD that backup from disk and RESUME it. (Of course, if you want to benefit from really fast program swapping, you should give the Snapshot Shuttle multi-tasking software a try.)

DOS and BASIC functions:

"LOAD A NORMAL DOS 3.3 FROM DISK" copies DOS directly from tracks 0-2 of any disk to the normal DOS region of RAM (9D00 - BFFF). The subject program is not otherwise disturbed. This can be useful when a subject program written in BASIC includes an abnormal DOS that does not permit commands like SAVE, CATALOG etc.

This does not mean that the program will automatically be functional with the normal DOS. It may make explicit calls to the "protected", altered DOS that will not work properly if it isn't there. You will, however, have the option of saving it to a normal DOS 3.3 disk.

"EXIT TO BASIC, CONNECTING DOS" is similar to the following option, except that it cold-starts DOS before warm-starting BASIC. "MAXFILES" is set to 1 and the Page 3 vectors are restored. This option assumes a fairly normal DOS.

"EXIT TO BASIC" attempts to make BASIC programs listable by zeroing the "protection flag" at \$D6 and setting the text screen width to 33. You can restore its normal width with the command POKE 33,40 or TEXT. This option makes the program resettable by repairing the reset vector at \$3F2. It restores the subject program in memory, deactivates the SNAPSHOT Copykit and jumps to the BASIC warmstart at \$E003. It does not attempt to reconnect DOS since that which the subject program is using may be unconventional. From BASIC, you can connect DOS 3.3 with "CALL 40383" (the DOS 3.3 warmstart routine). Pressing <RESET> may disconnect it again. Try LISTING before you connect DOS.

Making backups of unprotected disks:

"COPY AN UNPROTECTED DISK" calls up the Diskcopy program which you may have used to make copies of your original Copykit disk. It executes a fast (okay, a fairly fast) disk copy program (similar to COPY) which is suitable only for unprotected disks and requires 2 drives.

5. Making the Most of Your Disk Space

You will have noticed that one of the options on the Copykit menu was not discussed in Section 4. This is because we will have to talk about the way in which backups are stored on the Copykit disk before you try the "COMPRESS BACKUP ON DISK" option.

BHIGH and BLOW:

When the Copykit dumps the contents of memory to disk, it stores it in two binary (B-type) files which, for no special reason, we have named BLOW and BHIGH. These files become useful if you want to copy the backup to another medium such as an eight inch or a hard disk, or if you want to store several backups on one disk.

For the technically minded: BLOW and BHIGH contain memory from \$0000 to \$90FF and from \$9100 to \$BFFF respectively. Each has a brief loader program tacked onto its beginning. If the subject program used only memory within BLOW's range plus a more-or-less normal DOS, you can run the backup with MAXFILES 1 <RETURN>, then BRUN BLOW <RETURN>. MAXFILES 1 is necessary because BLOW, when loaded, overwrites the space used by the second and third file buffers.

LOWHIGH:

RUN LOWHIGH <RETURN> can be entered to run backups of programs which use memory above \$90FF. "LOWHIGH" is a short Applesoft program that does the following: sets MAXFILES to 1 and determines if there is 64K available (if not - BRUNning BLOW; if so - BLOADing BHIGH and then BRUNning BLOW). BLOW then relocates itself down to \$0000, relocates BHIGH down to \$9100 and, with the contents of memory thus restored, resumes running the subject program from the point of interruption.

Transferring backup-files to other media:

The rest of us can safely ignore technical details - we should be able to get along just fine without them. All we need to know for the moment is how to deal with these files so that they can be transferred to other disks. Here's the procedure:

1. Use the Copykit to make several different backups in the usual way. CATALOGing their disks will show that each is stored in the files BLOW and BHIGH. Test each backup to be sure that it works.
2. Switch off your computer to clear memory and then boot your

DOS System Master. Remove its disk from the drive, insert a blank (or a disk which contains nothing of importance) and type NEW <RETURN> followed by INIT HELLO <RETURN>. The disk will now be erased and initialized.

3. Now you must determine which of the files comprising each backup are essential. Put a backup disk in the drive and type MAXFILES 1 <RETURN> followed by BRUN BLOW <RETURN>.

4. Note whether or not the program loads and runs correctly. If it does, BLOW is the only file needed to run that particular backup. If your program does not load and run correctly, it consists of three essential files: BLOW, BHIGH and LOWHIGH. In this case, you may be able to run the backup by typing RUN LOWHIGH <RETURN>. "LOWHIGH" will ask you the name of the program you wish to run; just pressing <RETURN> is an adequate response for the moment. If it still doesn't work properly, then you will not be able to move that backup's files to another disk. This is because the total size of the backup is too large for DOS to handle.

However, you can still use FID to delete all the non-essential files from a Copykit disk containing a backup too large to transfer. (The only essential ones are BLOW, BHIGH and LOWHIGH.) Removing unnecessary files may free up enough space to enable you to fill the unused sectors of your disk with one or two programs which do work by RUNNING LOWHIGH or BRUNNING BLOW.

5. Go through all your backup disks, in each case identifying and noting which of the files are essential.

6. You're now ready to try the compression option and, at this point, you should boot the Copykit software and get its menu on-screen.

Compressing files:

Selecting "COMPRESS BACKUP ON DISK" enables you to compress the BLOW file on each of your backup disks. This option includes very explicit on-screen instructions, so we don't need to go into too much detail here.

If the compression program determines that a file is worth compressing, you will be asked to rename it (because you cannot, of course, copy two files called "BLOW" onto the same disk). You do not need to rename LOWHIGH. (In fact, you should only FID one copy of LOWHIGH to each "multi-program" disk that you make. LOWHIGH asks you for the name of any program you want to run.)

Rename BLOW to anything you like - possibly something which describes what a program does such as "DATABASE" or "SPREAD-SHEET". In cases where both BLOW and BHIGH are required, you will have to rename BHIGH as well. You should always give the BHIGH file of any given backup an identical name to it's BLOW

file with the addition of the suffix ".H". The BHIGH files to go with "DATABASE" and "SPREADSHEET", for example, would be renamed "DATABASE.H" and "SPREADSHEET.H". The ".H" suffix is vital for compatibility with the compression option.

You do not have to modify LOWHIGH at all. If you tell it to run the backup named "DATABASE", it will assume that it consists of the files DATABASE and DATABASE.H. LOWHIGH is also quite content to make do with DATABASE only, if a BHIGH/.H file was not required and, therefore, not included.

Dealing with compressed and uncompressed files:

The compression facility is used with BLOW only, because BHIGH is generally too full of DOS to be worth reducing. Even with BLOW files, compression does not always have a marked effect. It depends on how much of the space in that file is actually used by your backup. The compression algorithm looks for sequences of identical bytes (longer than 4 of the same byte) and encodes them as a four-byte word composed of a "marker", an "address" and a "value". A sequence as large as 36K can be compressed to such a four-byte word.

When you use it to run a backup, LOWHIGH re-expands a file (if it has been compressed) and runs the program (including its BHIGH portion, if there is one) exactly as though it had never been compressed at all.

Once you've compressed as many of your backups as possible, use FID to copy them to your empty disk (or any disk with enough room). You will find FID on your System Master disk. For more information on file-handling, consult your DOS Manual.

It may be a good idea to give LOWHIGH a more friendly name such as "MENU". If you have some knowledge of Applesoft, you could even adapt LOWHIGH to serve as the disk's "HELLO" program.

N.B. - You may use the described procedures to transfer protected programs to 80-track floppies, 8" floppies and even hard disk. However, if the program you are backing up expects to keep its user data on formatted 5.25" floppy disks, you might find that when searching for data, it won't settle for substitutes. This, of course, presents you with a problem, and you may not be able to solve it without help from the makers of the original program. You will need to modify their program to access your hard disk (or whatever) for data. If you have machine code skills, you can use the Copykit to break into and modify the program's DOS. If it uses a DOS with the same entry points as a normal DOS, the "LOAD A NORMAL DOS FROM DISK" menu option may let you replace the program's DOS with your hard disk DOS.

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.

DarkStar
SYSTEMS

Appendices

Appendix A - Programs Which Use the 80-Column Card

If you have an Apple II+ or compatible, you may have experienced some difficulties when trying to backup programs which use the 80-column card. All sorts of problems are 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 switching which will support all the different cards on the market.

It could be that we will be able to help you overcome a problem which you suspect is caused by your 80-column card if you are willing to help us. Get in contact with our Technical Department directly if you wish to give it a try. Otherwise, using the following procedure, you should be able to backup most programs which use the 80-column card anyway:

1. Boot your subject program from the Copykit menu in the usual manner.
2. Once it is running, interrupt the program by pressing the trigger. The Copykit will display its menu on the 40-column screen, but you won't be able to see it because the 80-column card is still active and showing the 80-column screen. Depending on which 80-column card you have, one of the following techniques should make the Menu visible:
 - a) 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 Copykit menu.
 - b) 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 affect.
 - c) Your 80-column card may accept a command which switches its display back to 40-columns in software. Again, check with your manual if you're not sure. If you find that it does, type the relevant command just before you interrupt your program.
 - d) As a last resort, try pressing <CTRL><RESET>.
3. Once you have the menu on-screen, skip "SET VIDEO MODE" and go straight to the "DUMP" option to make a backup of the program in memory in the usual manner. (There is no need to set the video mode, because you have already told the Copykit that your subject program uses the 80-column card when you selected the BOOT A DISK option.)

After dumping the contents of memory to a Copykit disk, you should re-enable the 80-column card by reversing the step(s) you took to display the Menu. You should now be able to boot your backup and get it running from the point of interruption. However, 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 Copykit has no way to read that RAM and save its contents on the backup disk.

Don't worry! It's likely that there's a command which will make the program redraw the screen. If the program in question is a word-processor, a command which changes menus will usually redraw the screen. With ZARDAX, for example, <ESC> M will do this.

Appendix B - Backing Up Multi-Access Programs

The Copykit is not a disk copier. It is a memory copier and, as such, is most suited to backing up programs which load entirely into memory at once. Copying some types of programs may require more expertise than the average user has at his or her command. That being said, if your motto is something like "Who dares, wins", or "per Ardua, ad Astra", you could do worse than try some of the techniques described in this section.

A program which does not load all at once and repeatedly refers to its disk for more information is sometimes called a multi-access or a multi-load program. During a session with a such a program, you have to leave its disk in the disk drive. Since a multi-access program is not memory-resident, the Copykit can't copy the full program from memory to backup disk in one dumping operation. Nevertheless, there are ways to backup many of these programs. Here are some examples:

Program A is a word-processor in two parts: a text editor and a text printer. The two parts are loaded into memory at different times, with no passing of data between them. The user's text files are kept on a separate data disk. This 2-stage program is easy to backup. The solution is to make separate backups of the two parts, then use FID to move them on to the same disk.

Program B is an accounting system written in Applesoft Basic. It uses a main menu to invoke a limited number of programs that handle various accounting functions. Each of these "function programs" can be copied to individual disks as separate LISTable Applesoft files by using the SAVE command after EXITING TO BASIC from the Copykit menu. You can then move them all to a single disk and (possibly) modify their menu to call them by names of your choice.

Program C, a popular business graphics system written in Pascal, accesses its program disk many times. You can make a partial backup of this program using a bit/nibble copier like Locksmith.

(You may even be able to do the same thing with the "COPY AN UNPROTECTED DISK" option from the Copykit menu. When the protected portions of the business graphics disk are encountered by the Snapshot copy utility, error messages will appear. You should ignore these and allow the copy program to complete its run.) The resulting disk may have everything needed to run the program after booting, but it won't itself boot. However, you may be able to use the Copykit to create an auto-booting disk containing the main part of the program which you couldn't successfully copy with your bit/nibble copier.

Use this Copykit backup disk to boot the program, then remove it from the drive and replace it with the backup made with the bit/nibble copier. The program will continue to access this partial backup, thinking it is the original program disk. If you habitually make use of both sides of your disks, you could even put the "boot program" on one side and the files it accesses on the other. There follows a full description of this 'two-step' technique. (For clarity, we'll demonstrate it in the form of a recipe for copying The Incredible Jack, but you can substitute the name Wizardry, Sargon III, Applewriter or whichever other program you find applicable.)

1. Make a duplicate of your original Copykit disk, using the DISKCOPY program or whatever. You can run DISKCOPY from Basic by typing BRUN DISKCOPY <Return>, or by going to the bottom line of the Copykit menu and pressing <Return>.
2. Now try to make a copy of the Jack disk using DISKCOPY. Because Jack is a protected disk, you will see some ERR messages and hear some buzzing from the disk drive. Don't be alarmed, DISKCOPY is just protesting about the few non-standard tracks on the Jack disk, but it is copying the remainder of the disk correctly.
3. Label the disk you just made "Jack Running Disk".
4. Now we will test the Running Disk. Boot the original Incredible Jack program disk. Jack will load itself in and repeat the word "JACK" on the screen until you press any key. Then it will verify that the disk is a genuine original Jack disk and display its starting menu. (Other programs may boot up in a slightly different way.)
5. Now remove the original Jack disk from the drive and substitute your Running Disk. Try using Jack to do various things: create a spreadsheet, save it, reload it, etc. You will find that Jack accepts the Running Disk as the original Jack disk!
6. Now we have a Jack Running Disk, a disk which is good enough to run but not good enough to boot! (Try booting it if you like, just to see.) The reason it will run is that Jack only checks the authenticity of its disk once, at boot time. After that, it's much less particular: as long as it

finds the files it expects on the disk, it doesn't care about authenticity.

7. So far so good. Now we will create a "Jack Boot Disk" (no totalitarian pun intended). Boot the copy of the Copykit software disk that you made way back in step 1. Go to the Copykit menu in the usual way.

8. Now put the original Jack disk in Drive 1. Move to the BOOT option on the Copykit menu, and press <Return>. Respond to the prompts on the screen until Jack boots.

9. Jack will display its name, wait for you to press a key, authenticate the disk, and go to its opening menu. At this point press the Snapshot card's trigger. You have now captured a version Jack that remembers it has already authenticated its disk!

10. Now go to the DUMP option on the menu. (On an Apple II+, you will have to use the SET VIDEO MODE option first.) Remove Jack from the drive and insert the Copykit software disk. Press <Return>. The Copykit will copy Jack from the Apple's 64K memory to the disk.

11. Label the Copykit software disk "JACK BOOT DISK". This disk contains a complete image of Jack as it existed in your computer's RAM when you pressed the trigger.

12. Now boot the Jack Boot Disk and respond to the prompts. Tell it what slot your Snapshot card is in. (Later you may want to try running it without a Snapshot card.) The disk will boot, reload Jack, and return you to the its starting menu. Jack doesn't know that it has been interrupted. It still thinks that it has just authenticated its disk!

13. Remove the Jack Boot Disk and insert the Jack Running Disk. Now exercise Jack by making a spreadsheet, saving it, etc. It works! You now have a backup of Jack on two copyable disks. If you like, you could even put the two disks onto opposite sides of a single disk. (You have to cut a second write-protect notch to do this; and we don't recommend it, as the reverse sides of most Apple disks are untested and are often less reliable.) If your Running Disk uses a standard DOS and has a readable Catalog, you can probably FID its files over to the Boot Disk. You can delete all the unnecessary files (ie., everything but BLOW, BHIGH, and - possibly - LOWHIGH) from the Boot Disk to make room.

If your Running Disk fails to work properly when you test it (step 5), then it may not be a good enough replica of the original disk. DISKCOPY only copies those areas of the original disk that are in more or less standard format. Perhaps the entire disk is copy-protected. Try copying it with one of the popular copy programs like Locksmith, EDD or Copy Two Plus. This probably won't give you a bootable disk (nibble copiers

seldom do without hit-and-miss parameter changes), but it may make an acceptable Running Disk.

If the Boot Disk fails to boot the program, or the program "crashes" almost immediately by freezing or going berserk, the problem may be that the original is a 128K program. This applies to the Apple //e only. On the //e, many programs that say '64K' on the disk actually use 128K if the extra memory is available on an extended 80-column card. Such programs may not run properly if you only dump 64K to the Copykit disk.

If you suspect that this is the case, you could try removing the extended 80-column card from your Apple before making the backup. If the program requires one to run however, you may have to substitute a standard 80-column card (one without the extra 64k). You can run the backup on the full 128K Apple, but it may ignore the extra 64k available to it.

Best of all, make a 128K backup. You do this the same way you made the 64K Boot Disk, except that you have to inform the Copykit at DUMP time that your subject program will use 128K. A 128K backup has an important limitation: the backup fills up the disk so completely that there is no room for the 'boot' program. Instead, you must run the backup in the following way:

1. Boot a copy of the original Copykit software disk, and go to the Copykit menu; or get to the Copykit menu by any other route.
2. Go to the LOAD option, remove the Copykit disk, insert the 128k backup disk, and press <return>. The 128k backup will then load into the computer's memory.
3. Go to the RESUME option. Remove the 128k backup disk and insert the Running Disk. Press <return>. The program will resume running.

Appendix C - Dealing With Disk Latch Protection

Some programs feature an interesting copy-protection method which may, at first, have you tearing your hair out. What such a program does is to repeatedly check that its disk is in the same position as when it last looked at it. For example, if you interrupt it and dump it to a Copykit disk, the memory you dump will contain a record of the last location of the program disk. When you come to run the backup, the program won't notice that any time has elapsed, but it will notice that the position of the disk has changed. It assumes that this change is evidence that it has been interrupted and then refuses to run any further. Smart!

But not smart enough. We refer to this protection method as "disk latch protection". Programs which utilise it can be copied by pushing the Snapshot trigger, not at the usual time, but

while the disk in drive 1 is spinning. This may be done either just before the disk finishes booting, or just as it begins to use drive 1 again for other purposes, e.g. when it reads a data disk. Since the change of disk position which results from the program's use of the drive is considered "legitimate", the disk latch protection will be disabled.

N.B. - Never press the trigger while a program is writing to a valuable disk, as this can erase data! Naturally, if the subject program is writing to a blank disk in drive 1 (as, for example, the EDD bit-copier does), it's okay to interrupt it.

To test whether a program uses disk latch protection, boot the original disk, interrupt it with the Copykit, set the video mode, and resume running it. See if the program resumes and continues to run properly. As you haven't used the drive at all, it should be okay. Now repeat the test, but perform a "DUMP" operation (to a different disk) before resuming. If the program resumes properly only when the disk drive is not used by the SNAPSHOT Copykit, it is safe to assume that disk latch protection has reared its pointed little head (bless it).

In the case of the EDD, you have to interrupt it while it's writing to drive 1, because it reads the disk it's copying from drive 2. You should wait until it has started writing the second track before interruption. Specify the video modes and dump memory to a Copykit disk as usual. You should now have a backup of EDD. Be sure to put a write-protect tab on it. When the backup is booted in drive 1, EDD will still be trying to write to it. Push <ESC> at this point to return to the EDD menu.

Sensible Speller is another example of a program that uses the disk latch method of protection. The trick is to find the right time to interrupt the program.

The program should be interrupted while the disk is spinning, so go to the "List dictionary words" option and have the program search for a word. When the drive starts, press the Snapshot trigger. The Copykit menu will appear. Set the video mode and dump memory to a copy of the Copykit disk as usual. During this procedure, the disk drive may still be spinning. Don't worry! It is OK to remove the Sensible Speller Dictionary disk and insert the Copykit disk for the backup.

When the backup is booted, the program will resume looking for the word chosen previously, discover it is not looking at a dictionary, and abort. Press <RESET> to go back to Sensible Speller's main menu and proceed as usual.

These examples are typical of the procedures which will overcome disk latch protection. In general, it is a good idea to write-protect a disk containing a backup of a disk-latch protected program before you boot it, in case it tries to overwrite itself.

Appendix D - Making BASIC LISTable

There are many ways to protect a BASIC program from being listed or modified. Often, several different methods are used in combination. The Copykit can help you circumvent several of the commonest methods.

Remember, only programs originally written in BASIC can be LISTed!

Interrupt the subject program with the Copykit, set the screen mode and select the "EXIT TO BASIC" option (without connecting DOS). Now LIST it. If that doesn't work, start over again and activate your printer before LISTing. You can activate it by selecting the menu option "EXIT TO MONITOR", typing 1 <CTRL> P <RETURN> <ESC> and then selecting EXIT TO BASIC again. If your printer card is not in slot 1, substitute the appropriate number.

Sometimes, programs which will not LIST on the screen correctly can be printed. This is because they include REM statements containing back-spaces (and other non-printing characters) that disguise program lines. If you use the BASIC command "SPEED=10", you can catch this sort of statement in the act. LIST the program on the monitor and watch for any program line that appears and then vanishes again. The last letters of a line will disappear first.

If you are trying to list an Integer - or some other - program which is in your Language/RAM card at the time of interrupt, remember that the procedure for getting into BASIC is different. (See Section 3, "EXIT TO BASIC".)

If you still haven't had any luck, try using the options "LOAD A NORMAL DOS FROM DISK" and then "EXIT TO BASIC, CONNECTING DOS". Selecting these options tells the Copykit to overlay the subject program with a more-or-less normal DOS, then exit to BASIC with that DOS connected.

Try issuing a SAVE before you issue a LIST, as some programs clobber themselves when LISTed. They do this by exploiting a peculiarity of DOS. Applesoft tries to LIST programs using 33 columns instead of the full 40. The 34th character is folded over and printed on the following line. DOS gets control at the 34th character (when fold-over occurs) and normally passes control back to Applesoft. If the 34th character is a <CTRL> D, then DOS (if it is connected) interprets the characters which follow as though they formed a DOS command. For example; <CTRL>D FP tells DOS to erase the program in memory.

The Copykit's "EXIT TO BASIC" options change the text window width so that this won't happen. You can restore the width by typing TEXT or POKE 33,40. This protection method is demonstrated by the program called "SAMPLE UNLISTABLE PROGRAM" on your SNAPSHOT disk.

A program may use POKES to clobber its first few lines, change line pointers, or set the protection flag at 214 (\$D6) to a non-zero value. It may PEEK these locations later to make sure they are still set. Be suspicious of PEEKs and POKEs to locations with addresses less than 3000 or so. (Most Applesoft programs load at 2048.)

If the subject disk has a readable CATALOG, use a disk patching utility like "The Inspector" to examine the directory track for unprintable characters in the file names. Remember that the subject program may be booted by a chain of several programs, each of which RUNs the next one; so use the Copykit to interrupt the booting/loading process and list whichever one is in control.

Each line of a Basic program in RAM contains a pointer to the next line. A program may protect itself from being listed by containing a POKE statement which, when executed, disrupts one of these pointers. If the program is RUN before it is LISTed, then the LIST will stop at the first clobbered pointer. Try interrupting the program while it is loading, before it runs. Exit to BASIC and list the portion loaded so far. If you are familiar with BASIC program tokens, you may be able to locate the POKE token and patch it on the disk file.

Another method is to interrupt the program during loading and use the Copykit's monitor to examine or print the first part of it as a hex listing. (Most Applesoft programs load on page 8.) Then, you can reboot the program and interrupt it while running and examine the same area. If the program has made itself unLISTable by damaging its opening lines, you should be able to see the difference and repair it. The program may also have damaged some of the page zero pointers (e.g., the pointer at \$67-\$68 - low, high - that points to the first line of the program.) This can be repaired in the same way.

Appendix E - Special Locations

If you select the EXIT TO MONITOR option from the Menu, you will find yourself in the autostart Monitor with the ROM enabled. The Copykit displaces the subject program in pages 00-07 and A8-BF. The remaining 48K contains the undisturbed portion of the subject program. If you want to study its displaced portions, type <CTRL>Y <RETURN>. You'll find the pages which were in 00-07 are now located in 80-87 in RAM, and those which were in A8-BF will be in 68-7F. Type <CTRL>Y <RETURN> again if you want to see the part of the program which normally fills the pages between 68 and 87. (Exception: Page A9 is visible at 81, the stack is visible at 69.)

Type C083 <RETURN> to enable the Language/RAM card if you need to look at pages of the subject program in D0-FF, but (be warned!) remember that if this RAM doesn't contain a copy of the monitor, you may crash.

A Load or Dump operation moves entire pages to/from entire disk sectors. The table below shows the correspondence between those locations. All values are hexadecimal.

Subject program pages	Disk track/sectors	
00-07	20	0-7
08-0F	20	8-F
10-1F	21	0-F
20-2F	22	0-F
30-3F	3	0-F
40-4F	4	0-F
50-BF	5-B	0-F
D0-DF (1)	C	0-F
D0-DF (2)	D	0-F
E0-FF	E-F	0-F
*04-07	2	4-7

* 80-column screen on the Apple //e only.

The table below shows the extra tracks that are used with 128K dumps.

Subject program pages	Disk track/sectors
00-BF	10-1B 0-F
D0-DF (1)	1C 0-F
D0-DF (2)	1D 0-F
E0-FF	1E-1F 0-F

A "snapshot" of your subject program includes the values that were in its various registers at the moment of interruption. They are saved to disk in the corresponding bytes of Track 2, Sector F, bytes F0 to FF.

Register	Saved at...
Stack Pointer	A808
Accumulator	A810
X-Index	A811
Y-Index	A812
Program Counter High	A813
Program Counter Low	A814
Status	A815

The user Utility area:

There is an area of the Copykit which, providing you have a reasonable knowledge of Machine Code, can be used by your own short utility to take advantage of Snapshot's interrupt and resume capabilities. This might be useful for debugging, disassembling, etc. Pages \$B800-BFC0 are used by the Copykit's RWTS. This location can be used for a routine of your own and accessed by entering the monitor from the Copykit Menu and typing BBOOG <RETURN>.

(If you are interested in making maximum use of the Snapshot card's interrupt-and-resume capabilities with your own programs, you should invest in a copy of the "Shell", a Snapshot software package specifically designed for that purpose.)

Appendix F - How the Copykit works

The Copykit software resides in the RAM on your Snapshot card. It is loaded onto the card when you first boot up a Copykit disk. It then "seals itself in" so that a subject program cannot detect or erase it. It remains inactive while you load and run a subject program.

When you press the Snapshot trigger, the Copykit is activated. It halts the subject program, saves all the register contents and rearranges the contents of memory to give itself some "elbow room". It displays its menu on the screen and waits for keyboard instructions.

If you ask the Copykit to resume execution of the subject program, it reverses the above process: It undoes the rearrangement of memory, restores the registers, seals itself in and resumes execution of the subject program at the point where it was halted.

A "snapshot" of a subject program is a complete image of the state of the Apple when the subject program was halted. It contains all the data required to resume executing the program. It consists of three parts: a rearranged image of the contents of RAM, an image of the contents of the registers and an image of the setting of the video screen switches (more about this below.)

When you activate the Copykit, it immediately forms in memory a snapshot of the halted program. When you ask the Copykit to resume execution of the subject program, that program is reconstituted from the snapshot in memory. It can also transfer a snapshot from the Apple to a Copykit disk by a "DUMP" operation or from the disk to the Apple by a "LOAD" operation. When you load a snapshot from disk, it replaces the snapshot in memory. When you dump a snapshot to disk, it replaces the snapshot (if any) already there.

When the Copykit resumes running a subject 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. If you own an Apple II+ or compatible, you provide the Copykit with these data when you select the "SET VIDEO MODE" option from its menu. (On the Apple //e, this process is performed automatically.) Once you have specified a video mode setting, the Copykit will retain that setting until you change it or load a backup from disk.

A Copykit disk is simply a duplicate of the disk that was provided with your Snapshot system. It contains a reserved area for the storage of a snapshot. When you turn on your computer, the disk boots and loads the Copykit software into the Snapshot card.

The "DUMP" operation converts a Copykit disk into an "autostart" disk. When the disk is booted, it will load the snapshot stored on it and resume execution of the subject program from which the snapshot was made. If the snapshot was taken immediately after the subject program was booted up, then for most practical purposes, the autostart disk is an unprotected backup of the original program disk.

Appendix G - Trouble Shooting

Running backups without Snapshot:

Apple DOS is incapable of handling programs which exceed more than about 38K in size. Since a Copykit backup comprises anything up to 128K (and more, in the case of 80-column programs), DOS can't deal with it. For this reason, we substitute our own "loader" routine for DOS in order to get Copykit backups up and running. Now, if you backup programs which completely fill your available memory for one reason or another, there is no room for the loader unless we allow the backup to "spill-over" into the Snapshot card RAM. In such cases, if the card is not installed, the backup simply won't run.

Latest versions of the Copykit software feature an "intelligent" loader which searches through the subject program in memory to try and find 9 identical pages of RAM. When it finds them, it stores them as a single page and locates itself in the remaining 8 pages. When a backup is loaded into memory, the original 9 pages are restored and it will run without a Snapshot card installed.

A tiny minority of programs fill memory up with random garbage which defeats the Copykit loader. If you are unlucky enough to have such a program, you may feel adventurous enough to try locating the loader yourself. If you would like to give it a try, select the EXIT TO MONITOR option from the Copykit menu and

type 32C <RETURN>. This will display the first page of memory occupied by the loader. Assuming that it has been unable to find anywhere else to go, the loader will have settled itself in at its default location and the figure 20 should appear on-screen. You can change the loader's location to anywhere within the range 2-B6 by typing 32C:n <RETURN> (where n = a suitable hexadecimal number within that range).

Finding the right location for the loader in your particular program will be pretty much a matter of trial and error but, if you're prepared to put in the time, it will probably be worth the effort.

Running backups made on a different computer:

If you make a backup on an Apple //e and then try to run it on a another //e, you should experience no difficulties. Try and run the same backup on a II+ or compatible however, and the chances are that it won't run properly. This is because of differences between the monitors of various computers. If you don't press the Snapshot trigger at a point in the subject program's execution where the monitor is common to all Apple II-type computers, you won't be able to use the resulting backup on a different computer.

Incidentally, it's worth remembering that when you break the seal on the packaging of most commercially produced software packages, you are committing yourself to observe the terms of the author's licensing agreement. These terms usually specify that you are allowed to use that software on one computer at one location only. By attempting to run a backup on a different computer to the one on which it was made, you may be breaking the law.

Compatibility:

The Copykit is generally compatible with Apple-compatible cards and hardware. The only exceptions are the Accelerator cards (which are compatible with hardly anything). If you have one, make sure it is disabled or removed.

Testing the Snapshot system:

If you find that a backup just won't run, try, try again. Reread the tutorial to make sure you are following the instructions. If you have already made successful backups of other programs, it is very unlikely that anything is wrong with your Snapshot Copykit. Remember, 90% of all problems can be resolved by carefully reading the relevant sections of this manual.

If the Copykit 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 Copykit was loaded into it.

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

Before you do anything else, eliminate potential sources of trouble by removing every other peripheral card from your computer apart from 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.

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

Turn on the computer and boot the Copykit disk. Press the Snapshot trigger and the Snapshot 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 appear. 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.

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

Take your original Copykit 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.

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 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.

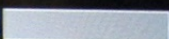
Unfortunately, conventional printing utilities suffer from some major drawbacks. In order to use them with anything other than text or graphic files, you have to be able to suspend work on a running program. The trouble is, there are a lot of protected programs out there which won't allow you to interrupt 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 Printinterrupt, 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 Printinterrupt 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 Printinterrupt up and running.

darkStar
SYSTEMS

■ Boot a Disk to be Studied/Copied 

Set Video Mode (Automatic on //e)

Save: Copy Program from Memory to Disk

Load: Copy Backup from Disk to Memory

Resume Running Program in Memory

Print Screen

Exit to Monitor

Will this program use

- 1) 64K
- 2) 128K

Your choice? (1 or 2) ■

The Copykit

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The Shuttle

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SERIAL NO. A314

The Printerrupt

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The Shell

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SERIAL NO. A106

Snapshot and the Art of Apple II Switching

The Snapshot card unleashes your Apple's hidden power to interrupt-and-resume any running program. When you load up Snapshot's on-board RAM with one of Dark Star Systems' growing family of easy-to-use, menu-driven software packs, you get awesome switching power at the press of a button....

Switch 1 The Snapshot Shuttle lets you keep *ANY* four programs in your RAMcard and switch back and forth among them — instantly!

Switch 2 The Snapshot Printer-ruprt lets you interrupt *ANY* running program, print its display using a galaxy of great menu options, and resume running it as though nothing happened.

Switch 3 The Snapshot Copykit lets you make archival backups of your copy-protected software in less than 25 seconds.

Switch 4 The Shell is the memory-manager and mini operating system which allows Snapshot software to work within an interrupted program.



PRICES (ex VAT)

Snapshot version //e card (requires software)	£ 95.00
Each software pack (requires card).....	£ 20.00
All 4 software packs.....	£ 55.00

MEMORY EXPANSION CARDS

The Shuttle will let you load 2 x 64K programs into a 128K Apple. Naturally, the more memory you have, the more programs you will be able to load. The Shuttle works with all the popular RAM cards.

Cirtech 64 extended //e 80-column card	£ 42.00
Cirtech PlusRAM 256K RAMcard.....	£ 90.00
Cirtech PlusRAM 1 Meg RAMcard.....	£144.00

If ordering direct, please enclose cheque or quote details of your Visa, MasterCard or American Express account.

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