WILDCARD 2

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USER MANUAL

*** IMPORTANT NOTICE ***

The WILDCARD 2 SYSTEM is offered for the purpose of 1) enabling you to print and view your computer's screen at any time and 2) for the purpose of enabling you to make personal backup copies of the software you own. Under the Copyright Law, you, as the purchaser of a computer program, are entitled to make a copy for archival purposes only, and the WILDCARD 2 SYSTEM will enable you to do so in many cases. The WILDCARD 2 SYSTEM is offered for no other purpose, and you are not permitted by law to use this product for any use which would infringe upon the valid copyrights of others.

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CHAPTER ONE: INTRODUCTION

Congratulations on your purchase of Wildcard 2, the most advanced software-backup card available. Wildcard 2 can backup most 48K, 64K, and Apple //e 128K memory resident software with a simple press of a button. It is completely compatible with Apple][, Apple][Plus, Apple //e, and Franklin computers.

Wildcard 2 "freezes" any running program in memory, and lets you make a fast-booting floppy-disk copy of the frozen memory image. Whenever you boot this copy, Wildcard 2 "thaws out" its contents, and allows the program to continue right where it left off..."unaware" that it was ever stopped!

With Wildcard 2, you can also stop the program to:

1) View the current graphics or text screen. Wildcard 2 always remembers which screen was being displayed, even on Apple][Plus and Franklin computers.
2) Print the contents of the current screen at any time. The card can print text stored on the Apple //e 80-column screen as well as the standard 40-column screen. If you have a Grappler or Grappler-compatible printer card and a graphics printer, you can also print high-resolution graphics screens.
3) Jump into the Apple monitor to examine or change the contents of memory.
4) Clear the Apple's memory and boot a disk.
5) Restart the interrupted program.

Wildcard 2 is designed to work with "memory-resident" software. These are programs that are loaded completely into memory when the disk is first booted, and do not require the program disk to remain in the drive. Some protected programs periodically load in other files or otherwise check the drive to make sure the original disk is still present. (This is called "disk-intensive" or "multi-access" software.) Your best bet with these programs is to back up the original disk with a good bit copy program such as Copy][Plus. For more information on multi-access disks, see Chapter Four.

Wildcard 2 can actually make three different kinds of back-ups:

1) The card itself makes fast-booting floppy disk copies. In order to copy software that might completely fill Apple memory, Wildcard 2 uses its own internal memory for both saving and restarting these programs. This means Wildcard 2 must be present in the computer whenever copies made with Wildcard 2 are booted. These copies are the fastest, easiest to make, and most reliable.
2) If you want to save your back-ups on standard DOS disks or on a hard disk, you can use the Wildcard 2 utility disk to convert a fast-booting copy into a set of normal DOS binary files. These DOS copies can then be restarted with a simple "BRUN" command, and the card doesn't need to be in the computer. However, since the disk operating system has to be loaded into the computer along with the entire memory image that was saved, there is a memory overhead involved. To restart a 48K copy, you need a computer with at least 64K of memory. To restart a 64K copy, you need an Apple //e with the extended text card for a total of 128K of memory.
3) Another program on the utility disk also converts fast-booting copies into DOS files. This program attempts to remove the memory overhead by "compressing" the program, removing sections of memory that it believes aren't needed, rather than saving the entire memory range. These compressed files are smaller and load more quickly than the uncompressed DOS files. Not all programs can be compressed, however.

The utility disk will also let you recover Applesoft programs from protected disks, print any graphics or text screen in memory, and save the graphics screens (or other areas of memory) to disk as binary files.

About This Manual

This manual is divided into five chapters.

This chapter, Chapter One, includes installation instructions and a first example to show you how easy Wildcard 2 is to use. We encourage you to do the first example before backing up other programs.

Chapter Two provides complete instructions for making backups with Wildcard 2 and for using the other features provided on the card.

Chapter Three describes how you can use the utility disk to convert your fast-booting copies into DOS files, extract Applesoft programs, save graphics screens to disk, and more.

Chapter Four is a short discussion on backing up some multi-access software with Wildcard 2.

We hope you never need Chapter Five. This chapter describes possible problems and how to deal with them. If you do run into a problem using Wildcard 2, please refer here first for more information.

Hardware and Software Requirements

Wildcard 2 requires an Apple][or Apple][Plus computer with at least 48K of RAM, or an Apple //e (which has 64K of RAM built in). Wildcard 2 is also compatible with the Franklin Ace line of computers (100, 1000, 1200).

For simplicity, this manual will only refer to Apple computers. Franklin computers can usually be configured with either 48K or 64K of memory. A 64K Franklin, as far as Wildcard 2 is concerned, is equivalent to an Apple][Plus with a 16K RAM memory card. A 48K Franklin is equivalent to an Apple][Plus without the memory card.

A floppy disk drive and controller (16 sector) are needed to save the Wildcard 2 copies. Wildcard 2 uses the Apple's usual boot drive (the one that starts up automatically when you turn on the Apple). The controller card can be plugged into any slot. However, if you also have a hard disk, then the floppy must be plugged into a higher numbered slot than the hard disk when making copies. Only one drive is needed. A second drive can be used to save time when using the Wildcard 2 utility disk.

If you want to print the contents of the current screen, your printer interface card will need to be plugged into slot 1.

The utility disk uses Apple's DOS 3.3. If you want to use the utility disk to make DOS copies of your programs, you'll need a DOS 3.3 system disk, so that you can initialize new DOS disks to save your programs onto.

How to Install Wildcard 2

1. This first step is only for those who have an Apple //e. A simple change needs to be made to the Wildcard 2 board so that it can take advantage of the extra features of the Apple //e. This change is not optional.

   Set the card on a flat surface such that the IC chips are right-side up. In the center of the card is a small plastic jumper. If the //e modification has already been done, you will see two small metal pins. This means the jumper has already been removed.

   If the jumper is still in place, you will want to remove it. Carefully lift up on the jumper block until it lifts free from the metal pins on the printed circuit board. With the jumper removed, the Wildcard 2 is ready to be installed in your Apple //e.

Put the jumper you have just removed in a safe place. If you ever need to use Wildcard 2 in an Apple][Plus or Franklin computer, you *must* replace this jumper before installing it or you might damage the computer.

WARNING: If the Wildcard 2 has been modified to work in an Apple //e, DO NOT use it in an Apple][Plus! Doing so might damage the Wildcard 2 or any RAM card in the computer. If you want to use the Wildcard 2 in an Apple][Plus, first replace the jumper on the Wildcard 2 as shown above. Your Wildcard 2 warranty will does not cover damage to your Wildcard 2 if this is not done.

Conversely, using Wildcard 2 in an Apple //e without the modification doesn't hurt anything, but the card will not be able to correctly save 64K or 128K programs.

2. TURN THE APPLE OFF!! If you've installed other peripheral cards in your Apple, you've heard this warning before. We won't say any more on the subject, except that installing or removing any card while the power is on can damage the Apple, Wildcard 2, and possibly cards in other slots. It has also been linked to cancer in laboratory rats.

3. Remove the lid from the Apple. This is done by pulling straight up on the back corners of the lid until they come free (with a couple of "pop" noises), then lifting the lid back and away.

4. Note the edge connectors, or slots, in the back of the Apple. Wildcard 2 can be placed in any convenient slot, except Apple][slot 0 or the //e auxiliary slot. If you have an Apple //e, you can still insert Wildcard 2 into slot 3 if you want. (Many other cards don't work in slot 3.)

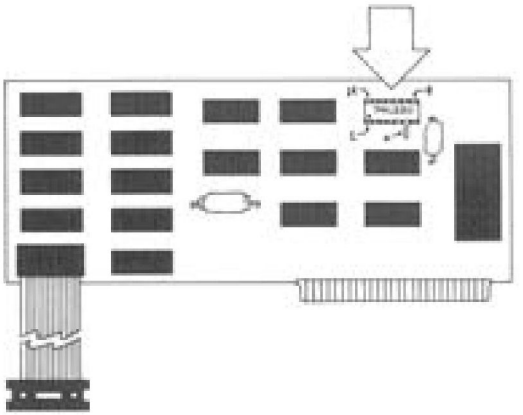
Hold the card in your right hand, parallel to the slot, with the black integrated circuit chips on the right. (Note that the other cards in the Apple are all oriented in this same way.) Push the card into the slot so that the gold fingers on the card are seated firmly in the connector. It may take a slight back-and-forth rocking motion if the connector is tight. (Don't flex Wildcard 2 left and right!)

5. Feed the pushbutton and cable through any convenient opening in the back of the Apple.

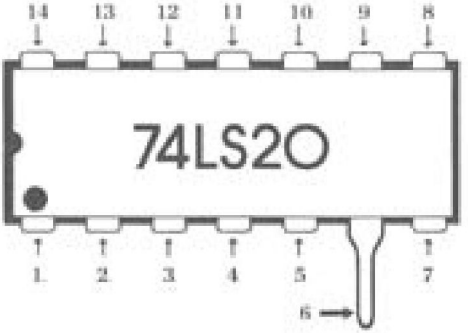
6. This part is only for those who have an Apple][or Apple][Plus with an Apple Language Card. You need to make a small modification to the card by lifting a pin on one of its IC chips.

   Note: Do not make this modification unless you have an Apple Language Card made by Apple Computer. Modifying a RAM card made by any other manufacturer will probably prevent the computer from working correctly.

   With the Apple turned off, carefully unplug the short cable from the socket in the Apple, and remove the Language Card. Set the card on a table with the black IC chips facing up and the gold fingers pointed toward you. Near the upper right corner is a chip labeled 74LS20. With an IC puller (or by prying up with a small screwdriver), carefully remove this chip from its socket. Don't pull it up with your fingers; it's too easy to simultaneously stab yourself and bend the pins on the IC chip.



By using the diagram below, find pin #6 on the chip. Bend this pin so that it points straight out from the chip and will not go back into the IC socket. (Use needle-nose pliers if you have them.) Gently push the IC back into its socket, making sure that the notch on the chip is facing left. Reinstall the Language Card in slot 0, and plug the short cable back into the socket in the Apple.



7. Replace the lid. Bring the front end of the lid slightly into the opening under the keyboard, then press the back corners straight down into place. The lid should seat firmly with two "pop" noises again.

8. You should also make a work copy of the Wildcard 2 Utility Disk at this time. This disk is not copy-protected, and you can copy it using any standard disk copy program, such as the Copy II Plus COPY DISK option, or COPYA on your DOS 3.3 system master disk. Put the original in your bomb shelter, and use the back-up as a working copy. From now on, we'll refer to this copy as the Wildcard 2 utility disk.

A First Example:

Here is a quick example to show you how easy it is to copy a program with Wildcard 2. You'll be entering this program from the Apple keyboard. Remember, though, that Wildcard 2 will copy practically any program in memory, whether it was typed in or loaded from a protected disk.

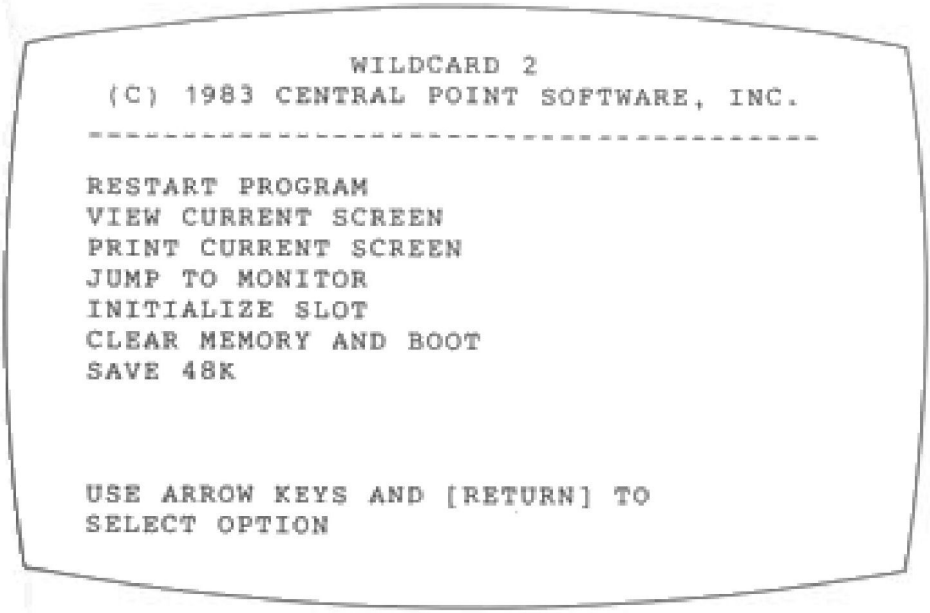
Boot any standard DOS disk (e.g. your DOS system master disk). When the Basic prompt appears, enter the following Basic program:

```
]NEW

]10 N = 0

]20 N = N + 1

]30 PRINT "NUMBER: "; N

]40 GOTO 20

]RUN
```

The running program should begin counting endlessly:

```
NUMBER:   1
NUMBER:   2
NUMBER:   3
NUMBER:   4
NUMBER:   5
NUMBER:   6
   .
   .
   .
```

Now to freeze the program, press the button on Wildcard 2. A menu similar to the following will appear.



The menu might also include the options SAVE 64K and SAVE 128K, depending on how much memory is available in your Apple.

The SAVE 48K option should be in inverse. Press [Return]. A message will appear at the bottom of the screen:

```
INSERT A BLANK DISK AND PRESS [RETURN]
(OR PRESS [ESC] TO EXIT)
```

Wildcard 2 uses the Apple's usual boot drive. (This must be a floppy drive, not a hard disk.) Insert either a blank disk, or a disk which you don't mind erasing, into this drive. Press [Return]. The drive will whir for about 12 seconds, saving the Basic program (and the rest of Apple memory) to disk. Then the menu will be redisplayed.

Turn your computer off (erasing any program from memory), then turn it back on again. The disk will whir for a moment, and display this message at the top of the screen:

```
PRESS THE WILDCARD BUTTON TO CONTINUE...
```

Remember that the fast-booting copies use Wildcard 2 in restarting programs. Press the Wildcard 2 button. The computer will display:

```
LOADING BACK-UP...
```

Wildcard 2 then loads the contents of the disk back into Apple memory. In about 10 seconds, the original Basic program is restarted, continuing from where it was interrupted as if nothing had happened:

```
NUMBER:   9
NUMBER:   10
NUMBER:   11
NUMBER:   12
NUMBER:   13
   .
   .
   .
```

(Press ConTRoL-C to stop.)

Making a back-up with Wildcard 2 is often as simple as with the above example:

1) Run the program to be copied.
2) Push the button on Wildcard 2.
3) Press [Return].
4) Insert a disk.
5) Press [Return].

Other times, you may need to select one or two options. Making back-ups on an Apple //e is almost completely automatic, since the Apple //e provides more information about its own status. For example, Wildcard 2 can directly find out what memory is "on" in an Apple //e; whereas on an Apple][Plus, this information cannot be read by the card and must be selected by you. These differences will be described in the step- by-step instructions of the next chapter.

CHAPTER TWO: USING WILDCARD 2

When you press the button on Wildcard 2, the program is interrupted, important status information is saved (including the contents of the text screen), then the main menu appears.

One of the menu items is displayed using inverse (black-on-white) characters. If you want to select that option, just press [Return]. If you want to select another option, pressing the arrow keys will move the inverse field to that option. Try pressing the arrow keys a few times. The left arrow (and the up arrow on an Apple //e) moves the inverse field up, and the right (and down) arrow moves it down. Once the option you want is displayed in inverse, then press [Return] to run it.

These same keys apply to all of the menu selections in Wildcard 2. Copy][Plus users will be pleased to note that this is the same menu style used in the Copy][Plus utilities.

Saving Programs to Disk

The three possible save options (SAVE 48K, SAVE 64K, and SAVE 128K) determine how much of the computer's memory is actually saved on the backup disk. The save options available to you depend on what kind of computer you have, and whether or not a memory card is installed. When you press the button, Wildcard 2 automatically determines these things to provide you with as much flexibility as possible on your computer system. The combinations that Wildcard 2 recognizes are:

1) Apple][Plus (48K of memory)
2) Apple][Plus with 16K (or larger) memory card (64K)
3) Apple //e (64K)
4) Apple //e with extended text card (128K)

If you have an Apple][Plus with a total of 48K of RAM memory, then SAVE 48K will be the only save option available, and the following sections will not apply to you. You may (without fear of losing your sanity) skip ahead to "Continuing with SAVE"....

Saving 64K Programs

If you have one of the other three combinations, then the SAVE 64K option will also appear in the main menu. When saving or restarting programs, you may need to select how to use the extra memory. A basic understanding of how this memory works can help.

The 64K of memory is divided into two groups, one 48K and one 16K. The 16K memory area can be turned on or off as needed by a program. The memory must be on to read its contents, and must be off in order to use the Basic stored in the Apple ROM. Some programs just store information into this memory then turn the memory off for a while. The information is still there and can be retrieved by turning the memory on again later. To complicate things a little more, 8K of the memory is divided into two 4K banks (numbered 1 and 2), only one of which can be selected at any one time. (For more detailed information, consult your computer or memory card manual.)

Suppose you wish to make a backup of a protected program. When you press the button, there are four possibilities for the 16K memory:

1) The memory is on, with bank 1 selected.
2) The memory is on, with bank 2 selected.
3) The Basic ROM is being used and the memory is currently off, but it contains important information which should be saved.
4) The top 16K of memory is being ignored altogether.

Apple][Plus

If you have an Apple][Plus, then the SAVE 48K option will appear in inverse when you press the button. There is no way for Wildcard 2 to tell whether the 16K memory was on or off.

Most programs which use the top 16K of memory will mention this in their manuals. Look for phrases like: "...requires an Apple][with 16K memory card". Some programs don't require the extra memory, but will use it if it's available. If you think this memory is being used by the program you're backing up, select the SAVE 64K option instead of the SAVE 48K option.

If you select SAVE 64K, the following sub-menu will appear:

```
WHICH MEMORY ON?
    ROM
    BANK 1
    BANK 2
```

Select the appropriate memory, using the arrow keys and [Return]. Most 64K programs only use bank 2. Try this first. Others, such as Apple Pascal, switch frequently between the two banks, and may require a couple of trials to copy. Try to find a stable place in the program (such as an input) to press the Wildcard 2 button when saving these, and select bank 2 for your first try.

Apple //e

If you have an Apple //e, Wildcard 2 automatically determines whether or not the top 16K of memory was on when you pressed the button.

If you have an Apple extended 80-column text card installed in your computer, then another 64K of auxiliary memory is also available for a total of 128K. As with the top 16K of main memory, the auxiliary memory on the card can be turned on or off by a running program. When it is on, it replaces some or all of the memory built into the Apple so that no more than 64K is ever being used at any one time.

With the extended text card installed, the SAVE 128K option will also appear in the main menu. If you select SAVE 128K, then the entire 128K of memory will be saved to disk, including the main 48K, the top 16K, and the auxiliary 64K of RAM.

When you first press the button on Wildcard 2, either SAVE 48K, SAVE 64K, or SAVE 128K will be in inverse. If SAVE 128K is in inverse, this means that the auxiliary memory on the extended text card was on when the button was pressed. You should definitely select the SAVE 128K option to save the entire 128K of memory. If SAVE 64K is in inverse, then the top 16K of main memory was turned on. You should select either SAVE 64K or SAVE 128K so that the top 16K will be saved. If SAVE 48K is in inverse, then neither the top 16K nor auxiliary memory were on when you pressed the button. Remember, however, that these areas can sometimes still contain important information even though they're off.

Whichever save option you select, Wildcard 2 will make sure that the program restarts with the correct memory and bank settings.

Continuing with SAVE

After selecting either SAVE 48K, SAVE 64K, or SAVE 128K, the next message will be:

```
INSERT A BLANK DISK AND PRESS [RETURN]
(OR PRESS [ESC] TO EXIT)
```

Insert a blank disk (or any disk with information that can be erased) into the boot drive. REMEMBER TO REMOVE YOUR ORIGINAL DISK!! Also make sure that your blank disk does not have a tab over the write-protect notch. Press [Return]. (If you decide you don't want to save the program, press [ESC]. You'll be returned to the main menu.)

If any problem occurs while the program is being saved to disk, the message:

```
DISK ERROR!
```

will appear. Double-check that the disk is not write-protected and the drive door is closed. If this is not the problem, the disk may be partially defective. Try another disk.

Wildcard 2 formats the disk track by track as it writes the contents of Apple memory. You don't need to initialize the disk ahead of time.

Here are the approximate times for each of the save options:

SAVE 48K	12 seconds
SAVE 64K	25 seconds
SAVE 128K	50 seconds

Note that when saving or booting a program, occasionally the drive may stop spinning then restart for a moment. This is a normal part of the Wildcard 2 operation and does not indicate a problem.

Booting Your Saved Programs

To restart a copy made with Wildcard 2, simply boot the disk as you would with any other program. The disk will whir for a moment, then the following message will appear:

```
PRESS THE WILDCARD BUTTON TO CONTINUE...
```

When you press the button, Wildcard 2 itself takes over the loading and restarting of the program, displaying the message:

```
LOADING BACK-UP...
```

The disk will whir for a few more seconds as Wildcard 2 restores the program in memory, then the program will begin running again. Here are the approximate loading times for each program size:

48K	10 seconds
64K	13 seconds
128K	26 seconds

RESTART PROGRAM

Another option from the main menu is RESTART PROGRAM. You can use this option to resume execution of your running program after pressing the Wildcard button. Simply use the arrow keys to display RESTART PROGRAM in inverse, then press [Return]. If you have either an Apple //e or a 48K Apple][Plus, the interrupted program will restart immediately.

If you have a 64K Apple][Plus, then the "WHICH MEMORY ON?" menu will appear first, so that you can select which memory should be active when the program restarts. After you select the appropriate memory option, Wildcard 2 will restart the program. (If you select the wrong memory option, the program will probably hang. You may still be able to recover by pressing Reset, or by pushing the Wildcard button and trying the RESTART PROGRAM option again.)

(Note: If a peripheral card was on when you pressed the button, you'll need to use the INITIALIZE SLOT option before restarting your program. See below.)

INITIALIZE SLOT

Another Wildcard 2 option is INITIALIZE SLOT. Sometimes you may need or want to freeze a program with Wildcard 2 while a printer, modem, or other peripheral is being used. If so, then the peripheral will usually need to be "initialized" whenever the copy is restarted. This helps to set the hardware to the way it was when the program was stopped, so that all conditions are the same when the copy is booted.

Wildcard 2 will initialize a peripheral card on restart for you. When you select INITIALIZE SLOT, a colon and a flashing cursor will appear. Simply enter the slot number you want to initialize. After you've entered a valid slot number, the colon will disappear but the slot number will remain, showing that the slot will be initialized whenever the program is restarted or booted. (If you change your mind and don't want to initialize the slot, just select the option again and press [Return]. The slot number will go away.)

Saving 80-Column Programs

If you have an Apple //e 80-column text card, Wildcard 2 will save 80-column programs automatically. Wildcard 2 keeps track of the 80-column hardware and firmware settings, and restores these when you restart the program or boot a copy.

If you're using a different 80-column card that is plugged into one of the 7 slots rather than the "auxiliary slot", the procedure may be a little tricky. The main difficulty is that Wildcard 2 menu appears only on the standard 40-column screen. If an 80-column card is on, you won't see the menu, even though Wildcard 2 is working perfectly! (Wildcard 2 has no way of knowing how to turn off the 80-column card, since nearly every card on the market uses a different method.)

If the 80-column card is on, you can usually still display the 40-column screen (and Wildcard 2 menu) by connecting the cable from your monitor directly to the Apple video-out jack. Some 80-columns cards also have switches connected to the circuit card that you can use to select between 40 and 80 columns.

Once the menu is on the screen, select INITIALIZE SLOT. Enter the slot number that your 80-column card sits in (usually slot 3). Then save the program in the usual way. When you boot the copy, the 80-column card will be automatically turned back on. Make sure that the video cable is reconnected to the 80-column card.

When you boot a copy made this way, you will get a blank screen as Wildcard 2 cannot restore the 80-column screen. You must initiate some action which will cause the program to display something on the screen. Sometimes pressing [Reset] works. You will have to find the right command for the particular program.

VIEW CURRENT SCREEN

The VIEW CURRENT SCREEN option shows you a "frozen" picture of whatever was on the screen when you pressed the Wildcard button. Wildcard 2 remembers what kind of screen (text or graphics) was displayed when the program was interrupted, even on an Apple][Plus.

To return to the main menu after viewing the current screen, press any key.

PRINT CURRENT SCREEN

The PRINT CURRENT SCREEN option is a handy utility you can use for making a hard-copy of nearly anything that appears on the screen during a running program. With any printer card, it can print the contents of the Apple 40-column text screen. If you have a Grappler or Grappler-compatible printer card and a graphics printer, then this option can also print any high-resolution graphics screen image. If you have an Apple //e, it can also print any Apple 80-column text screen. Printing the current screen is easy:

1) Make sure your printer card is in slot 1, and your printer is on.
2) When the screen you wish to print is being displayed, press the Wildcard 2 button.
3) Select the PRINT CURRENT SCREEN option. The contents of the screen are printed immediately.
4) Was a peripheral card on when you pressed the Wildcard 2 button? If so, use the INITIALIZE SLOT option to re-initialize it.
5) Use RESTART PROGRAM to resume execution of your program.

If you're not sure if the screen is exactly the way you want to print it, you can use the VIEW CURRENT SCREEN option to verify that it's correct before you print it with PRINT CURRENT SCREEN.

CLEAR MEMORY AND BOOT

The CLEAR MEMORY AND BOOT option basically does what its name implies: It lets you clear all of Apple memory, then boot a disk. When you select this option, the following message appears:

```
INSERT DISK AND PRESS [RETURN]
(OR PRESS [ESC] TO EXIT)
```

Insert the disk you want to boot, then press [Return]. There will be a short pause as memory is cleared, the the disk will boot.

Wildcard 2 will sometimes take advantage of the fact that memory is "clean" when creating a back-up. Usually you don't need to worry about this at all. However, if Wildcard 2 ever seems to have trouble making a reliable copy of a particular program, you may want to try the following simple procedure:

1) Press the Wildcard button.
2) Select the CLEAR MEMORY AND BOOT option.
3) Insert the disk you want to make a backup of.
4) Press [Return] to boot the disk.
5) After the program has loaded, press the Wildcard button again and make the backup.

Always try making a normal backup first, before trying the above method. The CLEAR MEMORY AND BOOT method isn't necessarily "better"; it's just different.

(CLEAR MEMORY AND BOOT does come in handy if you want to make compressed DOS copies of your program. The details are in Chapter Three.)

JUMP TO MONITOR

This option is mainly intended for machine language programmers. You can use Wildcard 2 to freeze a program, then enter the Apple system monitor to examine or change nearly any value in Apple memory, then restart the program again.

When you select the JUMP TO MONITOR option, Wildcard 2 clears the screen and enters the Apple system monitor with an asterisk prompt. While in the monitor, you can use CTRL-E to see the values that the 6502 registers contained when the program was frozen. The 6502 program counter is also saved into locations $3A and $3B, which are used by the monitor's [L]ist and [G]o commands. If you do a [L]ist, the disassembly will begin at the address where the program was stopped. (All register values are also stored in Wildcard 2's internal memory, so changing the values in these locations will not affect the actual copy in any way.)

To re-enter Wildcard 2, press [CTRL-Y] and [Return]. The following message will appear:

```
PRESS THE WILDCARD BUTTON TO CONTINUE...
```

When you press the button, the Wildcard 2 main menu will reappear. From here you can use the RESTART PROGRAM option to resume execution of your running program.

Nearly every location in Apple memory is left untouched when you enter the monitor. However, some locations are changed, then restored when Wildcard 2 restarts the program. Here are the addresses of those locations:

$20 — $6F	Various monitor and zero page locations
$100 — $1FF	6502 stack
$200 — $2FF	Line input buffer
$3F8 — $3FA	CTRL-Y vector
$400 — $7FF	Text screen area

(Note: When Wildcard 2 jumps into the monitor, it leaves the stack pointer at the same place it was set when the running program was interrupted. Even though the monitor is using the stack above this point, any values or return addresses that the running program had pushed on the stack will still be valid.)

Summary: How to Make a Back-up

1. Run the program to be copied.

2. As soon as practical after the program is loaded, press the Wildcard 2 button.

3. Was any peripheral card actually in use when you pressed the button? If so, use INITIALIZE SLOT to select the slot number of the peripheral card.

4. Select either SAVE 48K, SAVE 64K, or SAVE 128K.

5. If you selected SAVE 64K on an Apple][Plus, use the WHICH MEMORY ON? menu to select which 16K memory option to turn on whenever the backup is booted.

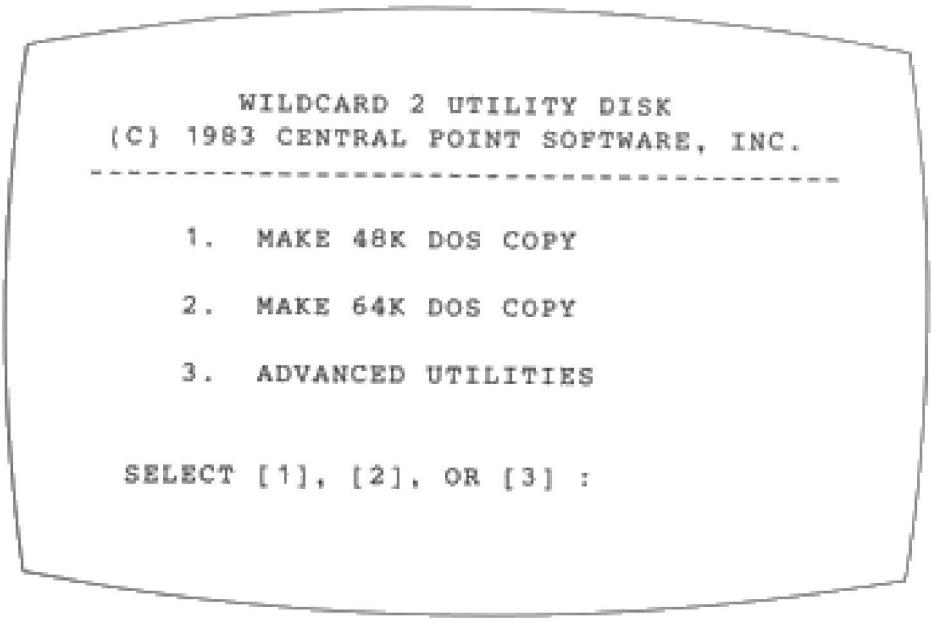
6. Insert a blank disk or a disk that doesn't have any valuable data into the boot drive, then press [Return]. The disk drive will whir for a few seconds as Wildcard 2 creates the back-up of your program.

To run the back-up, simply boot the disk then press the Wildcard button when the message comes up.

CHAPTER THREE:
THE WILDCARD 2 UTILITY DISK

Introduction

The Wildcard 2 Utility Disk adds several easy-to-use functions to your Wildcard 2. For a quick glance at what's available, boot your copy of the utility disk. You'll see the following menu:



MAKE DOS COPY

The options MAKE 48K DOS COPY and MAKE 64K DOS COPY can be used to convert your 48K and 64K fast-booting Wildcard 2 copies into DOS compatible files. Hard disk owners will find this to be a great advantage, since they can run their back-ups directly from the hard disk. Floppy disk users can store two 48K or 64K copies on each disk, so they don't have to use as many disks to store their back-ups. In addition, Wildcard 2 isn't used when the DOS copies are restarted, so the card doesn't need to be present in the computer.

To boot and run 48K DOS back-ups, you need an Apple with at least 64K of RAM (i.e. an Apple][or Apple][Plus with a 16K memory card, or an Apple //e). To run 64K DOS back-ups, you must have an Apple //e with an extended 80-column text card. This extra memory is needed because the disk operating system has to be loaded into the computer along with the entire memory image that was saved.

Since these utilities work on the fast-booting copies created by Wildcard 2, you need a working copy of a program in order to try out this disk. We recommend that you make a copy using "A First Example" described in Chapter One. This is a simple program which can be used with the MAKE DOS COPY and ADVANCED UTILITIES options.

If you're using a floppy disk, you'll also need a DOS disk to save the files onto. You can either initialize a new disk, or use a disk which is not very full. Note: If you own one of the commercial "DOS speed-up" programs which shortens the loading time of binary files, we suggest you make your initialized disk a "fast-DOS" disk. The binary file copy will then load 2 to 5 times faster.

If you want to save the DOS copy directly onto a hard disk, then don't boot the utility disk directly. Instead boot up the hard disk, insert the utility disk into your floppy drive, and type:

```
RUN HELLO,S#,D#
```

substituting the slot and drive numbers of your floppy drive for #. The utility disk menu will appear.

The MAKE DOS COPY options create the DOS copy by reading the data from your fast-booting copy and saving either two or three files onto your DOS disk. If you have two disk drives, this procedure is completely automatic. If you have only one drive, then the program will tell you when to insert each disk.

After booting the Wildcard 2 Utility Disk, press [1] to make a 48K copy, or [2] to make a 64K copy. The disk will whir as the appropriate program is loaded. A menu similar to the following will appear:

```
              WILDCARD 2
          48K BINARY FILE MAKER
  (C) 1983 CENTRAL POINT SOFTWARE, INC.
 ----------------------------------------

      COPY DISK SLOT: DEFAULT=6
                DRIVE: DEFAULT=1

    BINARY FILE SLOT: DEFAULT=6
                DRIVE: DEFAULT=2
               VOLUME: DEFAULT=0
  FILENAME:

 ENTER VALUES OR
 PRESS [RETURN] TO ACCEPT DEFAULTS OR
 PRESS [ESC] TO EXIT.
```

If you selected to make a 64K DOS copy, the header will say "64K BINARY FILE MAKER". The default values listed may also be different, depending on what drive the program was run from.

The questions allow you to tell the program what drives you want to put the disks into. COPY DISK SLOT and DRIVE refer to the fast-booting copy, and BINARY FILE SLOT and DRIVE refer to the DOS disk where the binary files will be stored.

The cursor will be flashing beside the COPY DISK SLOT question. If you want to use the slot shown for the fast-booting copy, press [Return]. If you want to use a different slot, type the slot number. (If you make a mistake, the speaker will beep.)

The cursor will then flash beside the DRIVE question. Either press [Return] or enter a new drive number.

You will then be prompted for the BINARY FILE SLOT and DRIVE. If you have a DOS-formatted hard disk that uses volume numbers to simulate floppy disk drives (see below), you can save the files directly onto the hard disk. Select the slot and drive numbers in the same way.

The next question asks for a VOLUME number. Some hard disks are divided into many volumes, each with the same storage as one floppy disk. If you're saving onto a hard disk that uses this scheme, enter an appropriate volume number. If you're saving onto a floppy, simply press [Return] to accept a volume of 0 (which will match any disk volume).

The last question allows you to select what FILENAME to give the files. Type in the name you want your program saved as, then press [Return]. The filename can't be any longer than 28 characters.

(A 48K save creates two files, and a 64K save creates three files. The second and third files will have a ".A" and a ".B" tacked onto the end of your filename. You don't need to worry about these files though. When you run the first file, it will automatically load the others for you.)

If you make a mistake when answering any of the above questions, and want to start over, press [ESC]. If you want to exit out of the program, press [ESC] twice.

After answering all of the questions, the screen should look something like this:

```
            WILDCARD 2
        48K BINARY FILE MAKER
 (C) 1983 CENTRAL POINT SOFTWARE, INC.
---------------------------------------

     COPY DISK SLOT: 6
               DRIVE: 1

   BINARY FILE SLOT: 6
               DRIVE: 2
              VOLUME: 0
  FILENAME: BACKUP

--------------INSERT DISKS-------------
PRESS [RETURN] TO PROCEED OR
PRESS [ESC] TO EXIT
```

Insert the disks in the drives you selected, then press [Return]. The drives will whir for a couple of minutes, saving the files onto your DOS disk. Note: This must be a DOS 3.3 disk, not a ProDOS disk.

If you selected the same drive for both the copy disk and the binary file, you will instead be prompted when to "INSERT SOURCE DISK" or "INSERT DESTINATION DISK". "Source disk" refers to your fast-booting copy, and the "destination disk" is your initialized DOS disk.

After the program finishes writing the files to disk, it will clear the screen, print "ALL DONE!", and return you to Basic.

Restarting Binary File Copies

To restart a binary file copy made with the Wildcard 2 utility disk, simply boot DOS, insert the disk with the back-up files in the drive (or select the proper volume on your hard disk), then type:

```
]BRUN BACKUP
```

substituting the name of your file for "BACKUP". The drive will whir, and after a few seconds, a phrase similar to:

```
        48K WILDCARD 2 COPY
```

will appear at the top of the screen. The copy will continue loading, then the program will resume its execution, right from where it was interrupted when you pressed the button on Wildcard 2.

Making DOS Copies Load Automatically

You may want your DOS copy to load automatically when you boot your DOS disk. If so, you can easily add a short Basic program that will do this.

When you originally initialized the DOS disk, you probably used a command like:

```
INIT HELLO
```

Disks initialized this way will always run the Basic program named HELLO when they're booted. You can change the HELLO program so that it BRUNs your Wildcard 2 DOS copy for you. Type this one-line program:

```
]NEW

]10 PRINT CHR$(4);"BRUN BACKUP"
```

again substituting the name of your file for "BACKUP". Insert your DOS disk and type:

```
]SAVE HELLO
```

Now whenever you boot your DOS disk, it will automatically load and run your DOS backup.

ADVANCED UTILITIES

The Advanced Utilities add several easy-to-use functions to your Wildcard 2. These are:

* Compressing BRUN file maker
* Screen Erase, View, and Print
* Recover APPLESOFT programs
* Save portions of memory as binary files

This menu driven program is simple to use, yet very powerful. Use the BRUN file maker to put multiple programs on a disk or on a hard disk. The APPLESOFT recover program will unlock protected APPLESOFT programs for modifications, bug fixes or "just to see how it was done".

1) ERASE lets you wipe clear any text or graphics screen stored on a WILDCARD 2 disk. This is useful in conjunction with the compressing BRUN file maker described below.

2) PRINT will let you print text and graphics screens from a WILDCARD 2 diskette. If you wish to print graphics screens you will need a printer and printer card with graphics print capabilities such as the ORANGE MICRO GRAPPLER and the EPSON MX-80 with Graftrax.

3) VIEW lets you see the various text and graphics screens stored on a WILDCARD 2 disk.

4) COMPRESSING BRUN FILE MAKER. With this program, you can convert a 48K or 64K WILDCARD 2 copy into a single Binary file which can be BRUN on a 48K or 64K Apple. The compressor automatically reduces the program into the smallest file possible. The resulting file may be placed on a hard disk, or more than one program may be placed on a floppy diskette.

5) MAKE FILE will save 16K portions of a WILDCARD 2 disk as discrete DOS 3.3 binary files. While these files cannot be BRUN, they can be used for dissassembly and to make modifications. Other functions include the ability to save graphics screens as binary files and to extract any APPLESOFT program which may be in a WILDCARD 2 disk copy.

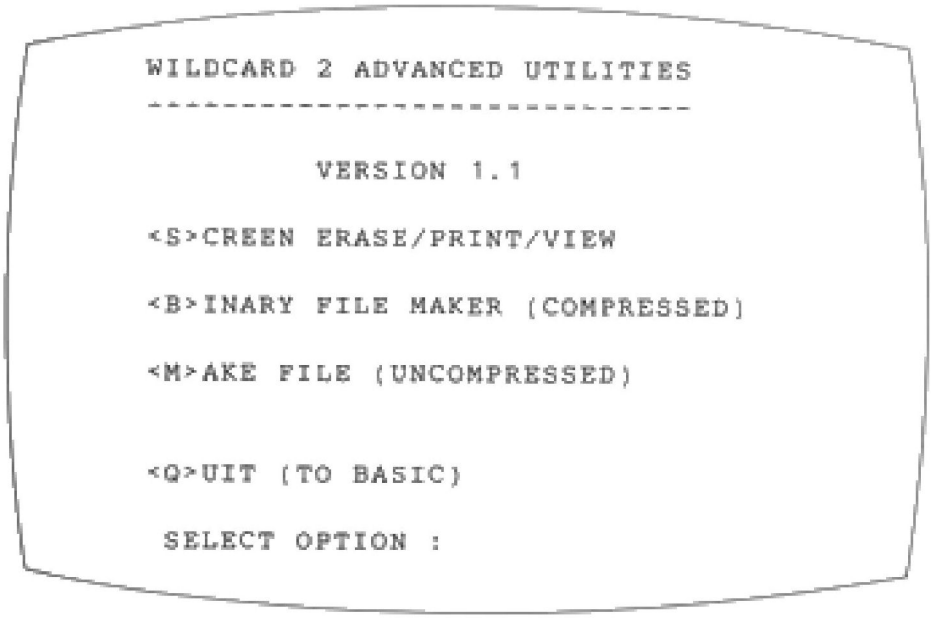
The Advanced Utilities require nothing other than an appropriate printer card and printer if you are doing printing.

In the Advanced Utilities, the first letter of a valid option is highlighted by showing it in inverse (white on black). Throughout this chapter we will show the highlighted character by surrounding it with brackets, i.e., <Q>UIT. To choose that option, press the key on the computer which corresponds to the highlighted character. For example, if <Q>UIT is the option, simply press the "Q" key.

It would be wise to initialize a few blank disks at this time for storing BRUN files and the files produced by the MAKE FILE option.

Since the WILDCARD 2 Utility Disk works on fast-booting copies created by Wildcard 2, you also need a working copy of a program in order to try out this disk. We recommend that you make a copy using "A First Example" described in Chapter One. This is a simple program which can be used to demonstrate several features of the Advanced Utilities.

Once you have made a copy using Wildcard 2, boot the Wildcard 2 Utility Disk and select option 3. The Advanced Utilities will load, and display this menu:



The utility disk may now be removed from the disk drive; all the functions are contained in the computer's memory.

Let's start with the last option in the above menu first as it is the most simple.

QUIT TO BASIC

This lets you exit the Advanced Utilities and places you into whatever BASIC you started with, i.e. INTEGER or APPLESOFT. When you press <Q>uit you will be prompted with:

```
<ESC>APE TO MAIN MENU OR <RETURN> TO CONTINUE
```

If you press the <ESC> key on the APPLE you will be returned to the MAIN MENU. If you press <RETURN>, the screen will clear and you will be put into BASIC.

If you want to restart the utilities from BASIC, type the following at the BASIC prompt (] or >):

```
]CALL 16384 <return>
```

This will return you to the MAIN MENU. If, however, you have run any program or typed any BASIC commands, it is best to reboot the Wildcard 2 Utility Disk.

SCREEN ERASE/VIEW/PRINT

Using the SCREENS option will allow you to examine and erase text or high resolution screens on a Wildcard 2 disk. Additionally, you can print the contents of the text and graphics screens to a printer.

After pressing <S> at the MAIN MENU, you are asked to place a WILDCARD 2 disk in drive 1 and press <RETURN>.

After pressing <RETURN>, the disk will be checked to make sure it is a WILDCARD 2 fast-booting copy. If it is not, you will see an error message. If this happens, either you have not inserted an autobooting WILDCARD 2 diskette, or it has been damaged. You can press <ESC> to return to the main menu.

If all is correct, the following message will appear:

```
<T>EXT OR <H>IRES :
```

Select whether you wish to work with a Text or Hires screen by pressing <T> or <H>. You are then asked to select screen 1 or 2 in a similar manner. Finally, you are asked to <V>iew, <E>rase or <P>rint the screen.

Selecting <V>iew causes the selected screen to be displayed. While in <V>iew, pressing <T> or <H> causes you to move to text or high resolution graphics screens, and you can move to primary or secondary screens by pressing <1> and <2>.

Every time you make one of these selections, the disk drive will run while the appropriate information is read from the disk.

<E>rase will clear the selected screen and rewrite the cleared screen to the WILDCARD 2 disk. This feature is useful in helping the BINARY FILE MAKER compress a file, but should only be used if the screen contains text or graphics pictures.

<P>rint will let you print the selected screen to the printer. After you select PRINT and select the appropriate screen, you will be asked to enter the PRINTER SLOT number. This should be a single number from <1> to <7>. If your printer card is in slot 1, then enter <1>.

The disk will run for a little while and then one of two things will happen. If you have selected <T>EXT, the printer will print your text screen. If it doesn't, check that your printer is turned on and properly selected.

If you have selected <H>IRES, the selected screen will be displayed and a second or so later, the following message will be displayed on the bottom of the screen:

```
<ESC>APE TO REENTER OR <RETURN> TO PRINT
```

Pressing <ESC> will take you back to the utility menu to try again. <RETURN> will move you to the printing section. You will see a message that you need an appropriate printer interface card and graphics printer. An ordinary interface card and printer will not be able to print graphics.

You are now prompted to enter the appropriate command to send to the printer interface card. The flashing cursor is placed at the '>' prompt. All valid keyboard characters may be entered. If you make a mistake, use the arrow keys to move back and forth. Control characters can also be entered but they will not be displayed on the screen.

The normal sequence with most graphics printer cards is <CTRL-I> G. End your entry by pressing <RETURN>.

If you press <RETURN> without entering anything you will be returned to the beginning of the SCREEN utility.

You are given a second chance to change your entry by pressing <ESC> or you can start printing by pressing <RETURN>. When the printer is finished, you will be returned to the beginning of the SCREEN utility.

BRUN FILE MAKER (COMPRESSED)

Using this function, you can convert a WILDCARD 2 disk into a single, compressed binary file which can be BRUN. Thus, several programs can be stored on one disk or the program may be put on a hard disk. This function will compress 48K or 64K saves. Larger copies (from a //e) will still compress but the extra memory from the extended 80 column card will not be stored as part of the compressed file. The original WILDCARD 2 disk is left untouched and will still function normally.

If the program on the WILDCARD 2 disk is 64K or 128K, you will be asked if you wish to compress all 64K or if only 48K should be compressed. Usually you will select option <6> which will compress the entire memory image.

You will now be asked to enter a name for this BRUN file. Any valid DOS 3.3 name may be entered. If you press <RETURN> without entering anything, the name WILDCARD 2.BIN will be entered.

If you enter only a <CTRL-C>, you will return back to the previous step.

After a few moments of running, you will be asked to insert a DOS disk in drive 2. If you only have one disk drive, press <1>. You will then be prompted to switch between the WILDCARD 2 disk and a DOS initialized disk. Have an initialized DOS disk available to store the compressed binary file.

The compression process takes a couple of minutes to complete, and while the compressed file is being transferred to the DOS disk, a display of the current size (in hexadecimal) is shown on the screen. This starts at the full memory size and becomes smaller as the memory image is compressed. If the compressed file is larger than 32K ($8000 in hexadecimal), you may experience problems in BRUNning the file. This is because the BRUN file will start to overwrite DOS as it is loaded. If you have a 64K Apple, we have provided a program to move DOS into the 16K RAM CARD area (or the top 16K on a //e).

If you BRUN a compressed file and get an I/O ERROR, boot the Wildcard 2 Utility Disk and press <RETURN> at the selection menu. This will put you into BASIC. Now enter:

```
BRUN DOS-UP <RETURN>
```

When DOS-UP is finished, it will re-display the selection menu. Press <RETURN> again and insert the disk containing your BRUN file and BRUN it.

Even if the file compresses below 32K, it may not work. In most cases, compressed files will run fine, but for a few programs, the compression destroys data that the program needs and it simply will not restart correctly. Unfortunately, there is no solution to this problem; you simply can not compress these programs. Use the standard uncompressed binary file maker (options 1 and 2 on the WILDCARD 2 Utility Disk).

A compressed binary file can be transferred to and BRUN from a hard disk. When the program resumes, however, it will be exactly as it was when the WILDCARD 2 button was pushed. Thus, if it was a database program using a floppy drive, it will still expect to use a floppy disk for data storage even if you run it from a hard drive system. In other words, compression may allow you to *run* the program from the hard disk, but it doesn't mean the program will *use* the hard disk for data storage.

BRUN files may take a little time to restart after they are fully loaded. This is because the program needs to be uncompressed and this procedure takes a little time.

If the computer's memory is fairly "clean" when you make the original fast-booting copy, the compressing BRUN file maker will often make a smaller, more reliable backup. You can make sure that memory is clean by either turning the computer completely off and on again to boot the program to be copied, or by using the CLEAR MEMORY AND BOOT option. This will guarantee that the only program still in memory is the one you're making a backup of. You can then press the Wildcard 2 button and make the fast-booting copy, then use the Advanced Utilities to make the compressed BRUN file.

MAKE FILES (UNCOMPRESSED)

This function allows selected areas from a WILDCARD 2 disk to be converted into uncompressed binary files. Areas of 16K from main or auxiliary memory can be selected, as can 12K and 4K banks from the RAM card. These binary files *CANNOT* be BRUN. Graphics screens can be recovered as binary files.

After pressing <M> from the MAIN MENU, you are asked to place a WILDCARD 2 disk in drive 1 and press <RETURN>. If it is not a valid disk, you will get a beep and an error message. Pressing <ESC> will take you back to the menu. If it is a valid WILDCARD 2 disk, you will see:

	MAIN	AUX	MAIN	AUX
$0000-3FFF	<0>	<5>	N	N
$4000-7FFF	<1>	<6>	N	N
$8000-BFFF	<2>	<7>	N	N
$D000-FFFF	<4>	<9>	N	N
PRIMARY HIRES	<P>		N	-
SECOND HIRES	<S>		N	-
EIGHTY COLUMN		<E>	-	N
APPLESOFT	<A>		N	-

SELECT OPTION, FOLLOWED BY <RETURN>

MAIN refers to the standard 64K of memory found in the Apple][and //e. AUX refers to the extended 64K found in the //e only. The highlighted characters are valid keys and the corresponding N on the right hand side of the screen indicates that the option has not been selected.

Suppose, for example, that you wish to turn the 16K containing DOS ($8000-$BFFF) into a binary file. You would press <2> and the N would change to a Y. You can select as many options as you like and they will all be converted. (The filenames of the converted files are described below.)

Options <3> and <8> refer to the 12K of the RAM card including bank 2. Options <4> and <9> convert the 4k of bank 1 in the RAM card. <E> turns the contents of the auxiliary part of the //e 80 column card into a binary file (1K in length), and A recovers an APPLESOFT program if one was in memory when you made the copy.

When you have finished selecting the areas of memory to convert, press <RETURN>. As the utility works on a section, the 'Y' entries will flash. When a section is done, you will be asked to insert a DOS disk in drive 2. If you have 2 drives, press <RETURN>; if you have only 1 drive, press 1. You will be prompted to insert the correct disks as needed.

When a particular section is done, a 'D' for DONE will be displayed in the prompt area.

Selecting <A> will cause the utility to attempt to extract an APPLESOFT program from the memory image stored on the WILDCARD 2 disk. This utility will not convert a machine language program to APPLESOFT, but will only recover an existing APPLESOFT program contained in a WILDCARD 2 copy.

The recovered APPLESOFT program is saved to the DOS disk as an APPLESOFT file (DOS 3.3 A type file). This file may be loaded, saved, listed and modified like any other APPLESOFT program.

Be aware, however, that the recovered program may not run correctly or at all. This is because the program may call machine language routines which are not recovered with the APPLESOFT program. There may also be hidden characters in some of the lines and POKEs which cause the program to run incorrectly.

Filename Conventions for MAKE FILE

When the files are placed on the DOS disk, they will have the following format for their file names:

```
BIN N.WILDCARD 2
```

'N' stands for the number or letter of the option you selected from the MAKE FILE menu. For example, if you had selected <0> and <E> at the MAKE FILE menu, the files would be named:

```
BIN 0.WILDCARD 2
BIN E.WILDCARD 2
```

The only exception is when you select <A> for APPLESOFT. In this case, the file will be named:

```
A/S.WILDCARD 2
```

The A/S stands for AppleSoft.

CHAPTER FOUR: MULTI-ACCESS DISKS

Although Wildcard 2 is designed to back up only total-load (memory-resident) programs, it is possible to make backups of some multi-access programs. This is done by making a two disk copy. The first disk is a Wildcard 2 copy of the program made right after the program has finished booting, perhaps at a menu. The second disk is a copy of the entire original program disk made with a good bit copy program such as *Copy II Plus*.

What this technique does is to bypass the disk protection schemes which are generally heaviest on the 'boot' portion of a disk. When a bit copy program alone cannot make a working backup of a disk, it has often copied everything but the boot portion correctly.

Since Wildcard 2 makes a copy of the running program *after* it has booted, we have bypassed the boot protection. However, all we have done is copied one part of the program. What we need is a way to get all the other parts. You might think that you could make Wildcard 2 copies of the individual parts and try to join them back again. This is not at all practical. Most protected programs do not store the various modules in normal DOS formats (That's part of what makes them protected!), so putting a whole mess of files on a disk wouldn't help. We also don't know what type of files they are looking for and the best we can do is to create BRUN files.

The solution is to use the copy made by the bit copier. Once you have booted the copy made by Wildcard 2, remove the disk and replace it with the copy made by the bit copier. Hopefully, this will fool the program and it will read the files off the copy.

With this technique you can often create copies that boot faster than the original! Although this technique will not work all the time, we have had reasonable success making backups with this technique even with complicated "adventure" type programs.

Here is a summary of the technique:

1) Use Wildcard 2 to copy the part of the program that is first loaded into memory when the disk is booted.

2) Back up the entire disk with the bit copier. If the program boots on one side or one disk and then requires you to flip the disk over or insert a new disk, then copy the back side or the new disk with the bit copier.

3) To restart the program, boot the copy made with Wildcard 2, then insert the copy made with the bit copier.

CHAPTER FIVE

Possible Problems, and How to Deal With Them

Wildcard 2 hardware and firmware were designed with a great deal of forethought regarding compatibility with other hardware, reliability of operation, and ease of use. Every card is tested before it is shipped. However, computers being what they are, and Murphy's Law being what it is, you may at some point run into a problem. Perhaps you are having difficulty making a working back-up of a program, or maybe the Wildcard itself seems to be misbehaving.

If you do have problems, the first thing you should do is try it one or two more times. Computers are stranger than you think, and a little persistence can often make a difference. If the problem refuses to go away, take careful note of four things:

1) what you're trying to do,
2) what keys you press,
3) what you think should happen, and
4) what actually happens instead.

Also, try making a backup using the "First Example" from Chapter One again. It's a good no-frills test that can help determine if the Wildcard is basically working.

Following are a few common problems and what you can do to correct them, printed in a "question and answer" format.

Q: A "DISK ERROR!" message appears when I am making a backup.

A: Make sure a disk is in the boot drive, the disk does not have a tab over the write-protect notch, and the drive door is closed. If you still get the "DISK ERROR!" message, then the disk is probably defective. Try another disk.

Q: When I boot my back-up, the message "DISK ERROR!" appears.

A: The back-up disk was probably damaged since the back-up was made. You'll have to make a new back-up.

Q: When I boot my back-up, the program's original screen is displayed, but then the program hangs, behaves erratically, or tries to reset or reboot.

A: This could be caused by a number of things:

1) You may not have saved enough memory, i.e. selecting the SAVE 48K option to save a program that uses 64K or 128K, or selecting SAVE 64K to save a 128K program.

2) On an Apple][or][Plus SAVE 64K option, you might have selected the wrong WHICH MEMORY ON? option.

3) You forgot to initialize a peripheral card.

4) You're trying to run an Apple //e copy on an Apple][(or vice versa). This will sometimes work, but there are no guarantees. There are important differences between the two computers.

5) The program may not be a single-load program. If it's not, the disk drive probably whirred just before the error occurred. If you're not sure whether a program you're trying to back up is single-load, try this simple test: Boot your original program disk. When you come to the point where you'd *like* to copy the program, just remove the original disk from the drive. Then continue to use the program as you normally would. If it works without the disk in the drive, then it's a single-load (memory-resident) program. If the drive ever turns on and produces an error, then it is a multi-access program. (See Chapter Four for more information on multi-access disks.)

Q: My program hung, and I wanted to find out where it was stuck by using the JUMP TO MONITOR option. However, nothing happened when I pressed the Wildcard 2 button.

A: While trying to execute code where it wasn't supposed to, the processor encountered an "invalid opcode". Several of these nasty numbers can make the processor stop cold, so that it won't even respond to an interrupt from Wildcard 2. Pressing [Reset] is the only way back to reality.

If the card itself doesn't seem to be working correctly, there may be a hardware problem in your Apple. Wildcard 2 uses hardware features in the Apple that are ignored by most other peripheral cards and programs. Your computer will usually work correctly even if this special hardware is defective — until you try to use the special hardware by installing Wildcard 2. We've found that most problems of this sort are caused by the Apple rather than the Wildcard 2.

If you suspect a hardware problem, try the card on another computer if at all possible. This will help pin down the real source of the problem. We recommend that the more technically inclined reader refer to the February 1983 issue of Apple Orchard for the article "Diagnosing and Repairing Your Apple II" by Neil Lipson. It points out some of the more common hardware problems in the Apple][and][Plus computers.

If all else fails (!), please contact Central Point Software with a description of the problem. Have ready as much information on the problem as possible. With this information, problems that do come up can usually be corrected quickly and easily.

Possible MAKE DOS COPY Problems

If you run the MAKE 48K DOS COPY option on the Utility Disk, then insert a 64K or 128K fast-booting copy, the program will print the message "THIS ISN'T A 48K COPY" and stop. Similarly, using a 48K or 128K copy with the MAKE 64K DOS COPY option will produce the message "THIS ISN'T A 64K COPY". Load the correct option and try again.

If the utility has trouble reading the data from the fast-booting copy, the error message:

```
ERROR READING WILDCARD 2 DISK COPY
PRESS A KEY
```

will appear. Check to make sure the right disk is in the right drive and the drive door is closed, then try again. If the error message occurs again, try booting the copy directly. If a "DISK ERROR!" message appears, then the copy was probably damaged. You'll need to make a new backup.

If the utility has problems saving the binary files, a normal DOS error message will be printed. Make sure that you're using an initialized DOS disk that does not have a tab over the write-protect notch, etc.

Remember that a 64K Apple is needed to load a 48K DOS copy (not compressed) into memory. If there is not enough memory available, the copy will print:

```
I NEED 64K TO LOAD!
```

To load a 64K DOS copy, you need an Apple //e with an extended 80-column text card. If the text card is not present, the program will stop with the message:

```
I NEED AN APPLE //E EXTENDED 80-COLUMN
TEXT CARD TO LOAD!
```

(We hate to say this, but a number of customers have *thought* they had an extended text card in their Apple //e, when they actually had the standard text card. In case you're not sure: Apple's current extended text card has 10 black IC chips, and the printing "AIIE 80COL/64K MEMORY EXPANSION". The standard card has 5 IC chips and the printing "AIIE 80COL".)

Other Wonderful Products

Central Point Software also sells these other software back-up and disk utility products:

The Filer is a collection of file and disk utilities for the Apple computer. The Filer utility allows you to copy, delete, lock, and unlock files, copy DOS, and change the DOS booting program. Fast Copy is a very fast yet reliable copy program for DOS, CP/M, Pascal, and other Apple compatible diskettes. Disk Test is used for verifying that your disk drives are in top working order, and for checking the reliability of your floppy disks. All three Filer programs support 35, 40, and 70 track drives.

Copy][Plus is a sophisticated yet easy-to-use utility and software back-up product for the Apple. Copy][Plus can make back-ups of most popular software, protected or not. The Bit Copy option handles synchronized tracks, quarter tracks, bit insertion, spiral tracks, and other common protection schemes. The utilities are completely menu-driven, with convenient file selection. Options include copy files, disk, DOS; delete files, disk, DOS, lock/unlock files; format disk; verify disk, files, drive speed; view files; fix file sizes; track/sector map; change boot program; recover deleted files; sector editor; and catalog with file lengths, hidden characters, and deleted files. Copy II Plus was recently voted among the top 30 favorite Apple software products of all time in a survey of Softalk magazine readers.

Copy II PC is the most complete copy program available for the IBM Personal Computer. It copies most protected diskettes with no parameter changes, and uses all available memory to make reliable copies — fast. Copy II PC also includes a disk speed test to help keep your drives in top running order, and was also rated as one of the best selling IBM software products by Softalk magazine.

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