

**Double Density  
User's Manual**



**OSBORNE™**  
COMPUTER CORPORATION

**Double Density**  
**For the Osborne 1 Computer**  
(Part No. 3F 00070)

**WARNING:** Do not proceed using your new option until you have completed reading the manual. Failure to do so can result in damaging your double density master diskette and losing use of your computer while the diskette is replaced.

If left-hand drive packs it in,  
make right-hand drive "Drive A" by  
pressing **SHIFT** **"** simultaneously. Doing this will  
result in the right-hand drive becoming  
"A" & the left-hand drive becomes "B".

#### Double Density

Also, get ahold **For the Osborne 1 Computer**

(Part No. 3F 00070)

of [SWAPCOPY.COM](http://SWAPCOPY.COM) & .DOC on [//AVS1DV.000](http://AVS1DV.000).

This makes it possible to copy disks using  
one drive.

**WARNING:** Do not proceed using your new  
option until you have completed reading  
the manual. Failure to do so can result in  
damaging your double density master disk-  
ette and losing use of your computer while  
the diskette is replaced.

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### Introduction

Congratulations! You've just purchased the double density disk drive option for your Osborne 1 computer.

Your expectations are probably that you will receive twice as much storage per diskette than from the single density Osborne 1. You'd be right if you thought this, but you'd also be wrong, for our double density option is much more than just a doubling of the capacity of the disk drives.

A bit of historical perspective is need to tell you about the "other" things about our double density disk option provides you.

The first floppy disk drives were sold by IBM and used 8-inch diskettes. In IBM nomenclature, these drives formatted diskettes in the "3740" format, a process of dividing up the space on the diskette into concentric "tracks" of information, each of which was, in turn, divided into small blocks, called "sectors."

A number of other manufactures began making disk drives after IBM, but most chose to use IBM's method of arranging information stored on the diskette. This format is known by a lot of different names, but we'll refer to it as "standard 8-inch single density."

IBM and others eventually began looking for ways of increasing the amount of information stored on a diskette, and a number of "8-inch double density" formats appeared. Most of these new formats were the inventions of the firms that distributed them. The way they claimed compatibility with the rest of the world was that their double density implementation was also able to read and write the standard 8-inch single density format in addition to their double density format.

Meanwhile, a disk drive manufacturer by the name of Shugart invented what they called the "minifloppy." Basically, this was a smaller version of the 8-inch floppy IBM invented. This smaller disk drive used 5 1/4-inch diskettes, the type that are in your Osborne 1 computer.

Unlike IBM's disk invention, it seemed that few companies wanted to maintain compatibility with Shugart's small floppy. What this meant is that almost every manufacturer of computers that used 5 1/4-inch disk drives stored information on the diskette using

different methods. Never mind that the actual diskette was the same, you still couldn't take a 5 1/4-inch diskette out of one computer and put it into another.

Osborne Computer Corporation, in deciding what format to use to store information on a diskette, found that no two manufacturers thought alike, and that there was no commonly accepted 5 1/4-inch diskette format.

The stated intention of OCC is to build "standard" computers that use "standard" software; with 5 1/4-inch diskettes, the method that we used to store information on a diskette could not be standardized with that of other manufacturers. The problem is not the fault of any one particular manufacturer--rather it is the short-sightedness of an entire industry.

To make a long story short, there is a way out of the dilemma. As Mohammed is reputed to have said: "If the mountain won't come to Mohammed, Mohammed will go to the mountain." In designing our double density option, we at OCC decided to attempt to make our computer capable of using diskettes from a number of other manufacturers.

Thus, you'll find that you didn't just purchase double density, you purchased a multi-density disk option. Under the current release of double density, the following formats are all automatically recognized by the computer.

Osborne 1 single density	92k per diskette
Osborne 1 double density	182k per diskette
Xerox 820 single density	80k per diskette
Cromemco single density	80k per diskette
IBM Personal Computer (CP/M-86 format)	156k per diskette
DEC VT-180	171k per diskette

We've made our double density option more flexible than just this short list suggests, however. As we become more familiar with the formats used by other manufacturers, we will publish the methods to use to get our double density option to recognize these additional densities, most likely in our user magazine, The Portable Companion. It is anticipated that TRS-80 Model I and III CP/M, and Zenith/Heath double density may be supported as compatible formats in the future.

We don't want to mislead you, however. There are still disk formats that cannot be used in an Osborne 1 computer:

- o Any format that uses hard-sectored diskettes (North Star, Micropolis, Vector).
- o Any format that does not store information in the traditional block-of-bytes format (Apple, NEC).

- o Any format that attempts to modify the normal formatting used by LSI floppy controller chips.

Also, with our limited resources and immense growth, the number of additional formats we will be able to directly support has to be limited. Users who are experienced in Z80 assembly language and are familiar with how CP/M 2.2 accesses disk drives should find our implementation easy to reconfigure, however.

In short, while you have purchased increased data storage capacity for your Osborne 1 computer, you've purchased a great deal of convenience and flexibility, as well. Our only question is: why didn't some other computer manufacturer do the same thing before we did? We think you can guess the answer.

## Using Double Density

### Installation

The double density option has been installed in your computer. A small board is mounted directly above the main logic board of your Osborne 1 and connected to it by a short cable. In addition, a new ROM has been installed in your computer to replace the single density one.

There are instructions in this manual for converting your existing single density Osborne diskettes into the new double density format; and for reading and converting diskettes from other computers into Osborne double density format. The conversion of your existing single density disks will apply to you if you have just had your single density Osborne 1 upgraded to double density. If you bought your Osborne 1 with double density already installed, you probably won't have any single density disks that need converting, so you can ignore those parts of the instructions that refer to conversion from single density.

When you buy your double density Osborne 1, or get it back from your dealer after upgrading, you receive this manual and diskette. All you need to do to proceed is to read this manual, create a copy of your double density diskette, and begin using your new option.

### Getting Started

The first thing you should do with your new option is make a copy of the diskette we provide. We strongly encourage you to use certified double density diskettes now that you have double density. All testing of the double density option to determine whether it is functioning correctly is done by both Osborne Computer Corporation and your dealer using such diskettes. If you're on a tight budget, you might try using standard diskettes, but we make no claims that the double density option performs correctly with uncertified diskettes.

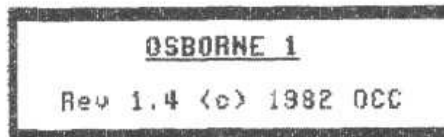
Certified diskettes are guaranteed by the manufacturer to be compatible with double density systems. Diskettes are sometimes sold with the claim that they're "usable" with double density systems. This is not the same as certified.

Be sure to fill out the registration card that accompanies the double density option; this is the only way that we know who you are so we can provide you with information about new compatible formats and other information that may make your double density option more flexible.



To copy the double density diskette we supply, perform the steps that follow.

1. Turn on the power to your Osborne 1. Note that the "sign-on" message looks different. If it is not as shown, your option was possibly not installed correctly (see your dealer if you experience problems):



Insert disk in Drive A and press RETURN.\_

2. Place the double density diskette in the left-hand drive, close the door, then press the RETURN key as the display on the screen indicates.
3. CP/M loads into your computer's memory and the HELP program appears. Press the ESC key (Escape) to display the A> prompt.
4. Type COPY and press RETURN.
5. The computer asks whether you wish to format or copy a diskette. Press C, for copy. Next, a message on the screen instructs you to press A or B to indicate the drive containing the diskette to be copied. Press A. Now, the system asks you to place the diskette to be copied in the lefthand drive and a blank, unformatted diskette in the righthand drive. The program prompts you to press RETURN to proceed.

OSBORNE DISK UTILITY PROGRAM  
Rev 3.1 (c) 1982 OCC

Select source drive for COPY (A or B)  
or press RETURN for main menu \_

(Note: We have changed the formatting messages in the COPY program slightly from the one used in the single density machines: using asterisks instead of "F's" to indicate that a track has formatted correctly. The program also allows you to select whether you want to format diskettes in single density or double density. Other than this, the COPY program remains the same as the single density one provided by Osborne.)

One nice thing about the COPY program is that if you put a double density diskette in drive A and select the copy option, the diskette created in drive B will be double density automatically; if on the other hand you put a single density diskette in drive A, the resulting diskette in drive B will then be single density.

Once you have created a copy of your double density diskette, place the original in a safe place and use the copy you made to continue.

We do not provide utilities to format or duplicate the alternate diskette formats we can read. You may, however, format diskettes with your other computer and then use PIP to copy files onto that new diskette using your Osborne 1 and double density. Remember, when you purchase software you normally must sign a license agreement that states you will use that software on one machine only. Therefore, while it is physically possible to copy programs between machines, it may not be legal to do so.

### Double Density Files

Your double density diskette contains a few new or changed programs. These programs are:

COPY	Copies or formats entire diskettes in either single or double density.
SYSGEN	Places new CP/M systems on double density or single density diskettes.
MOVCPM	Creates a different-sized CP/M system.
SETUP	Used to choose options of printer type, function keys, horizontal scrolling, etc. We have also added the ability to select which device number to use for the IEEE-488 port, and also allow a printer initialization string to be entered.

SYSGEN and MOVCPM work exactly as they did before. Attempting to use SYSGEN or SETUP to place a double density CP/M system on a single density diskette, and vice versa, results in an error message. And while you can read and write Xerox format diskettes, at present no facility for formatting or copying such diskettes (other than PIP) is supplied.

SETUP works similarly to the way it does under single density as described in the Users Reference Guide. The IEEE-488 device number and the printer initialization string options are selected by first pressing A (to specify PRINTER setup). The additional IEEE-488 device number option must be selected by any user who selects IEEE-488 as the printer type; the documentation accompanying your printer should tell you which device it expects to be addressed as.

The printer initialization string must be entered in hexadecimal notation, with each byte separated by a comma. Full instructions on each options appear on the screen when they re-selected.

In addition, SETUP also allows you to use the present system configuration (stored in memory) and change it. You may save your changes to memory (in other words, temporarily), by pressing M when prompted for what diskette to save the configuration on.

### Using Xerox, DEC Cromemco, or IBM CP/M-86 Diskettes

To use an alternate format density diskette in drive B, you would first start CP/M on Drive A using one of your Osborne double density diskettes with CP/M SYSGENed on it; then put your other diskette into drive B. That's all there is to it! The double density option will automatically switch between double density in Drive A and the other density diskette in Drive B. Double density automatically recognizes all the densities supported by Osborne Computer Corporation.

Due to the limitations of CP/M's need to occasionally perform "warm starts," you cannot use an alternate density diskette in drive A and write information to it without first SYSGENing CP/M onto that diskette. Since the SYSGEN operation must be performed on the Osborne 1, the result is that the CP/M image written on the diskette will not match the CP/M system tracks as supported by the manufacturer of the alternate diskette. In short, using our SYSGEN on an

alternate format diskette will allow you to perform a warm start from that diskette, but then that diskette will not warm start properly on your other machine. There is no simple method of avoiding this problem: the disk in Drive A must have our CP/M SYSGEN on it. This procedure may or may not be acceptable to you, depending upon whether you must maintain the integrity of the system tracks on that diskette.

A note about Cromemco format diskettes: Cromemco diskettes have many formats. The Osborne double density option can read the original 5 1/4 inch, single-sided, single-density Cromemco format.

### Using Single Density Diskettes

If you put a diskette created on a single density Osborne 1 into drive A and start the system, you'll find that it boots (starts) correctly. However, you would not be able to use double density diskettes in your system as long as you are booted in single density.

**RULE #1:** If you **boot in single density**, both drives are locked in single density and any attempt to use other format diskettes results in an error message.

If you put a double density diskette in drive A and start your system, **both** single and double density diskettes may be used interchangeably (as long as you do not have to restart CP/M with a single density diskette in drive A).

**RULE #2:** If you **boot in double density**, both drives respond to both single and double density diskettes.

**RULE #3:** You may SYSGEN double density CP/M onto a single density diskette in order to perform warm starts with the single density diskette in drive A. In that case you will be booting in double density as in Rule 2, above.

Basically, if you want the advantage of booting with double density, you must SYSGEN from your double density CP/M onto any diskette you wish to warm start with, even an Osborne format diskette.

Remember, to write to a diskette in drive A that is not Osborne double density, you must first SYSGEN that diskette.

### Using Double Density

Since double density offers so many advantages over single density, if you have single density disk files, you'll want to convert them over to all double density. Here's the process to use:

1. Start the system using your double density master diskette.
2. For each diskette you wish to create:
  - a. Use the format option of the COPY program to format a new double density diskette in drive B.
  - b. Leave the new double density disk in drive B. Put your single density CP/M master diskette in drive A and type:

PIP<cr>

PIP displays an asterisk to let you know that it is ready to accept commands. Don't worry about the fact that you haven't told CP/M you're switching formats.

- c. Put the single density diskette you want to copy into drive A (the double density blank diskette is still in drive B) and type:

B:-A:\*. \*[V]<cr>

You see the message **COPYING...** followed by a list of the files as they are transferred. PIP indicates it is through by displaying an asterisk again.

- d. When copying is complete, put your double density master diskette into drive A and press **^C**.
    - e. Use SYSGEN and SETUP to properly configure CP/M on your new diskette.

You may wonder why you can't simply use the COPY program to create a double density diskette. The reason is that when using COPY, the destination diskette assumes the format of the source. If the source diskette is single density, a destination diskette which is double density will be changed to single density. That's why PIP is needed to make the initial copies, because PIP doesn't change formats. Once



you have a double density diskette, you can use the COPY program to duplicate it.

If you purchase Osborne Approved Software, you might want to create "special" related-program diskettes. Some possible combinations are:

WordStar and Spellguard  
 WordStar, Math\*, Enumerate, Documate, and Footnote  
 WordStar and Grammatik  
 WordStar and Thesaurus  
 DataStar and SuperSort  
 MBASIC and BASCOM  
 SuperCalc and any CalcAid (tm)

### Differences?

Other than has been already described, there are virtually no differences in operation of an Osborne 1 equipped with double density as opposed to a single density Osborne 1. Your programs and data should work exactly as before--you'll just have more storage space to put them in.

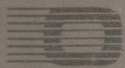
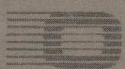
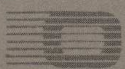
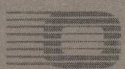
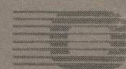
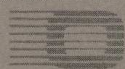
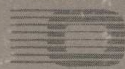
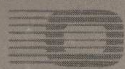
As with single density, however, do be sure to keep track of how much space you have remaining on a diskette. You shouldn't have as many Disk Full errors as before, but they can still be aggravating if you aren't expecting them.

### Technical Specifications

Here are the technical differences among the formats supported by the Osborne double density option:

	<u>Single Density</u>	<u>Double Density</u>	<u>Xerox Cromemco</u>	<u>IBM CP/M-86</u>	<u>DEC</u>
tracks per diskette	40	40	40	40	40
sectors per track	10	5	16	8	9
bytes per sector	256	1025	128	512	512
totaldiskette capacity	102K	204K	80K	160K	180K
reserved tracks	3	3	3	1	2
directory track	3	3	3	1	2
data storage capacity	92K	184K	74K	156K	171K
CCP starting location	OCF00h	OCB00h			
BIOS starting location	OE500h	OE100h			
sector skew factor	2	1	5	1	2

Note: The double density TPA has been reduced by 1K.



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