



# APPLE DISK COPY PROGRAM

- Nibble Copy Program
- Disk Speed Utility
- Bulk Erase
- Quick Scan
- Nibble Editor

**Omega MicroWare, Inc.**  
(formerly Omega Software Products, Inc.)

222 So. Riverside Plaza  
Chicago, IL 60606  
Phone 312-648-1944

## INTRODUCTION

Locksmith is a nibble copy program that allows the creation of archival copies of your most valuable software. This includes so called 'copy protected' disks.

Included within this package are several utilities designed to make the task of backing up your software easier. All of the utilities may be used on their own or in conjunction with the Locksmith copy routine.

There are two copies of Locksmith on the disk. Each side contains the entire set of utilities. This provides a means of back up for Locksmith itself. If your disk should be rendered unusable for any reason, simply send it and \$3.00 back to us for a replacement. Shipment of repairs is usually less than 24 business hours.

We at Omega have become exceedingly aware of the problems of disk protection and piracy. Although the law allows the creation of archival copies of computer software, it does NOT allow for giving away of copies of software. Nor does it allow selling copies made. It simply allows the owner of a computer program to make archival copies. Locksmith is distributed to accomplish this, and only this.

Omega MicroWare, Inc. makes no warranties, either expressed or implied, with respect to this product, its quality, performance, merchantability, or fitness for any particular purpose or use. This product is sold 'as is'. Omega MicroWare, Inc. will not be liable for direct, indirect, incidental or consequential damages as a result of the use of this product or as a result of any defect even if we have been notified of the possibility of such damages. This product, its media and documentation are copyrighted.

A purchase of Locksmith is actually a purchase of a non-exclusive license to use the Locksmith program.

## SYSTEM REQUIREMENTS

In order to use LOCKSMITH, the following is required:

APPLE II OR APPLE II +  
48K OF RAM MEMORY  
1 OR 2 APPLE DISK II DRIVES  
DISK CONTROLLER IN SLOT #6

The following additional features are supported:

THE INSPECTOR (TM) APPLE DISK AND MEMORY UTILITY  
PRINTER WITH APPROPRIATE INTERFACE

©1981 Omega MicroWare, Inc.

Apple is a registered trademark of Apple Computer, Inc.

## **AN OVERVIEW OF THE NIBBLE-COPY PROCESS**

Some commercially available software is stored on disks which are "copy-protected". This means that normal copying techniques will not work on these disks. Still, it is necessary to have back-ups for these programs. To make a back-up of these disks, it is necessary to use a "Nibble-Copy" program. This means that a copy program is required which will not have to rely on the disk format to allow it to work. The program makes no assumptions about the data on the disk, so it does not have the same constraints as normal copy programs. We will discuss some of the protection techniques as well as the method by which LOCKSMITH works.

### **PROTECTION TECHNIQUES**

Some tracks are unrecorded, to cause normal copy programs to halt when they encounter errors.

Non-standard Markers, Trailers, and Checksums are used, which do not allow standard DOS to understand the Address or Data fields.

Occasionally, track \$23 may be used. This is one track beyond the normal range, and standard DOS does not normally use this track.

Half tracks (a track half-way between normal tracks) may be used to record data. Since the head can't normally reach these, DOS is not able to read tracks recorded here.

Tracks may be synchronized. That is, tracks are positioned in a specific orientation around the disk. In this way, one tracks position must be related to another track in a specific timing relationship.

Non-standard self-sync may be used. Self-Sync is normally \$FF. By changing this value, other Nibble-Copy programs do not understand which nibbles are Self-Sync and which are not.

### **HOW LOCKSMITH WORKS**

Normal disk copy programs can be made very reliable, since they may use checksum information to insure reliable copies. Since this checksum information may be changed to allow disk protection, Nibble-Copy programs do not have this advantage. Therefore, to insure reliable copies, other techniques must be used. LOCKSMITH uses very reliable error checking to make sure that its copies are accurate.

When performing a copy, LOCKSMITH first reads in an entire track from the Original Disk, 2 or 3 times. The first and second images are compared together nibble by nibble. If any unequal comparisons are found, the third image is used

as a tie-breaker. Using this technique, extremely reliable copies can be produced without the need for checksum verification. After the data is analyzed, the track is written to the Copy Disk. Then, it is read back from the Copy Disk to verify that it was written correctly. This procedure is repeated for every track that is copied.

## **A WORD ABOUT SPEED**

All of this verifying and reading multiple track images takes time. LOCKSMITH is not the fastest Nibble-Copy program available but it is by far the most reliable. The time and memory which LOCKSMITH consumes analyzing, comparing, and verifying, could have been used to copy several tracks at a time. However, we feel that it is important to keep in mind the following:

**WHEN BACKING UP YOUR IMPORTANT (AND EXPENSIVE) SOFTWARE, SPEED IS USELESS WITHOUT RELIABILITY.**

## **BOOTING LOCKSMITH**

Your LOCKSMITH diskette may be booted on either a 13 or 16 sector DISK II CONTROLLER (DOS 3.2 or DOS 3.3). Your LOCKSMITH disk should be placed in SLOT 6, DRIVE 1 and booted. Shortly thereafter, the LOCKSMITH LOGO will appear, followed by the cover page. At this time, pressing "ESC" will enter the LOCKSMITH program. Replace your LOCKSMITH diskette in its protective envelope, and you are now ready to use the program.

## **LOCKSMITH SCREEN DISPLAY**

The screen display contains two selections, the STATUS DISPLAY and the CURRENT MENU.

The STATUS DISPLAY is located at the top of the screen, on the first five lines. The first two lines contain the TRACK LIST. Each track number is displayed here, starting at \$00 and ending at \$23 (note that the track numbers are displayed in HEX format, not DECIMAL). Although the APPLE II DISK usually uses only tracks \$00 - \$22, occasionally some software uses track \$23 as a method of software protection. For this reason, track \$23 has been included. Below this TRACK LIST, is the area for the STATUS CODE. The fourth line down from the top displays "TRK" on the left side of the screen. The status code for a normal track will appear on this line, directly below the track number in the TRACK LIST. The fifth line from the top displays "+.5" on the

left of the screen. Status codes for half tracks appear on this line. The following is a list of valid STATUS CODES:

- 0 - NO ERRORS WERE FOUND DURING A COPY OR QUICK SCAN
- 1 - THE TRACK WAS UNRECORDED OR ERASED
- 2 - THE TRACK DID NOT READ RELIABLY
- 4 - THE TRACK IMAGES DID NOT COMPARE RELIABLY
- 8 - THE TRACK DID NOT VERIFY CORRECTLY
- R - "READ" MODE
- A - "ANALYZE" MODE
- W - "WRITE" MODE
- V - "VERIFY" MODE (READ-BACK AFTER WRITING)
- S - "SYNCHRONIZE" MODE DURING READ OR WRITE
- E - "ERASE" (OR DEGAUSS) MODE
- C - "CERTIFY" MODE
- . - TRACK CERTIFIED CORRECTLY
- \* - TRACK DID NOT CERTIFY CORRECTLY
- N - "NIBBLE-EDIT" MODE
- \* (FLASHING) - "CHANGE" MODE OF NIBBLE EDIT
- F (FLASHING) - "FIND" MODE OF NIBBLE EDIT

The sixth line on the screen displays the command which is currently being executed. When the MAIN MENU is being displayed, it shows the LOCKSMITH VERSION # and SERIAL #.

The COMMAND MENU displays the different commands available with LOCKSMITH. Each of these will be explained in detail in the following portion of the manual.

## USING LOCKSMITH

You will find that LOCKSMITH was designed to be self-documenting. Most menus are self-explanatory, and simply require you to answer questions concerning the function desired. Most answers will require a single keystroke, and will not require pressing "RETURN". When you are prompted for an answer, simply press the key which corresponds to the function desired, and the program will continue.

The "ESC" key may be used at any time to abort the current function and restart. If you have made an error entering information, the "ESC" key may be used to restart, allowing you to re-enter the correct information.

Pressing "CTRL-Z" instructs LOCKSMITH to print the current screen display. This may be used at any time that LOCKSMITH is awaiting keyboard input. Refer to the section entitled "PRINT STATUS DISPLAY" for additional information.

LOCKSMITH may be exited by pressing " RESET". If you have an AUTOSTART ROM, the disk drive will reboot. If you have a STANDARD MONITOR ROM, the APPLE will enter the monitor.

The COMMAND MENU contains the different functions which LOCKSMITH is capable of performing. Press the correct key, and the command will be executed.

## 1. COPY DISK

This function is the most important one in the LOCKSMITH program. It will enable you to back up your copy-protected software. During its use, there are a number of different choices which must be made. After selecting COPY mode, you will be asked which drive number is the Original Disk, and which is the Copy Disk. After you answer these questions, you will be asked to select which Retry Mode should be used. When selecting from this menu, you are instructing LOCKSMITH how to handle errors which may arise during the copy operation.

In this menu, you will be given the choice of Automatic Retry, Manual Retry, or Extended Retry (normally, Automatic Retry should be selected). In Automatic Retry mode, LOCKSMITH will do its own error handling. In Manual Retry mode, LOCKSMITH passes control to the user each time an error occurs. You must then specify what course of action to take with the track in question. In Extended Retry mode, LOCKSMITH will just keep trying to copy a track until it gets it right (on a really messed-up track, this could take a while).

After deciding which type of Error Retry, you will be asked to select a Copy Mode. Mode #1 will copy an entire disk (tracks \$00 to \$22), without synchronizing or copying half tracks. In Mode #2, you may select which tracks you wish to copy. You will be prompted for a Start Track, End Track, and Track Increment. Simply enter the values for these questions and press RETURN. In this mode, half tracks are specified by adding ".5" to the track number (for example- 6.5). After entering this information, you will be prompted as to whether or not tracks should be synchronized. Most disks do not employ track synchronization as part of their copy protection.

LOCKSMITH is then ready to begin copying. Simply insert the diskettes, and press the space bar.

During the COPY operation, Processing Codes will appear on the display in the MENU area. These codes indicate what type of internal processing LOCKSMITH is performing, and are included to allow the user to provide useful information when inquiring about problem disks. However, a few of these codes may be of interest to the user. The block of HEX data consisting of 3 inverse lines labeled "TRKST", is the sequence which LOCKSMITH chose to be the start of the track. Also, the four digit HEX number immediately

following the inverse block is the nibble count for the track. Processing Code 14 indicates that LOCKSMITH used the third track image to resolve a discrepancy between the first two images.

## **2. QUICKSCAN**

QUICKSCAN mode may be used to assist in determining which tracks on a disk contain data and need to be copied. Basically, it works the same as the COPY option, except that it does not actually copy a disk. It reads and analyzes the disk data, but does not write back to a disk. Simply answer the questions regarding disk drive, tracks you wish to check, and track increment, and the QUICKSCAN will start. You may then analyze the STATUS codes, and decide which tracks need to be copied.

## **3. MODIFY PARAMETERS**

LOCKSMITH contains a number of parameters which may be changed to customize the program. These may be required occasionally to copy some disks. To invoke the parameter modifier, select option #3. Enter the parameter that you wish to modify, followed by a carriage return, and the current value will be displayed. You may then enter a new value, followed by a carriage return. This will change the parameter to the new value. Press "ESC" to return to the MAIN MENU.

NOTE - A SEPARATE LIST OF PARAMETERS, THEIR DEFAULT VALUES, AND THEIR DESCRIPTIONS HAS BEEN INCLUDED WITH THIS MANUAL.

NOTE - THE PARAMETERS OCCUPY PAGE \$0900 IN MEMORY. THESE PARAMETERS MAY BE SAVED AND RECALLED USING THE INSPECTOR (TM) INTERFACE. SEE THE SECTION ENTITLED "SELF-PATCH" FOR MORE INFORMATION.

## **4. INSPECTOR (TM) INTERFACE**

If you have THE INSPECTOR (TM) DISK AND MEMORY UTILITY installed in your APPLE (either ROM or RAM version), this function will allow use of the utility, while still under control of LOCKSMITH. This will allow great flexibility when working on disks. In order to use this, a disk containing DOS (usually 3.2 or 3.3 SYSTEM MASTER) must be booted prior to LOCKSMITH. This will allow THE INSPECTOR to read and write to disks. After the DOS disk is booted, you should then boot LOCKSMITH. Selecting command #4 will enter THE INSPECTOR, and CTRL-C from THE INSPECTOR will re-enter LOCKSMITH. If the APPLE does not contain either THE INSPECTOR or RWTS, an error message will be displayed, and LOCKSMITH will then be re-entered.

NOTE - THE INSPECTOR MAY BE USED TO SAVE PARAMETER AND PATCHER CHANGES TO A DISK FOR STORAGE AND RECALL. THIS METHOD WILL BE EXPLAINED IN THE SECTION ON THE SELF-PATCHER.

## 5. ERASE/DEGAUSS DISK

This function has been included to allow the user to conveniently erase all or part of a disk. This may be done in one of two ways. After selecting option #5, LOCKSMITH will ask if you wish to erase a range of tracks, or degauss a disk.

If you choose ERASE A RANGE OF TRACKS, you may specify a starting and ending track, as well as a track increment. After that, LOCKSMITH will erase this range of tracks.

If you choose to do a FAST DEGAUSS, the entire disk will be erased. LOCKSMITH accomplishes this by turning on the write head of the drive, and seeking between tracks \$0 and \$22. This will, in effect, erase spirals across the tracks. It will very quickly destroy any data on a diskette.

**WARNING - USING THIS FEATURE WILL DESTROY DATA ON THE TARGET DISKETTE. BE SURE THAT YOU DO NOT ACCIDENTALLY DESTROY A GOOD DISKETTE (ESPECIALLY YOUR LOCKSMITH).**

NOTE - THE DEGAUSS MODE IS ALSO EXCELLENT FOR CLEANING DISK DRIVES, IF THE USER HAS A CLEANING DISKETTE. SIMPLY PUT THE CLEANING DISKETTE IN THE DRIVE, AND SELECT DEGAUSS. THE HEAD WILL STEP VERY QUICKLY, CLEANING THE READ/WRITE HEAD.

## 6. NIBBLE-EDITOR

The NIBBLE-EDITOR may be entered either by selecting option #6 from the MAIN MENU, or by requesting it after an error has occurred while in Manual Retry mode. The NIBBLE-EDITOR is a valuable tool for the "ADVANCED" LOCKSMITH user. With it, you can read a track of data, inspect and modify the raw disk data (nibbles), and write the modified data back to the disk. A detailed discussion of nibbles and disk formats is beyond the scope of this manual, and will not be attempted here.

While in the NIBBLE-EDITOR, the area beneath the STATUS DISPLAY will display a portion of the nibble buffer. The nibble buffer is \$6000 bytes long, and will contain 2 or 3 images of the current track. To the left of each line of data is an address ranging from \$0000 to \$5FF8, which represents buffer displacement, and is not the same as memory address.

A pair of brackets ([ ]) indicates the current cursor location, and the cursor may be moved with the I, J, K, M, and the right and left arrow keys. Note that if an attempt is made to move the cursor off of the display (in any direction), the display will scroll forward or backward, or wrap around left and right. For continuous scrolling, the "<" and ">" (shifted or unshifted) can be used. Pressing any key will stop the scrolling.

The beginning of a track is indicated by the symbol "(" in front of a nibble. Similarly, the end of a track is indicated by a ")". These track beginning and end indicators may be moved by positioning the cursor at the desired location and pressing the "(" or ")" keys. The bell sounds if the track end is positioned before the track beginning.

It is possible to quickly move the cursor to the track beginning or end, from anywhere within the nibble buffer. CTRL-B is used to move the cursor to the beginning, and CTRL-E is used to move to the end. Pressing either one of these keys a second time will move the cursor to the buffer beginning or end.

Nibble data displayed in inverse represents Self-Sync nibbles. To change a nibble to Self-Sync, position the cursor over the nibble, and press "S". To change a Self-Sync nibble to normal, press "N". To change all nibbles in the buffer to normal, press CTRL-N.

Occasionally, some values for Self-Sync are used which do not read reliably. This is because the values chosen contain more than two consecutive zero bits. These "invalid" nibbles may be displayed by pressing CTRL-I, which sets them to Self-Sync.

It is possible to insert and delete nibbles in the buffer using the "+" and "-" keys. To add nibbles, position the cursor and press "+" (shifted or unshifted). The nibble at the current cursor location will be replicated. To delete a nibble, position the cursor and press "-".

Pressing CTRL-F will perform a search operation. To use this function, position the cursor over the first nibble in the search string. Press CTRL-F, followed by the length of the string (1-9 are allowed). The cursor will then move to the next occurrence of the string. If the string is not found after the current cursor location, the bell will sound. This function may be used to easily find the second occurrence of the track beginning. Once it is found, it is very simple to specify a track end. This function may also be used to search for each Address Field header in a track.

To view a Hi-Res graphics representation of a track, press the "G" key. With a little practice, this can be a very fast way of determining what type of data is contained on a track. Press any key to return to text mode.

Probably the most important feature of the NIBBLE-EDITOR is its ability to change data. This may be done from the CHANGE mode of the editor. To enter this mode, position the cursor over the nibble to be changed and press "C". A flashing "\*" will appear on the appropriate track in the STATUS DISPLAY, to indicate that you are in CHANGE mode. A value may be changed by simply entering the new value and pressing RETURN. If an error is made, CHANGE mode may be exited by pressing "ESC". To change consecutive nibbles, use the space bar instead of return after entering the new nibble value. This will advance the cursor to the next position, allowing further changes. From within

CHANGE mode, the "S" and "N" keys work as described above, but the cursor control keys are deactivated.

Pressing "ESC" will exit the NIBBLE-EDITOR.

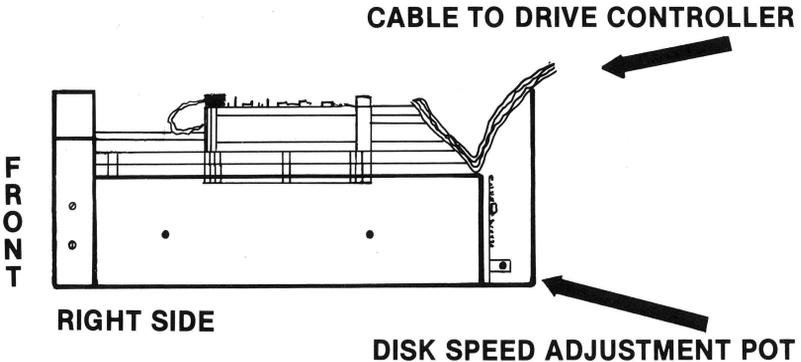
### 7. DISK SURFACE CERTIFY

This function is used to certify that the disk media surface contains no physical defects which could cause errors when reading and writing to the diskette. The diskette is tested track by track, and you are notified of any tracks which are unreliable or damaged. To use this option, answer the questions regarding the disk drive, track numbers, and track increments. LOCKSMITH will test each track, and display the test results in the STATUS area. If the track passes the test, a "." will be placed in the STATUS area for that track, and if the track is defective, a "\*" will be placed there.

**WARNING - USING THIS FEATURE WILL DESTROY DATA ON THE TARGET DISKETTE.**

### 8. HIRES DISK SPEED TEST

Occasionally, disk read/write problems may be caused by the disk drive speed being too fast or too slow. This function allows you to correctly adjust the speed of your drive. The program will ask if you wish a coarse, medium or fine graph scale (we recommend fine). The program will then ask if you wish from 1 to 3 disk speed samples per graph. Enter your choice when asked (we recommend 2). The disk drive may be adjusted during the display to set the correct speed. This may be accomplished by turning the adjustment until the speed display is centered over the center line. To terminate the disk speed test, press "ESC". The drive will stop and the graph will remain on the screen until "ESC" is pressed again.



**SIDE VIEW OF DISK DRIVE**

The disk speed adjustment is located on the small circuit board in the back of the disk drive. The correct adjustment is on the lower right-hand side of the vertical circuit board (see diagram). DO NOT turn any of the adjustments on the horizontal circuit board on top of the drive. To gain access to the inside of the disk drive case, remove the four screws on the bottom of the disk drive. The case may then be slid off of the drive to the back (it must be slid to the back). To replace the case, simply slide the case forward over the drive, and replace the screws.

**WARNING - USING THIS FEATURE WILL DESTROY DATA ON TRACK 0 OF THE TARGET DISKETTE.**

**NOTE - YOU MAY SAFELY USE THE DISK SPEED TEST TO DETERMINE DISK DRIVE SPEED. HOWEVER, ADJUSTMENTS MADE TO THE DISK DRIVE HARDWARE MAY VOID YOUR WARRANTY. THEREFORE, ANY ADJUSTMENTS SHOULD BE MADE BY QUALIFIED PERSONNEL.**

## **9. SELF-PATCH**

This function is provided to allow changes to be made to the LOCKSMITH program. These changes are in the form of a character string, which may be entered in one of two ways. After invoking this mode, the program will ask if you wish to enter the patch from the keyboard or from the buffer. If you choose to enter the patch from the keyboard, simply type in the string and press RETURN. The patch is then checked for validity and automatically applied. Once the patch has been applied, the first four characters of the patch will appear on the screen. Only one patch may be applied at a time. To remove a patch, you must re-boot LOCKSMITH.

Once you have applied a patch, it is possible to save a patch to the disk using THE INSPECTOR (assuming that you have one installed). Once the patch has been entered, select the INSPECTOR MODE. You should then place an initialized disk, on which you wish to save the patch, in the disk drive. We recommend using a 3.2 or 3.3 disk, exclusively for saving patches. Start saving patches at track 3, sector 0, and continue up. With the buffer set to \$0800, set the track and sector to where you wish to save the patch. Then press CTRL-W to write the patch to the disk.

After a patch has been saved to the disk, it is possible to enter it from the buffer (option 2 of the SELF-PATCH menu). To enter a patch, select INSPECTOR MODE and install the disk on which the patch was saved. You may then set the buffer to \$0800 and scan the disk until you find the correct patch. Once the patch has been read in, press CTRL-C to return to LOCKSMITH, enter SELF-PATCH mode and specify option #2 (enter patch from the buffer). The patch will then be checked for validity, and applied.

## **: CLEAR STATUS DISPLAY**

Normally, LOCKSMITH does not clear the STATUS DISPLAY of the different codes. This is to enable you to keep the previous status codes on the screen so that you may determine which tracks need to be copied or worked on. If you wish to clear the status area, simply press ":".

## **; PRINT STATUS DISPLAY**

This function has been included to enable you to make a permanent record of which tracks need to be copied for specific disks. When ";" is pressed, the top five lines will be printed. There are two assumptions which have been made about your printer. First, it assumes that your printer interface is in Slot #1. If it is not, simply set parameter #2D equal to the slot # your card is in. It further assumes that your interface card does not automatically supply a carriage return after 40 columns. If your printout is double-spaced, it is because your interface card does supply carriage returns. To change this, simply set parameter #2E equal to 0. This will correct the problem.

