SHERLOCK

DISK UTILITY

PANTDAM

Microcomputer Software

SHERLOCK

version 2·2

RANTOM

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Congratulations on purchasing what we feel to be the finest ATARI disk utility program currently on the market. With SHERLOCK you will be able to examine any byte in any sector, change any byte in any sector, disassemble (from disk, not core) any machine language file or autoboot disk, make a sector map of a diskette, format disks, search for up to 32 bytes in any sector on a disk in either HEX or ASCII format, and other useful utilities -- all at machine language speed!

SHERLOCK is a menu driven utility. A thorough reading of the documentation is recommended to fully utilize all of SHERLOCK's features. For novice disk drive users, a short tutorial is included -- read this carefully for clear understanding.

SYSTEM REQUIREMENTS

ATARI 800/400
ATARI 810 DISK DRIVE OR
PERCOM RFD 40 TRACK DISK DRIVE
32K RAM (MINIMUM, 48K RECOMMENDED)
PRINTER (OPTIONAL)

SHERLOCK is copy protected. The program is on both sides of the supplied diskette. Should your diskette fail to boot at any time within 90 days, return it to Rantom Software, and it will be replaced at no charge. After 90 days, a nominal charge of $7.50 will be charged.

BOOTING SHERLOCK:

Remove all cartridges.

Turn on your disk drive. After the busy light goes out, insert SHERLOCK and turn on your computer. RANTOM PRESENTS SHERLOCK will be displayed, then SHERLOCK's menu. Choose the option of your choice, enter the number, then press return.

In using SHERLOCK, bytes in a sector are numbered from $1 to $80 HEX (1 to 128 DECIMAL) and sectors are numbered from $1 to $2D0 HEX (1 to 720 DECIMAL)

SHERLOCK is a floppy disk utility program. A floppy disk is nothing more than a circular piece of material with an oxide coating capable of storing magnetic pulses. A formatted ATARI diskette organizes these magnetic pulses in a specific manner. There are 40 concentric rings on an ATARI diskette. These rings are called tracks, so the ATARI 810 disk drive is a 40 track disk drive. Each track is divided into 18 areas called sectors. Each sector contains 128 pieces of information called bytes. There are a total of 40 tracks, 720 sectors, and 92,160 bytes on a formatted Atari diskette. Remember, tracks, sectors, and bytes are nothing more than magnetic pulses stored on a diskette. They cannot be seen or felt. Do not touch the surface of a diskette, because it is very susceptible to damage by body oils, scratches, and dents on their surface. Also, do not expose your diskette to any type of a magnetic field, because this can destroy any data that is stored on the diskette. Do not put your diskettes within 6 inches of a television set (or monitor), telephone, or any other source of magnetic fields. SHERLOCK will allow you to see the value of any of the 92,160 bytes stored on a diskette, and allow you to manipulate those bytes in any manner that you choose.

When a diskette is formatted, 720 blank sectors are written on the diskette. Initially all of these sectors are filled with zeros (0). This indicates to the computer that the diskette is void of information, yet ready to store information. After the actual formatting process, the DISK OPERATING SYSTEM (DOS) reserves and writes to certain sectors on the diskette in sectors 1 through 3. The information stored here is called the DOS bootstrap. When the ATARI computer is turned on, an internal program stored in READ ONLY MEMORY (ROM)

is executed. This program checks to see if a disk drive is connected to the system (and turned on). If not, the computer turns control over to whatever cartridge is in the left slot. If no cartridge is in the left slot, the control is turned over to the MEMO PAD mode. If a disk drive is connected and turned on, then the diskette in the drive will be read starting with sector number 1. The first six bytes in sector number 1 are very important. This sector is called the "BOOT SECTOR". If you have not already loaded SHERLOCK, do so now. After the program is loaded and the busy light on the disk drive is out, remove SHERLOCK and return it to it's protective jacket. Now insert a diskette into your disk drive on which you know has DOS written on it. Now select option number 1 for "DUMP SECTOR" and hit return. Answer the prompt with a "1" and hit return. Displayed on the screen is the contents of sector number 1 in both the HEX and the ASCII formats. For now ignore the ASCII side. Look at the first row of numbers on the HEX side of the screen. We are only interested in the first 6 pairs of numbers. If you have a DOS 2.0S disk in your drive, these numbers should be: -- 00 03 00 07 40 15 -- Byte number 1 is not significant, and is usually 00 or FF. Byte #2 is the number of sectors to be read into memory -- the number of "BOOT SECTORS". In our example there are three "BOOT SECTORS". Byte numbers 3 and 4 tell the computer where in memory to start storing the incoming 3 sectors of information. In this example the memory location is $0700 (HEX). You may wonder how I got $0700 out of 00 07. The reason for this is that the ATARI stores memory location addresses with the low byte first, then the high byte. If this is confusing, just remember that when you are dealing with a memory location address, such as 00 07, all you have to do is transpose the two sets of numbers to get 07 00 -- so, the correct address is $0700. Bytes 5 and 6 are also an address. This tells the computer what address to go to and start program execution AFTER all of the "BOOT SECTORS" have been loaded. Therefore, after the three boot sectors of this example have been loaded into memory starting at $0700, control

will be given to the program starting in memory location $1540. This is a location in the 10K OPERATING SYSTEM (OS). All DOS 2.0S disks should have the same information in the first 3 sectors. After you've finished reading this tutorial, insert an autoboot game diskette and see how this differs from DOS. They only numbers that are likely to be the same are the pair of numbers in byte #1, and as we discussed earlier, this byte, for our purposes, is insignificant.

VTOC

After the format process, DOS writes to other sectors besides 1, 2, & 3. It writes to sectors 360 to 368 (DECIMAL). This is where the VOLUME TABLE OF CONTENTS (VTOC) and the DISK DIRECTORY is stored. Use option number 1 of SHERLOCK again and look at sector $168 ($168 HEX = 360 decimal. All input to SHERLOCK, except for menu selections, is in HEX. For help in conversions, use option number 9 - "NUMBER CONVERSION"). On a DOS disk, the first two bytes are 02 C3. This means that there are a maximum of $2C3 (707 DECIMAL) sectors on the disk available for your use. The next two bytes can be anything from 0 to $2C3. This tells the computer how many of the $2C3 sectors available to you are actually empty of information. The other numbers seen in this sector tell you which sectors on the disk contain information and which sectors are empty. For a detailed description of how this works, refer to your DOS 2.0S manual and/or the Technical Users Notes.

DISK DIRECTORY

Sectors $169 through $171 contain the DISK DIRECTORY. These sectors contain the names of the files on a DOS disk, their length and status -- locked, deleted, opened, etc. Without the DISK DIRECTORY you would not be able to tell what programs of files you have stored on a diskette. If you still have a DOS disk in your drive, use option number 1 and look at sector $169. The file or program starts in byte $06 and the extension in byte $0E. If the program name does not contain 11 characters (including the extension) spaces fill out the name field. File names start every 16 (DECIMAL) bytes -- allowing for 8 entries per sector. Since there are 8 sectors reserved for the DISK DIRECTORY, you are allowed up to 64 (DECIMAL) files per diskette. The first byte of every entry is the status byte for that particular file. If the file is unlocked the number will be $42. If locked $62. If deleted $80. Occassionally, a file may be opened for a read operation and before the file is properly closed the user will turn off the computer. Should this happen, the status byte will be $43. As far as the computer is concerned, this file does not exist. The file has neither an "in use" status byte, nor a "deleted" status byte, so it is in limbo, and just taking up directory space. To regain the directory space, change the status byte (using SHERLOCK option number 2) to $80. The second and third bytes in a directory entry contain the size, in sectors, of the file. Again, like an address, low byte first, then high byte (just transpose the numbers like before). The fourth and fifth bytes tell you (low/high) the beginning sector number of that file.

SECTOR LINKS

When a file is written to a DOS disk three bytes of each sector are reserved for DOS use. These sectors tell DOS how many bytes of information are in the current sector, and where the next sector to be read is located. The bytes reserved are bytes $7E,7F, and $80. When you write a file to a diskette, DOS will try to write that file in contiguous sectors. If there are not enough contiguous sectors available, the DOS will look for available empty sectors to write the remainder of the file. Because you can't count on one sector calling the next sequential sector, you must have a way to tell DOS where to find the next correct sector to load. Again, to understand precisely how there last three bytes are used, consult the DOS 2 manual and/or the Technical Users Notes.

The preceding was meant to be a very fast and dirty tutorial on the structure of ATARI DOS diskettes. For more information, carefully read the DOS 2 manual and the portion of the Technical Users Notes dealing with disk booted software.

INSTRUCTIONS FOR USING SHERLOCK

At any time there could be a chance of writing to the wrong disk, as in editing, copying, and formatting, the border will change to red as a warning. At almost any point in the program, you can press 'P' and get a screen dump to the printer.

1) DUMP SECTOR

Select option number 1. You will then be asked which sector (in HEX) you would like to have displayed to the screen. Enter the sector number and hit return. On the left is the HEX representation of the sector, and to the right the ASCII representation. To dump the screen contents to a printer press "P". Press either the left or right arrow keys to see previous or following sectors. Should you attempt to view non-existant sectors (less than $1 or greater than $2D0) SHERLOCK will return to the main menu. To return to the main menu press any key other than "P" or the left and right arrow keys.

2) EDIT SECTOR

Select option number 2. Enter the sector number you wish to edit and press return. You will be asked if you would like to zero the sector -- answer yes or no. Now you will be asked if you want to edit in the HEX or ASCII mode. Unless you choose the "A" option, the program will default to the HEX mode. In the HEX mode, 0 through 9 and A through F are legal keys. All others are trapped out. In the ASCII mode, all keys except arrow keys, are legal. In either mode, cursor movement is achieved by using the four arrow keys. Holding down the CTRL key is NOT required, nor will it move the cursor. Change the sector information in any manner you wish. When completed, press return. You will be asked if the changes are correct. If you answer no, the sector will be re-read from the disk and displayed. If you answer yes, you will be asked if you want to write the sector with

your changes back to the disk in the same location. Answer yes and the sector will be written and you will be returned to the main menu. Answer no and you will be asked to what sector you want to write the information. The information will them be written to the location you specified and you will then return to the main menu. If you realize that you don't want to write to the disk at all and just want to abort the option, enter a zero (0) for the sector to be written or press SYSTEM RESET.

3) DISK MAP

Select option number 3. After return is pressed, what ever diskette is currently in the drive it will be read and a graphic representation of it's contents will be displayed on the screen. An asterisk (*) indicates that a sector sector has valid information in it (non-zero). A period (.) means the sector is totally empty (all zeros). A hyphen (-) indicates that the sector is unformatted. Each row of *'s, .'s, and -'s represent 2 tracks. After the map is completed a hex number index is displayed on the left side of the screen to help you locate the sectors you are interested in. Should you wish to abort the map before completion, just hold any of the yellow keys.

NOTE: For users who do not have a DATA SEPERATOR installed in their disk drive, occassionally, the map will indicate that you have unformatted sectors in the last two or three tracks on a disk you know to be good. This is not an error in SHERLOCK, but a problem with your disk drive. There are two solutions to this problem. 1 -- Go to your nearest ATARI Service Center and have a DATA SEPERATOR installed or 2 -- Recognize the problem and live with it. If you are having problems reading sectors in other tracks, and you know the disk being mapped does not have unformatted sectors, go to an ATARI Service Center and have your disk drive speed checked and corrected.

4) DISK DISASSEMBLER

Select option number 4. You will be asked if you want a print out of the disassembled code. Answer yes or no. Input the sector number to start disassembly. If you enter sector 1, then you will be asked if you want to use the first six boot bytes -- answer yes or no. If this point is confusing, read the tutorial supplied. Now, enter the address of the first byte in the sector you choose to disassemble. Now enter the address of where you want disassembly to begin. This may seem rather confusing, however, there is a purpose. Suppose you know the beginning address of sector $1 is $0700 and you really want to look at the code beginning at $0900. Answer 1 for the sector to start disassembly. Answer yes for the boot bytes. Answer $0700 for the first byte in the sector. Answer $0900 for the address you want to disassemble from. SHERLOCK will figure out where $0900 would be in relation to the beginning address of $0700. In this example, $0900 is located in sector 5.

If you have not chosen the print option, you must press the START key for the disassembly to continue. The disassembly to screen is relatively fast. If you see a portion of code you want to examine more closely, release the START key, and the disassembly will pause. To continue, press the START key again. To abort and return to the menu press the SELECT key.

If you did select the print option, then holding the START key could be inconvenient, especially if you wish to print several pages of disassembly. With this option, disassembly will start and continue until the option is aborted with the SELECT key. In the print mode, the disassembly will be displayed to the screen as well as the printer. Should you choose not to use the print option, and would rather use the screen dump option instead, you must hit a key (any key) before pressing 'START' to continue the disassembly.

5) DISK SEARCH

Select option number 5. You can search for up to 32 bytes in either HEX or ASCII mode. You will be asked if you would like to search for HEX or ASCII. Unless you specify ASCII, you will default to HEX. If you are in the HEX mode, just enter the HEX code to be searched for. Make sure you type a space between each pair of numbers. For example, if you want to search the disk for the code LDA #$21, the HEX code would be A9 21. That is what you would enter -- A9 21. You will be asked which sector you want the search to begin with. When a match is found, the sector will be displayed to the screen -- in the same format as the Dump Sector option, with an arrow pointing to the first byte of the sequence you were searching for. You will be asked to enter a "Y", "N", "P", or "D". If you want to continue the search for the same sequence, enter "Y". If you do not want to continue the search enter "N". If you want to print the screen contents enter "P". If you wish to see the code in disassembled form enter "D". Answer "N" and you will be asked if you want to edit this sector. Yes will drop you into the Edit Sector option -- from here follow the directions for option number 2. A "D" option will display the code you were looking for and a few bytes of following code in disassembled form. You will then be asked if you want to continue the search or print the screen contents.

If you want to search for an ASCII string, answer "A", then input EXACTLY what you are looking for. For example, if you want to know where, on a DOS disk, the phrase "Write DOS Files" is located, then enter "Write DOS Files".

6) DISK COPY

Select option number 6. This is basically a straight forward copy utility, prompting for source and destination disks. This copy utility is intelligent. It will read as many sectors as the buffer size allows. If a source sector is empty, then it is not stored. Since SHERLOCK takes approximately 26K to run, there is a 22K buffer in a 48K computer. If the disk being copied is less than 24K the copy will be accomplished with one pass. A maximum of 4 passes is required if the source disk is full. If while copying, an error is encountered from the source disk, you will be prompted to insert the destination disk. After the buffer has been written out, you will be told which sector was not read. You will be given four choices:

1) Retry Sector
2) Continue (with next sector)
3) Skip (to next) track
4) End copy

Should there be an error in writing to a disk, you will be asked if you would like to retry the write.

SHERLOCK also offers a two drive copy utility. The functions work the same as described above, but there will be no prompts to change disks, it will automatically read and write from drive 1 to drive 2. Sherlock has write WITHOUT verify as it's default. Should this not be acceptable, see option 11 for disk configuration. Also, regardless of the configuration, if you use the two drive copy option, the source drive will always be drive 1 and the destination drive will always be drive 2.

7) DISK DIRECTORY

Select option number 7. This gives a Disk Directory for DOS disks. Information given includes the file name, status of the file, starting sector, length of file, and the file number. If you want a print out of the directory, just press "P".

8) FMS SECTOR TRACE

Select option number 8. This is a utility to trace sector links for DOS files. Enter the file number determined by option number 7, and the sector link trace will be displayed. Press "P" and the screen display will be printed.

9) NUMBER CONVERSION

Select option number 9. To convert a decimal number to a hexadecimal number, just type in the decimal number and the conversion will automatically be printed. If you want a hexadecimal to decimal conversion, just preceed the hexadecimal number with a '$' and the decimal number will be printed.

10) FORMAT DISK

Select option number 10. This option is really meant as a compliment to the Disk Copy utility. This option will format a diskette, but will not write the DOS boot sectors or set up the VTOC and Disk Directory. If you need a formatted diskette for the copy routine, then this format is fine, because every sector is copied. If you need a formatted diskette for use with DOS files, do not use this format. Boot a DOS disk and format with option I.

11) CONFIGURE DRIVE

Select option number 11. By using this option you can have SHERLOCK communicate with up to 4 ATARI 810 Disk Drives or 8 PERCOM RFD Disk Drives. At this point you may also decide if you would like to write to the disk drive with or without verify.

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