

SUPER
81
UTILITIES

Free Spirit
Software Inc.



FOR COMMODORE 1581 DISK
DRIVE AND C128 COMPUTER

Super 81 Utilities

A Full Featured Disk Utility System
for the
Commodore 128
and
1581/1571 Disk Drives
from
**Free Spirit Software &
[BSD] Software**

Instruction Manual By
Mark Brannon

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To Marlene, thanks for keeping the world at bay while I lived on the mountaintop.

To Joe and all the great people at Free Spirit, thanks for the chance.

Mark Brannon
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Super 81 Utilities

Table of Contents

Subject:	Page:
A) Super 81 Utilities Overview	1
B) Description of Features	1
C) System Requirements	2
D) The Options Window	2,1
E) Partitions, A Tutorial	2
a. Purpose	2
b. Sub-directories	2
c. Rules	3
d. Entering Partitions	3
e. Filetype	3
f. Deleting	3
g. Confusion!	3
F) Drive Status and Format	4
G) System Configurations	4
a. The Active Drive	4
b. Auto-Configuration	5
c. Disk Copy Configuration	5
d. File Copy Lockout	5
H) Definitions	5
a. GCR Format	5
b. MFM Format	5
c. IBM System 34	5
I) Getting Started	6
a. Second Drive	6
J) The Partition Commands	6
a. Status Window	6
b. Scan/Select Partitions	6,7
c. Create Partition	7
d. Auto Create Sub-Directory	7
e. Manual Creation	7
f. The ROOT Option	8

Subject:	Page:
K) Disk Copy	8
a. 1581 ↔ 1581	8
1. Configuration	8
2. Directory	8
b. 1571 → 1581	9
1. Configuration	9
2. Partition Commands	9
3. Directory	9
4. Copy Data Requirements	9
c. 1571 ↔ 1571	10
1. Directory	10
2. Select Target Format	10
3. CP/M+ Disk Copy	10
L) File Copy	10
a. Configuration	10
b. Capacity	11
c. Directory	11
d. Errors	12
e. File Select (Screen Display)	11
M) Single Drive File Copy with Partitions	11
a. Copy Procedure	12
N) Two Drive File Copy with Partitions	12
a. Using Partition Commands	12
O) CP/M Utilities	13
a. Format MFM	13
b. Format Parameters	13,14
c. Analyzing Disk Formats	14
d. Format GCR	15
P) Super Disk Editor	15,16
a. Editor Command Set	16
b. Editing a Sector	17
c. Edit Commands	17

Subject:	Page:
Q) 1581/1571 DOS Utilities	18
a. Format	18
b. Scratch Files/Partitions	18
c. Change Disk Name	18
d. Directory	18
e. Rename File	18
f. Change Disk Format	18
g. Write Protect Disk	19
h. Change drive	19
i. Reset Drives	19
j. Bulk Lock	19
k. Unlock files	19
l. Create Auto Boot	19
m. Partition Commands	20
n. Direct DOS Command 1581/1571	20
o. Bulk File Unscratch	20
p. Trash a Track	21
q. Bulk Erase Disk	21
R) Drive Monitor	22
a. 1571 Memory Map	22
b. 1581 Memory Map	22
c. Using the Monitor	23
S) RAM Writer	24
a. Drive Operating System	24
b. Job Queue	25
c. Job Codes	25
T) 1541 Notes	25
U) 1571/1581 Operating System BUGS	25,26
V) Warranty	26
W) Addendum	27

What Is Super 81 Utilities?

Super 81 Utilities is a full featured Disk Utility System that will perform virtually every CBM DOS function available for both the 1571 and 1581 disk drive.

Super 81 Utilities is designed to help you get the most out of your new 1581 drive, to make it a useful data storage device that can easily be used in conjunction with either another 1581 or a 1571 drive using any device assignment combination. Super 81 Utilities is not a jumble of independent utility programs, but a studied attempt to bring the full power of the Disk Operating System to the non-programming user.

Super 81 Utilities does almost everything conceivable within the disk operating system: Copy whole disks (1581 to 1581, 1571 to 1581, 1571 to 1571, even copy a 1571 disk to a 1581 partition!), copy files from/to 1581, 1571 in any drive combination. PLUS: Edit any track or sector of any CBM disk format with the Super Disk Editor, miscellaneous DOS functions like rename a disk, change format, bulk file scratch and un-scratch, bulk lock and unlock files, erase any track, bulk erase disks, create auto boot files, and much, much more. Super 81 Utilities also incorporates a sophisticated partition utility that fully utilizes this powerful feature of the 1581 drive.

Plus, Super 81 Utilities helps you learn the inner workings of your drive with the Memory Monitor and unique RAM Writer. With these options you can assemble, disassemble any section of drive RAM or ROM, or use the RAM Writer to program Drive RAM yourself. Both these options fully support the 128 Monitor command set, so you can even save sections of drive RAM or ROM to disk as a binary data file.

Super 81 Utilities uses an Options Window to display all the possible choices available at any given time, so there is no need to memorize any hidden commands. All disk directories are displayed in a scrolling fashion for easy selection. Super 81 Utilities fully supports a second 1581 or 1571 drive. Also performs many MFM utility functions, such as: Analyze MFM format disk, including MS-DOS, format MFM disks, also including MS-DOS, format in MFM + (GCR Format) and more.

SYSTEM REQUIREMENTS

The following hardware is required to use Super 81 Utilities: Commodore 128 computer, 1581 or 1571 drive, 1541 drive (see '1541 Notes'), Printer (with MPS 1525/801/803 compatibility), 80 column color monitor.

OPTIONS WINDOW

In the upper section of the screen is a 2 line window that will constantly display all the choices available at any given time. This window is also where Super 81 Utilities will keep you informed of what's going on, such as scanning directories, etc. and where Super 81 Utilities will request all the user input when required.

PARTITIONS: A Short Tutorial

Partitions are a new feature for the C-64/128 family of floppy disk drives, but they have been around a long time in the MS-DOS community.

Disk partitions are exactly what their name implies, they are a section of the disk surface that is partitioned from the rest of the disk. This partitioned area of the disk is not subject to the disk "VALIDATE" command, and is therefore protected from accidental DE-ALLOCATION of disk blocks. But partitions are much more than just a protected section of the disk surface. If a partition is created with at least 120 Blocks allocated to it, it can contain it's own directory and up to 296 files, disk space depending! This feature gives the 1581 a tremendous amount of power to consolidate your data files and programs. Using partitions, you can divide your disk up into various uses, such as a partition for arcade games, one for your checkbook, etc.

Another important feature of partitions is that a directory inside a partition (called a SUB-DIRECTORY) is completely isolated from the main disk directory (called the ROOT DIRECTORY.)

This means if a sub-directory becomes corrupted, you may lose all of the files in that directory, but the root directory and all other sub-directories are safe. Protecting your files becomes of significant concern on a disk that will hold over 800 kilobytes of data! Remember, there are two types of partitions, those that contain sub-directories, and those that don't.

Partitioning rules:

A partition can be of almost any size or location on the disk, but a few rules must be remembered:

1) The partition cannot contain track 40, the disks ROOT directory. This effectively limits the size of a single partition to about 1600 blocks.

2) For a partition to also be a sub-directory, it must be at least 120 blocks long. (40 blocks will be for the directory and 80 blocks for data.) The number of sectors in the partition must be a multiple of 40.

3) After a partition is created it must be formatted before it can contain any files. The format process creates the sub-directory.

4) Before you can transfer files to or from a partition, or load a program from a partition, you must first ENTER a partition.

MOST IMPORTANT:

Once you have entered a partition, as far as the disk drive and computer are concerned, *the ENTIRE disk IS the partition you are in*. Most commands you give will only have an effect within the partition! Including file load, save, open, close, format, etc.

5) Partitions have a filetype of 'CBM' in their parent directory. Scratching this file will erase the partition and everything it contained.

6) Super 81 Utilities will automatically move you to the ROOT partition every time the Main Menu screen is displayed.

If all this talk about partitions thoroughly confuses you, then you have made a wise purchase. Super 81 Utilities will create, copy, manipulate, enter and exit partitions automatically, with minimum input from you.

DRIVE STATUS AND DISK FORMAT

At the bottom of all utility function screens are two windows that show the current drive status and disk format type for the active drive. The drive status window shows the most recent error message received. This message is displayed until another message has been received. The format window will display the format type (1581, 1571, 1541, or CP/M) and the number of sides. With creative disk editing it is possible to get a 1541 double sided display! If the active drive is a 1581, then most utility function screens will also display the name of the partition you are currently in.

SYSTEM CONFIGURATION

It is expected that you will be using your new 1581 as a data disk (device 9) while keeping your 1571 as device 8. For this reason Super 81 Utilities is packaged on a 5¼" floppy disk. However, if you like the speed and storage capacity of the '81, you may have it connected as device 8, with your '71 as device 9. A 3½" disk is packaged with Super 81 Utilities for this reason.

All of the modules in Super 81 Utilities work equally well with both drive types, regardless of which drive is device 8 or 9. Super 81 Utilities even works quite well with no 1581 on the bus, but you will not be able to access all of the program's features.

The ACTIVE DRIVE: This term describes the default drive for any particular module you are using. The active drive for most of the modules is device 8. The significance of this is that most of the options presented in the options window apply only to the active drive.

For File and Disk Copy screen, the active drive is the drive shown in the SOURCE DRIVE window at the upper left screen corner. For virtually all modules, the active drive is the drive shown in the Drive Status window at the lower left of the screen.

Super 81 Utilities will automatically configure itself for your system as long as you have your drives turned on prior to booting the program. Some of the modules you will be using will require that a specific drive be the active drive. If the specific drive is NOT the active drive, the Super 81 Utilities may not allow you into the module.

Many Utility modules will automatically configure themselves to your drive hook-up. Example: If you have a 1571 as device 8 and a 1581 as device 9, and you select '1581 <=> 1581' from the disk copy menu, Super 81 Utilities will automatically display '9' as the SOURCE and TARGET Drive. Certain menu options would be disabled also. In this case, 'Toggle Drive' wouldn't do anything, because the source and target drive are the same.

Additionally, the File Copy menu includes a LOCK OUT feature that allows you to lock out one drive while you copy files from disk to disk on the other drive. This feature is especially for the user with both a 1581 and 1571. This allows you to make backup copies of your files on the same disk format type.

SOME DEFINITIONS:

1) GCR Format: This refers to the data encoding scheme used by Commodore to store information on a CBM disk Drive (GCR = Group Code Recording).

2) MFM Format: This refers to the encoding scheme used by the rest of the computer industry. The 1581/1571 drive has the capability to read, write and format in the MFM mode. The 128 in CP/M mode (and Super 81 Utilities) take advantage of this (MFM = Modified Frequency Modulation).

3) IBM System 34 format: This is a general term that describes the most common MFM formats in use. Some of the companies that use this are: Wang, Compaq, Epson, IBM, etc..

GETTING STARTED

If you are using a second drive, turn it on prior to booting up Super 81 Utilities. If your second drive is a 1541, read the '1541 Notes' before going any further. Super 81 Utilities is an auto-booting program and will load and run from a computer reset or by turning the computer on with the Super 81 Utilities program disk in drive # 8 and the drive turned on.

PARTITION COMMANDS

Because the partition commands built into Super 81 Utilities can be accessed from so many different modules, it is appropriate to discuss these first, before going into a brief of each individual module.

Status Window:

The status window will not only display the last drive error message, but will also show the current selected partition name. Default is ROOT. Additionally, the status window will display important information about partition activity, such as whether an effort to enter a partition was successful or not. When dealing with partition commands, watch this window!

Scan/Select:

Selecting this option will scan the disk directory (of the drive number shown in the Status Window) and display any partitions on the disk, and their size (in blocks). Select a partition to enter in the same manner as selecting a filename to copy as discussed below. If you do not want to enter any partition shown, press RETURN to restore the default (Current) partition.

As stated in the partition tutorial, not all partitions have directories associated with them. Attempting to enter a partition that has no directory will result in an error message 'Selected Partition Illegal', and you will not enter the partition.

However, entering a partition that DOES have a directory will result in a status display of 'SELECTED PARTITION', then show the partition name. You are now in this partition, and for all intents and purposes the disk you are working with IS this partition. All of the DOS utilities that support the 1581 will work in this partition.

Create Partition:

Using this option, you can quickly and easily create partitions for any purpose.

After selecting this option, follow the screen prompts and enter the partition name and size (in Blocks) and the starting track of your partition. If you plan on Super 81 Utilities creating a directory for you and you have no specific location in mind for your partition, enter 0 here. This will force the drive to scan the entire surface of the disk looking for a place for your partition.

Auto Create Sub-Directory:

Selecting <Y>es will automatically take the block size you entered and adjust it to a multiple of 40, so you don't have to (see the partition tutorial above). As you are building a directory, you now must enter a 2 digit ID code. After this information is entered it will be displayed, with the options to Redo it or Abort.

Selecting Auto Create takes the starting track you entered and uses it as a starting point to begin a disk scan, looking for a place to build your partition. Super 81 Utilities creates a NON-Destructive partition. That is, it will not overwrite valid information on the disk in an effort to create a partition. For that reason, you may see a display that informs you that the partition attempt was unsuccessful, and the reason why. Chances are it's because there was inadequate room on the disk. If the selection was successful, the partition will be automatically formatted and entered.

Manual:

Selecting NO at the Auto Create request will result in one attempt being made to create your partition. The partition will NOT be entered, even if the creation was successful. Nor will it be formatted.

Root

This menu option is provided as a means of quickly moving to the Root Directory of a disk.

DISK COPY

Super 81 Utilitites will copy 1581, 1571, 1541 or CP/M + formatted disks. If using two drives, you can select either drive as the source drive.

The Disk Copy Menu:

Selecting '<1> Disk Copy' from the main menu will show you the disk copy menu, with three choices. Each selection will be discussed below.

<1> 1581 ↔ 1581:

Configuration:

This module will copy a 1581 disk on a single or double drive system. If there is only one 1581 drive connected to your system, that drive will be displayed as the Source and Target drive. If you select this module with no 1581's connected, you will be returned to the main menu.

If you have two 1581's, as device 8 and 9, the 'Toggle Drive' option will function, allowing you to select which drive is the target and which is the source.

Directory:

The DIR option will show you the directory on the SOURCE drive. To view the directory on the target drive, use the 'Toggle Drive' option to toggle the target drive to the Active drive. Just don't forget to 'Toggle' it back to the target drive before you start the copy process!

The SET TARGET FORMAT option is inactive in this module for these drives. This disk copy option will destroy all existing data on the target disk.

<2> 1571 → 1581:

Configuration:

This module will copy the contents of a 1541 or 1571 disk onto a 1581 disk. To use this module, you must have a 1571 and a 1581 drive connected. The module will auto-configure the drives as source and target drives.

Partition Commands:

This module menu displays a selection called 'Partition Commands.' For more on how to use this command set, read the 'Partition Commands' section above. The purpose for having this command set available is so you can copy the contents of the 1571 disk into a partition of the 1581 disk.

If you choose to copy into a partition, you must ensure that the partition has adequate BLOCKS FREE to accommodate all the information on the 1571 disk.

Directory:

Use the DIR menu option to determine how many blocks you will require, then use the partition commands to create and enter the partition.

One thing to remember. Once you have begun the copy process, the partition you selected (or forgot to select!) is final. The default partition is ROOT, which means that if you do not select any partition commands, the contents of the 1571 will be copied onto the root, or main directory of the 1581 disk.

Copy Data:

In order for data to be copied onto the 1581 disk, it **MUST** have a directory entry on the 1571 disk! This copy routine will not duplicate the placement of data to the 1581 disk. Some protected software may require the data be in a specific disk location. Chances are, these programs will not run from the 1581 disk.

<3> 1571 ↔ 1571:

Configuration:

This module works in much the same way as the 81 ↔ 81 module described above. If you have only one 1571 connected, the module will auto-configure the 1571 and show it as both the source and target drive. As before, the 'Toggle Drive' option will be disabled for single '71 systems.

Directory:

The DIR option shows the directory in the source drive. For systems with two 1571's, the 'Toggle Drive' option will change the source and target drives.

Select Target Format:

An additional menu item is the 'Select Target Format' option. This option allows you to set the target disk format, thus placing a 1571 disk onto a 1541 format and vice versa.

However, if transferring to a 1541 disk, this module will not read the back side (track 36-70) of the source disk. If any files are stored on these tracks they will not be copied. If you do not pre-select your target disk format, Super 81 Utilities will prepare the target disk in whatever format the source disk is in. (This includes CP/M+ format.) For best results when copying CP/M+ disks, pre-select '1571 format' as the target disk format.

FILE COPY

Configuration:

File copy works with either one or two 1581's or 1571's, or one each. It will copy files from or to any drive connected to your system. It will also copy files from a 1581 partition to another partition on the same disk or a different disk. The file copy menu includes a feature for locking out one of the drives, and then making single drive copies of files. In this manner, you can back up important files to a similar format, and copy files from one partition to another (or the root directory) on the 1581.

Capacity:

Super 81 Utilities will copy up to 50 files consecutively. File Copy uses a buffer that will allow a file of approximately 200 CBM disk blocks to be copied.

Directory:

As with the Disk Copy modules, the DIR option will display the directory in the SOURCE drive. The 'Toggle Drive' option is also available, with the added feature that any time the ACTIVE (source) drive is a 1581, an additional option becomes available, the Partition Commands <Control> <P>. If the active drive is a 1581, the current partition will display in the drive status window at the lower left corner of the screen.

A different procedure is used for partition copying on a single or double drive system.

Single Drive File Copy Using Partitions: (1581)

If the files you want to copy FROM are on the root directory, then select 'Copy' from the options window. However, if you wish to copy from a partition, use the partition commands to scan and select your source partition. After selecting the partition to copy from, you can view the contents of the partition by using the DIR option from the File Copy menu. Once you are satisfied that this is the partition for you, select COPY from the options window.

Screen Displays:

The source disk root or partition directory will be displayed in a scrolling fashion. Pressing the space bar will cause the filenames to 'light up'. Pressing the plus <+> key when a filename is lit up will cause that filename to be selected. Pressing the minus <-> key will un-select. A red arrow next to the filename indicates it has been selected for copying. Continued pressing of the space bar causes the filenames to wrap around to the beginning of the directory display.

When the file list to copy is complete (50 maximum), pressing RETURN will begin the file copy.

File Copy Procedures:

The files will be read sequentially until the file copy buffer is full. When the program requests the target disk, the Partition Commands option will be displayed. Insert the target disk and use the partition commands to select a target partition, or press <RETURN> to begin the file copy write routine. For the duration of the file copy, the partition commands will not be available. Once you have made your selections and begun the copy process, the partition choices are final.

Errors During Copy:

If an error is encountered, (like a file exists error), File Copy will display the error message and go on to the next file. If copying a large file, a few second delay may be encountered before the next file copy begins. Additionally, a list is displayed on screen of all your file selections, and each file's name is displayed in the Options Window as that file is being read or written.

Two Drive File Copy Using Partitions:

The only significant difference between single drive and double drive file copy is the manner of selecting the target drive partition. The target drive **MUST** be the first partition you select. To select the target drive partition, use the 'Toggle Drive' option to make the target drive the **ACTIVE** (source) drive. If this drive is a 1581, the Partition Commands option will be displayed.

Now use the Partition Commands to scan, select or create your target partition. After you are satisfied with your partition selection, exit the partition command screen with the <ESC>ape key and use the DIR menu option to view the contents of the partition.

Toggle the active drive back to the original source drive. If it is a 1581, use the partition commands to set the source partition to copy from. Don't worry, even though the target partition is not being displayed in the Drive Status window, it has not changed.

Using this procedure, you can select and de-select source and target partitions as many times as you like. Once you have selected **COPY** from the menu, all partition selections are final.

CP/M Utilities

The CP/M Utility section performs many interesting and useful functions. The 1581 and 1571 Drive are capable of reading almost any MFM formatted floppy disk. As mentioned earlier, many computer companies use one form or another of the basic MFM format. With the MFM Utilities section you can analyze and format MFM and GCR floppy disks in almost any configuration.

Format MFM:

Selecting this option will display a list of user selectable parameters. Manipulating these parameters allow you to format disks in any configuration imaginable. The default values displayed are for the Osborne DD format. This format is recognized by the C128 in CP/M+ mode. Read and write operations occur much faster with this format than with the GCR formatted CP/M+ disks. This means you can copy your COM and data files (using PIP) to an Osborne DD disk and gain much faster disk accesses. Most useful for database programs that scan large data files.

Format Parameters:

Press the space bar to move the arrow to the item to change, press <RETURN> to select the item. Enter the new value, then press <RETURN> to lock in the new value.

Now you can press the space bar to select another parameter or <F1> to begin the format process. Many IBM System 34 format types use 40 tracks, but not all do. Below is a list of parameters for the disk types that the C128 will recognize and access in CP/M+ Mode.

- 1) Epson QX10:
512 byte sectors, double sided, 10 sectors per track
- 2) IBM-8 SS (CP/M 86):
512 byte sectors, single sided, 8 sectors per track
- 3) IBM-8 DS (CP/M 86):
512 byte sectors, double sided, 8 sectors per track
- 4) Kaypro II:
512 byte sectors, single sided, 10 sectors per track
- 5) Kaypro IV:
512 byte sectors, double sided, 10 sectors per track
- 6) Osborne DD::
1024 byte sectors, single sided, 5 sectors per track

The 1581 and 1571 will also read and write in the most common MS-DOS formats (except MS-DOS v1.x series) up to and including the newest release. These files cannot be run on the 128, but the 1581/1571 has the ability to handle the data on these disks. The most common MS-DOS format layout is as follows: 40 tracks, 9 sectors per track, 512 byte sectors, double sided Sector Skew. This is the offset to use as the sectors are written to disk. The number is variable, (default is zero), but if the sector skew you select is greater than zero, it must evenly divide into the total number of sectors or the drive will return an error.

Fill Byte:

The most common value is 229. Whatever you select, you should not exceed 250. Numbers above this may cause screen display problems in CP/M mode.

* Note: The above information applies primarily to the 5½" floppy.

Analyzing Disk Formats:

Using this section will display the following information on the disk in the active drive:

IBM System 34 Format (MFM)

- a) Target track side bit number (0=side one, 1=side two) (significant: 0 on both sides would indicate a 'floppy')
- b) Bytes per sector
- c) Total sectors per track
- d) Sector recording sequence

Sequential numbers (i.e. 3,4,5,6) indicate a sector skew of zero. The larger the numeric gap between sectors, the higher the skew value.

Commodore DOS Format (GCR)

- a) Target track number
- b) ID. High byte
- c) ID. Lo byte

Format GCR:

Using this option prepares a disk for CP/M + system use. It formats in double sided GCR format with 1328 disk blocks available (3160 for the 1581), 70 tracks (80 on the 1581), with the standard number of sectors per track. The significant difference between this format and the 128 mode double sided disk format is this CP/M + format has no directory.

SUPER DISK EDITOR

Super Disk Editor is a full featured disk editor specifically designed for double sided GCR format disks. (However it will also accommodate single sided disks.) The disk editor gives you the ability to modify any data byte recorded on the disks surface.

With it you can repair damaged sectors, modify directory entries, bury hidden messages or codes in unlikely spots, allocate blocks, modify file link pointers, and much more.

Be careful using the editor, you can easily destroy valuable disks. You should work with a backup copy when using the editor.

Using The Editor

First, press the '?' key from the Editor intro screen. This shows the command set used with the editor. Abbreviations of these commands will be displayed in the options window when using the editor. Press <ESC>ape to return to the intro screen.

Select <I> to initialize the disk in the active drive and enter the editor. Next you will see the Set Track and Sector screen. Pressing <RETURN> instead of entering any values will automatically set the T & S to the Block Availability Map (Track 18, Sector 00 for the 1571, 40, 00 for the 1581). This is the beginning sector of the disk directory. Or you can enter numeric values into the Set T & S screen and jump to anywhere on the disk. If you enter values, use 2 digit notation (i.e. press 01 for track).

Now you see a very complex screen display. Starting from the upper left screen corner: The track and sector currently at are displayed in both ASCII and HEX\$ notation. The 'next' indicates the next track and sector pointed to by the file pointers in this sector. If these indicate '*', then this is the last sector in the file. In the upper right corner: The 'location' refers to the cursor position within the data area when in the EDIT mode. The 'byte Value' is the ASCII value of the byte UNDER the cursor when in the EDIT mode. The options window displays abbreviations of the word HEX is the hexadecimal representation of all 256 bytes in the sector. To the right of them and beneath the word ASCII is the ASCII representation of the same 256 bytes. Non printable characters are represented with a period. Below the data areas are the usual drive status and disk format windows.

Disk Editor Main Command Set:

- <F1> Set T & S: this key returns you to the Set T & S screen:
- <F2> Trace: Jumps to the next track and sector shown in the upper left of the screen (the 'next' T & S). Using this feature, you can follow the path of a single file from sector to sector, thus viewing and editing any part of the file.
- <F3> Edit data area in Hex\$ notation
- <F4> Edit data in ASCII notation
- <F5> Increments the track displayed by one
- <F6> Decrements the track displayed by one
- <F7> Increments the sector displayed sector by one
- <F8> Decrements the sector displayed sector by one
- <Control> <P> Sends the data area (Hex\$ and ASCII) to a CBM 801/1525 printer
- <ESC>ape: Returns to the Editor intro screen

Editing the Displayed Sector:

The need exists to edit in both HEX\$ and ASCII, depending on what you are editing.

ASCII edit is limited to printable characters only. If you wanted to edit a name in the disk directory, that would be fine, but much of the data on a disk is not in the printable ASCII range. To edit these numbers you must be able to directly manipulate each byte value. That's where the HEX\$ edit comes into play.

EDIT Commands:

When either <F3> or <F4> are pressed, the words HEX DATA or ASCII DATA will 'light up,' indicating which edit mode you selected. Two cursors will also appear, one in each data area at the zero byte location.

A unique feature of Super 81 Utilities is the ability to control two cursors simultaneously, and display the edited version in each data area regardless of which edit mode you select.

Use the cursor keys to move both cursors in both data areas. Notice the location and byte value changing as you move the cursor. Another unique feature of the editor is its ability to shift edit modes without moving the cursor, making it very easy to perform complex editing tasks.

Pressing <F1> now writes the edited sector to disk. The <ESC> key will exit the edit mode without rewriting the sector to disk. However easy the editor is to use, it is still only a tool.

With the editor showing track 18, sector 00 of a formatted (but unimportant) disk, read over the chart for BAM FORMAT/DIRECTORY HEADER (1571 MODE). Enter the EDIT Mode and use the cursor to locate the byte values they show for disk name location (144-159). Try editing the disk name and the sectors available bytes and see what happens when you view the directory. Try changing the value of location 3 to a zero (assuming it was \$80) and the FORMAT window display will change to 1541 format! Editing directories can be fun, but you should never try it on commercial software. You could destroy a valuable disk.

**** Above values are for the 1571 drive. See the '1581 Users Guide' for this information on the 1581.**

1571 DOS UTILITIES

A) Format

Select either 1571 (double sided) or 1541 (single sided) format. If a 1581 drive is the active drive, no options will be given. Follow screen prompts to enter disk name and ID.

B) Scratch Files

Bulk scratch from 1 to 50 files. Filename selection and display is the same as the FILE COPY described earlier. This routine will not erase the data itself from the disk, but rather the directory entry file type is erased. When all selected files have been erased, a disk validation is performed. The number of files scratched will be displayed in the drive status window. File Type CBM (Partitions) can be scratched just as any other file type. BUT this will destroy any data in the scratched files.

C) Change Disk Name

Selection of this option will display the disk name in the active drive. If you are in a partition, the partition name will be displayed. This is the name actually IN the partition directory, NOT the filetype CBM in the parent directory that points to the partition! These names DO NOT have to be the same.

D) Directory

Directory in the active drive will be displayed in the traditional manner. If in a partition, then the partition will be displayed.

E) Rename File

Enter the filename to be changed and the new filename. To change a filename that is within a partition, you must first enter that partition.

F) Change Format

Selecting this option will display the disk format (1541 or 1571) in the active drive and present the user with the option of changing the format. This has NO EFFECT on the data stored on the disk, but may make the data inaccessible (i.e. the back side of a 1571 disk cannot be accessed if the disk format is changed to a 1541 format).

This option is a good way to protect your important data from prying eyes. Any 'hidden' data becomes accessible by changing the format back to a 1571. This feature is not supported on the 1581 drive.

G) Write Protect Disk

This option modifies the disk so that no write operation can be performed to the disk, and most copy programs will not copy the disk (not supported on the 1581 drive).

H) Change Default Drive

This option toggles the active drive if more than one disk drive is active on the bus. The active drive is displayed in the command window (line 4) and the disk status window at the lower left corner of the screen.

I) Reset Drives(s)

This option sends the 1581 and 1571 cold start command to the active drive. Most useful for clearing drive errors, etc. This command will also return the 1581 to it's ROOT directory.

J) Lock Files

Reads and displays the directory of the disk in the active drive (or the partition directory if within a partition). Filename selections are made similar to the FILE COPY method discussed previously. Files locked in this manner cannot be scratched from a disk. Although a locked file cannot be scratched, a full disk format will erase the disk thus erasing the locked file.

K) Unlock Files

Any locked files on a disk (or partition) will be displayed. File selection to unlock files is made similar to the FILE COPY selection discussed earlier. If no locked files are located on a disk, that information will be displayed.

L) Create Auto Boot

This menu option will create the auto booting code on the target disk that will cause the computer to load and run the program of your choice from the BOOT command or a computer reset or cold start. When this option is selected, the boot sector of the target disk is scanned to determine if, a) a boot program already exists in the disk, or b) any data is occupying the boot sector.

Creating an auto boot program will destroy any data in track 1 sector 0 of the target disk. Therefore, creating an auto booting file should be the first operation performed on a disk after formatting. After creating an auto boot file, the utility will allocate the boot sector to protect it from being overwritten. The boot sector allocation will be freed during the disk COLLECT or VALIDATE operation (unless protected from this in a partition on the 1581 drive). Therefore you should NEVER validate an auto booting disk.

M) Partition Commands

Discussed at length above.

N) Direct DOS Commands

Direct DOS Commands: This provides a means to send commands directly to the active drive. Both BASIC V2.0 and V7.0 are supported. If an invalid command is sent to the active drive, an error message will be returned and displayed in the drive status window.

Some valid 1571/1581 Commands (quotes NOT included):

Command	Function
---------	----------

- 1) 'V' : Validate (collect) a disk
- 2) 'U:' : Reset (power up vector)
- 3) 'U0>M1' : Shift to 1581/1571 mode *** (1571 only)
- 4) 'U0>M0' : Shift to 1541 mode *** (1571 only)
- 5) 'U3' to 'U8' : Jump to \$050x address in RAM (x=0,3,6, etc.)
- 6) 'NO:FILENAME' : Short format (New Dir only)
- 7) 'NO:FILENAME,ID' : Full Format
- 8) 'I' : Initialize
- 9) 'U0>H0' : Head active, side 0 *** (1571 only)
- 10) 'U0>H1' : Head active, side 1 *** (1571 only)
- 11) 'U0>T' : Check ROM signature (LED flashes on fail)

1581 Specific Commands

- 1) 'U0:B0' : Slow serial bus
- 2) 'U0:B1' : Fast serial bus
- 3) 'U0:V0' : Disk verify off
- 4) 'U0:V1' : Disk verify on

Check the 1581/1571 users guide for more.

O) Unscratch

This option will scan the target disk and display any scratched file names as they are found. As a scratched file is found, you will have the option of reviving the file or continuing the scan. After the entire directory has been scanned, the disk BAM will be rewritten if any files are to be revived. This feature will also UNSCRATCH a partition. Assign a file type of CBM to the file to be unscratched.

P) Trash a Track

This option will erase the tracks of your choice, so long as the tracks selected are between track 1 and track 35 (i.e. the front side of the disk). This is a total erasure of the selected tracks including all the track header and checksum data. There is no recovery from this operation. This feature is not supported on the 1581.

Q) Bulk Erase Disk

This option will erase the front side, back side, or both sides of the target disk. Because the erase routine uses 1541 ROM, in order to erase the back side of a 1571 disk, the program will request that the target disk be inverted in the active drive. As with item (P) above, this is a total erasure of the disk. There is no recovery from this operation not supported on the 1581 drive.

The 1581/1571 DRIVE MONITOR

The 1581/1571 Drive Monitor allows you to view any part of drive RAM or ROM. Additionally, the drive monitor includes a full featured ML Monitor that supports all of the 128 monitor commands. Using the ML Monitor you can automatically disassembly any section of RAM or ROM and even save it to a disk as a binary file. The Drive and ML Monitor are very easy to use and take the frustration out of 'internal exploration' for new users.

The 1571 Memory Map:

Location	Function
0000 00ff	: Zero page (job queue, variable storage)
0100 01ff	: System stack, GCR buffers
0200 02ff	: Command buffers, data tables
0300 07ff	: RAM buffers 0 to 4
1800 180f	: Serial bus control
1C00 1C0f	: Motor & electronics control
2000 2003	: WD 1770 drive controller for IBM 34 format
4000 400f	: Fast bus control
8000 ffe5	: ROM
ffe6 ffff	: Jump table

The 1581 Memory Map:

Location	Function
0000 00ff	: Zero page (job queue, variable storage)
0100 01ff	: System stack, GCR buffers
0200 02ff	: Command buffers, data tables
0300 09ff	: RAM buffers 0 to 6
0a00 0aff	: BAM for tracks 0-39
0b00 0bff	: BAM for tracks 40-79
0c00 1fff	: Track cache buffer
6000 7fff	: Floppy drive controller
8000 feff	: ROM
ff00 ffff	: Jump table

To do any serious exploration of the 1581/1571, a detailed and commented memory map is a must. The brief map above shows the basic layout of both drives' memory.

Using the Drive Monitor:

Follow the prompts to select the active drive, etc., and when asked for a start address, enter "8000." All of the address entries must be in the HEX\$ notation. What is displayed is similar to the Disk Editor, in that 256 bytes are shown in HEX\$ and ASCII representation, except what you are looking at is the beginning of ROM. Note the signatures of the design engineers? (1571 signatures!)

You can now select a new page (all references now will deal with a 'page' of memory, i.e. 256 bytes), advance one page, or disassemble the page displayed.

Select <3> to disassemble. Now press the <F1> key to enter the ML Monitor. See appendix J of the 128 System Guide for a description of the monitor commands in addition to those displayed in the options window. Press <F3> to begin disassembly. Pressing <F4> will continue disassembly, or press <F3> again to return to the beginning of the code. The engineer's signatures don't disassemble into a very readable machine code! Select <F2> to return to the Drive Monitor. Enter 9775 as a starting address. Select Disassemble and enter the ML Monitor <F1>. Press <F3> to begin the disassembly. What you are looking at is the machine code ROM routine to write a sector to a 1571 disk.

If you wanted to, you could save it to disk with the monitor command ' S"MY FILE",8,19775 197F6', but don't forget the '1' in the address.

The drive ROM you selected to view was transferred to C128 memory in Bank 1. When you're done PEEKing at the internals, press <F2> to return to the Drive Monitor or <F7> for the Main Menu. When disassembling drive RAM below address \$0400, the data is banked into 128 memory starting at \$10400. Any relative branch instructions you see will reference the new address, but absolute branch instructions will still show the original (below \$0400) address. The same is true for drive ROM above \$D000. But it will be banked into 128 memory starting at \$1D000.

RAM WRITER

Although the 81/71 and 41 drives are 'smart' disk drives with their own RAM and ROM, not many users utilize the programmability of these drives. Not only must they be programmed in 650x machine code, but getting the program into drive RAM, then executing it can intimidate even the most experienced programmers.

RAM Writer makes it easy to develop sophisticated drive programs, or to just learn about the inner workings.

Drive Operating System Overview:

In it's simplest form, the drive control system consists of two parts, a File Handler (called the Interrupt Processor, or IP) and the Floppy Drive Controller (called the FDC).

The IP interprets incoming commands from the host computer and breaks them down into small jobs and places these job requests in the drive JOB Queue, where they are read and executed by the FDC.

With RAM Writer, we can take direct control of the job queue and completely bypass the IP. But we also bypass most of the protection built into the drive ROM.

With RAM Writer you can assemble your custom code and send it to drive RAM as a complete program, or you can send a single byte to RAM. Either option will request a starting address to send the data to. If you select the assemble option, stay at or above drive RAM address \$0400 (buffer #1). The assemble options again places you into the ML Monitor, with access to all of the monitor commands. Using the function keys, you can move between RAM Writer and the monitor. After entering the monitor, press <F3> to begin assembly. Assemble your source code, (or load it from disk with the monitor LOAD command 'L"FILENAME",8,\$1XXXX' where XXXX is a four digit HEX\$ address.) You can send it to drive RAM with the <F3> key. Watch the drive status window for return messages. If your program got to drive RAM, you'll see an OK message.

The Job Queue:

Once you get your program into Drive RAM, how do you RUN it? The job queue does it for you. That's what the SEND A BYTE option is for on the RAM Writer menu.

The job queue is at zero page location \$0000 to \$0005. Each location corresponds to a memory buffer. Buffer 0 (\$0300) for job queue location \$0000, Buffer 1 (\$0400) for job queue location \$0001, etc.

Job Codes:	Description:
\$80	Read a sector
\$88	Read sector from same track (1571 only)
\$90	Write a sector
\$A0	Verify a sector
\$B0	Seek sector header
\$C0	Bump to track 00
\$D0	Jump to buffer and execute program
\$E0	Execute program in buffer, BUT get head on track, turn on LED and drive motor first

See *The 1581 Users Guide*, Ch. 10 for an expanded list of specific job codes for the 1581.

1541 Drive Notes

Although many of the modules will work as an independent program with the 1541 drive, as a rule the results you get when using a 1541 with the program are less than satisfactory. Super 81 Utilities was developed using the 1581 and 1571 drives. The 1541 did not play a part in product development.

BUGS in the 1581!!

During development of this program, a few problems were noted with the operating system of the 1581. For your information they are commented on below.

1) The drive is agonizingly slow at responding to reconfigure commands such as: full reset, change directory, configure for MFM, etc. Considering its data transfer rate (by rough benchmark, [counting seconds in my head]) it appears to write to an order of magnitude faster than the 1571. Why does it respond to certain commands so slowly?

2) 'Stacking' drive commands (issuing one before the last one has been executed), causes problem with corrupted disks. Specifically, sending the RESET command during a disk format causes the drive to trash the disk at the end of the format process.

3) Creating sub-directories within sub-directories gives erratic results. Specifically, the drive error channel reports that the sub-sub-directory was selected successfully, but attempts to format it cause the parent directory to be formatted instead, with disastrous results to any files on the parent directory!

LIMITED WARRANTY

Free Spirit Software, Inc. warrants that the diskette on which the enclosed program is recorded will be free from defects in materials and workmanship for a period of 90 days from the date of purchase. If within 90 days from date of purchase, the diskette proves defective in anyway, you may return it to Free Spirit Software, Inc., 905 W. Hillgrove, Suite G, La Grange, IL 60525 and Free Spirit will replace it free of charge. Please allow up to 3 weeks for delivery.

Free Spirit Software, Inc. makes no warranties, either expressed or implied, with respect to the software programs recorded on the diskette or the instruction sheet, their quality, performance, merchantability or fitness for any particular purpose. The programs and instructions are sold "as is." The entire risk as to their quality and performance is with the buyer. In no event will Free Spirit Software, Inc. be liable for direct, indirect, incidental or consequential damages resulting from any defect in the programs or instructions even if Free Spirit Software, Inc. has been advised of the possibility of such damages.

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SUPER 81 UTILITIES ADDENDUM

Compatibility:

Super 81 Utilities was developed with an eye towards future ROM upgrades. Regardless of the upgrade, so long as CBM uses the same command structure, Super 81 Utilities will continue to work well.

More on The 1541:

All of the modules in Super 81 Utilities work well with the 1541 with the following exceptions:

- A. Partition Utility (1581 only)
- B. CP/M Utilities (1581/1571 only)
- C. 1581 ↔ 1581 Disk Copy (1581 only)
- D. 1571 ↔ 1571 Disk Copy (1571 only)
- E. Trash a Track/Bulk Erase Disk (1571 only)

The 1541 can be configured as device 8 or 9. Super 81 Utilities will auto boot from ANY drive configured as device 8.

The 1571 → 1581 Disk Copy module works very well with the 1541 as either device 8 or 9!

IMPORTANT

The 1541 drive will show a drive type of '1571' in the upper left or right hand corner of the Main Menu screen. THIS IS NORMAL. With a 1541, you will have access to ALL 1571 features of Super 81 Utilities, even though some will not work on the 1541 drive.

Configuration:

Super 81 Utilities will automatically address up to 2 drives on the bus so long as they are turned on and device number set prior to booting the program.

Using Your New Partitions:

Now that you have created partitions and stored your data files and programs in them, how do you access your files? Listed below are some hints that will help you utilize the partition ability of the 1581 drive.

Most application programs such as word processors, data base systems, terminal programs, etc., have a feature called 'WEDGE' or 'DIRECT DOS COMMANDS,' that once selected, will present you with a prompt of some type (cursor, 'greater than' symbol, dot, etc.). By keying in the various commands below, you will be able to move from partition to partition on your disk. Once you have entered the partition, most application programs will have a directory feature that may work inside the partition.

When a 1581 disk is inserted into the drive, the root directory is automatically selected by the DOS. So that is our starting point.

To move into a partition called MYDATA, (from the Direct DOS prompt of your favorite application program) type in /O:MYDATA , then press <RETURN>. If your application program has a method of displaying the drive error channel, you will see the message 'SELECTED PARTITION' if the move into the partition was successful. Any other error message would indicate that the move was unsuccessful and you are still in the 'Parent' partition, in this case the ROOT directory. You can continue to move INTO partitions (sub-directories) with the /O:PARTITION-NAME command. You can only nest deeper into the sub-sub-directories with this command, and the 1581 DOS has no command to move up just one level of sub-directories. The only way to move OUT of a partition without going into the next lower level of sub-directory is with the '/' command. Typing this in at your DOS prompt will return you to the ROOT directory of the disk.

If all this is a little confusing to you, try reading it again while you look at the graphic representation of partitions in Chapter 6 of *The 1581 Users Guide*.

Whether or not the above commands work from your applications program is entirely a function of the application program itself, and not Super 81 Utilities or the 1581 DOS.

Super 81 Utilities

Super 81 Utilities is a complete utilities package for the 1581 disk drive and C128 computer. Among the many Super 81 utilities options are:

- Copy whole disks from 1541 or 1571 format to 1581 partitions
- Copy 1541 or 1571 files to 1581 disks
- Copy 1581 files to 1571 disks
- Back up 1581 disks or files with 1 or 2 1581's
- 1581 Disk Editor, Drive Monitor, RAM Writer
- Supplied on both 3½" and 5¼" diskettes so that it will load on either the 1571 or 1581 drive (1581 may be device 8 or 9)
- Perform many CP/M and MS-DOS utility functions
- Perform numerous DOS functions such as rename a disk, rename a file, scratch or unscratch files, lock or unlock files, create auto-boot and much, much more!

Super 81 Utilities uses an options window to display all choices available at any given time. No need to memorize cryptic commands. Full featured disk utilities system for the 1581.

