**Disk Image Utility**

**1 OCT**A screenshot of a computer

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**Rev 2.2**

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# Introduction

Disk Image Utility is designed to support using Flash Floppy or HxC flashed Gotek drives with Heathkit 1980 era computers. It supports the native disk formats using IMG files and allows you to extract and add files from your PC to the disk image file. It currently supports CP/M, HDOS and MS-DOS FAT 12 formats used by the H-8, H-89, Z-100, RC2014, and Small Z-180.

If you want to copy files between images you must first extract the file and then insert the file in another image. This process is explained in the Function Button section below.

Disk Image Utility (DIU) can also create blank disk images in several CP/M, HDOS and MS-DOS formats which you can use in a Flash Floppy or HxC flashed Gotek. Disk Image Utility also supports adding files to these images.

## Supported File Types

The table below summarizes the capabilities for each file type. There is no need to convert an H8D file to IMD since the HxC Floppy Emulator supports the H8D format. IMD formats are converted to IMG. IMG files are converted to IMD.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Image** | **Directory** | | **Extract** | **View** | **Insert** | **Delete** | **Convert Format** |
| H8D | Y | | Y | Y | Y | Y | To IMG |
|  |  | |  |  |  |  |  |
| IMD DOS |  | |  |  |  |  | Y |
| IMD CP/M | Y | | Y |  |  | N | Y |
| IMD HDOS | N | | N |  |  | N | Y |
|  |  | |  |  |  |  |  |
| IMG CP/M | Y | | Y | Y | Y | N | Y |
| IMG DOS | Y | | Y | Future | Y | Y | Y |
| IMG HDOS | Y | | Y | Y | Y | Y | Y |
|  |  | |  |  |  |  |  |
|  |  | |  |  |  |  |  |
|  | Feature not supported | | | |  |  |  |
|  |  | Note IMG DOS files must end in "DOS.IMG" | | | | | |

# Home Screen

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## Windows

The **Disk Image List** shows the disk images in the target directory. Disk Image Utility starts in the last target directory used by the program. You can change the target directory using the **Folder** button. If you add files to the directory after starting DIU, you can refresh the Disk Image List by clicking Folder and OK.

The **File List** box shows the files in the images currently selected in the Disk Image List box when you click the **File List** button. If no images are selected, all file images are processed. CP/M file lists show the user area and status flags for each file. MS-DOS files show the flags, date and time for each file. Sub-Directories are only supported one level deep. Files in a sub directory of a sub directory will not display and cannot be extracted.

The **File List** window supports **copying the file listing** by left clicking with your mouse and then pasting the information in another application. There is no indication that the list copy occurred when you left click in the window.

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# Function Buttons

## Folder

Selects the working folder for the Disk Images.

## File List

Displays the files in each disk image selected in the Disk Image List. If no images are selected, all images in the Disk Image List window are processed. The User Area and flags for each file are displayed for CP/M and HDOS images. DOS files show the flags, date, and time. Disk Image Utility will display the contents of a sub directory, but not sub directories in the sub directory.

File List does not currently support DOS IMD images.

## Extract

Extracts selected files in in the File List window. If no file is selected, Disk Image Utility will offer to extract all files. Extracted files are placed in a directory in the Disk Image List target folder created from the Disk Image file name with “\_Files” appended.

Extract does not currently support DOS IMD images

## View

Displays text in the first selected file. Currently, only CP/M and HDOS formats in IMG and H8D are supported.

## Delete

Currently only supported under HDOS and MS-DOS.

## IMD/IMG Convert

Converts IMG files to IMD format. You can then use HxC Floppy Emulator to convert the image to HFE format for use on HxC flashed Gotek drives. Disk images need to end in DOS.IMG for Disk Image Utility to properly recognize the image for conversion.

Converts IMD files to IMG file format. DOS files need to end in DOS.IMD for Disk Image Utility program to properly recognize the image as a DOS file. The file name does not impact the conversion from IMD to IMG.

You will need to select Folder and the click Ok to rescan the folder to see the new files.

## H8D Convert to Soft Sector

Converts H8D files to IMG file format. The disk type byte at location 5 in sector 1 is updated to 0x60 to represent a 100k SS disk format. You will need to select Folder and the click Ok to rescan the folder.

## Add CP/M / Add MS-DOS / HDOS (IMG and H8D only)

Opens a new window That allows you to create blank images in several formats. When opened using Add CP/M or HDOS, only non MS-DOS files are displayed in the Disk Image List. Not surprisingly, when opened with the Add MS-DOS button, only MS-DOS files are displayed. Image buttons not related to the select DOS are disabled.

The file convention is DOS.IMG for MS-DOS files.

Double clicking on a file in the Disk Image List opens a new directory window to select individual files to add to the image.

### Create an Empty File

Clicking on the button will create the format on the button. After the image is created, a new directory window will open to add files to the image. HDOS images give you an opportunity to change the Disk label from the default. If you only want the empty file, simply close the window.

In order to see the file in the Disk Image List window the left side, click the **Folder** button and then click OK. This will cause Disk Image Utility to rescan the directory.

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# Appendix

## Disk Format Details

DIU will convert images to and from IMD to IMG. DIU only updates .IMG files.

### CP/M formats

Heathkit CP/M disk images have an ID marker in byte 5 of the first sector on the disk.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Disk ID Marker** | **Sectors per Track** | **Sector Size** | **# Tracks** | **# Heads** | **Disk Size** | **File Extension** | **Computer** |
| 0xff | 18 | 512 | 80 | 2 | 1,474,560 | IMG | H89/H8 |
| 0x6f | 5 | 1024 | 80 | 2 | 819,200 | IMG | H89/H8 |
| 0x6b | 16 | 256 | 80 | 2 | 655,360 | IMG | H89/H8 |
| 0x67 | 5 | 512 | 80 | 2 | 409,600 | IMG | H89/H8 |
| 0x62 | 16 | 256 | 40 | 2 | 327,680 | IMG | H89/H8 |
| 0x63 | 9 | 512 | 40 | 2 | 368,640 | IMG | H89/H8 |
| 0x60 | 10 | 256 | 40 | 1 | 102,400 | IMG | H89/H8 |
| 0xE5 | 10 | 256 | 40 | 1 | 102,400 | H8D | H89/H8 |
| 0x00 | 10 | 256 | 40 | 1 | 102,400 | H8D | H89/H8 |
| N/A | 18 | 512 | 80 | 2 | 1,474,560 | IMG | Small Z80 |
| N/A | 9 | 512 | 80 | 2 | 737,280 | IMG | RC2014 |

### HDOS Formats

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Sectors per Track** | **Sector Size** | **# Tracks** | **# Heads** | **Sector Per Group** | **# Groups** | **Disk Size** | **File Extension** |
| 10 | 256 | 40 | 1 | 2 | 400 | 102,400 \*\* | IMG |
| 16 | 256 | 40 | 2 | 6 | 1,278 | 327,680 | IMG |
| 16 | 256 | 80 | 2 | 10 | 2,550 | 655,360 | IMG |

\*\* 100k size need additional work

### Z100 CP/M Format

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Disk ID Marker | Sectors per Track | Sector Size | # Tracks | # Heads | Disk Size | File Extension |
| 0x23 | 8 | 512 | 40 | 2 | 327,680 | IMG |

### DOS Formats for Z-100

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Disk ID Marker** | **Sectors per Track** | **Sector Size** | **# Tracks** | **# Heads** | **Disk Size** | **File Extension** |
| 0xfd | 8 | 512 | 40 | 2 | 327,680 | DOS.IMG |
| 0xff | 9 | 512 | 40 | 2 | 368,640 | DOS.IMG |
| 0xf9 | 8 | 512 | 80 | 2 | 655,360 | DOS.IMG |

### DOS Formats

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Disk ID Marker** | **Sectors per Track** | **Sector Size** | **# Tracks** | **# Heads** | **Disk Size** | **File Extension** |
| 0xf0 | 18 | 512 | 80 | 2 | 1,457,664 | DOS.IMG |
| 0xf9 | 9 | 512 | 80 | 2 | 737,280 | DOS.IMG |
| 0xf9 | 15 | 512 | 80 | 2 | 1,228,800 | DOS.IMG |
| 0xff | 9 | 512 | 40 | 2 | 368,640 | DOS.IMG |

* Note: DIU uses file size and Disk ID Marker (Media Description) to determine the correct disk parameters

## File Conversion Notes

* Dunfield IMD files image skew matches physical disk. For an 800k disk, the first sector is 3.
* MS-DOS IMD disk has skew = 1
* IMG files are sequential order, skew = 1
* IMG conversion to IMD keeps skew = 1
* IMD conversion to IMG changes skew to 1

# Change Log

* 1.1e
  + Added code for Livingston Logic Labs for H8D
  + Added IMG to IMD conversion
  + MessageBox Title Update. Changed Disk Utility to Disk Image Utility
* 1.1f
  + Corrected program exception error when adding files
* 1.1g
  + Changed IMD conversion to report a fatal error if the number of sectors per track changes between tracks.
  + Added ability to handle IMD cylinder map data (ignore it).
  + Delete converted file if an error occurs. Improved file conversion abort code.
* 1.2
  + Added HDOS Support
  + Supports both HDOS 3 and HDOS 2 disks
* 1.2a
  + Added support for MS-DOS 1.2MB
  + Added HDOS file delete
  + Added support for .H37 files with disk information at the end of the file name.
* 1.2b
  + Fixed bug in CP/M extract caused by added support for .H37 files.
* 1.2c
  + Added support for RC2014 CP/M format
* 1.2c1
  + Mostly fixed issue with CP/M disk definition table caused by 1.2c
* 1.2c2
  + Finally fixed CP/M disk definition table caused by 1.2c (mismatch on disk creation button)
* 1.2.d
  + Added ability to change disk label when creating HDOS disk image
  + Disabled buttons on Image creation page not related to current DOS selection
* 1.2d1
  + Fixed ^Z detection for text files truncating binary files
* 1.2e
  + Added on/off button for ^Z feature
* 1.2f
  + Fix Create 720k MS-DOS disk resulting in 1200k image
  + Fix Large IMD file treated like CP/M disk
  + Exit Insert function after Disk Full error message, so you don't keep processing files
  + After adding a new disk, clear File List
  + Clear File List on Folder Change
  + Remember last location you added files
  + Create a folder for each user area when extracting CP/M files
  + Added 320k Floppy disk image capability
* 2.0
  + Change IMD to IMG conversion to allow for SPT changes on different tracks
  + Corrected bug on RC2014 disk creation where the create function wasn’t called
* 2.1
  + Added 1,440k format for RC2014
* 2.2
  + Corrected HDOS date format updates in the directory to match Stan Webb’s Y2K format.

Year 00-99 Mon 1-12 Day 1-31

15-----------9 8------5 4--------0

| 7-bits | 4-bits | 5-bits |