FSYS - Software

DFSee HOWTO

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DFSee

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This document offers some guidance in using the DFSee product to achieve the best results possible with the least effort, and avoid some common pitfalls.

Using the DFSee bootable CDROM

No doubt using DFSee from a bootable CDROM solves a few problems in case of disk problems. Using it however, also introduces a few potential problems:

1. Since DFSee is started **from the CDROM** the current directory is read-only

   This is a problem for actions that want to write files into this current directory like:
   - Open a logfile
   - Find (lost) partitions

   The easiest way to get arround the problem is to change the current directory to a location where files **can** be written. This can be done from the DFSee commandline using the ***CD*** command, or from the menu using:

   - File -> Change current directory

   Note that other things like creating imagefiles or exporting the sectorlist will present a File-SaveAs dialog by default, so the current directory is of less concern. It is important of course, to select a directory that can be written to.

2. The bootable CDROM image emulates a diskette in drive **A:**
   Because of this, the first or only diskette drive is accessible as **B:**, or not at all if two physical diskette drives are present. Note that the **A:** driveletter that will appear in the file-dialogs really represents the CDROM bootimage and can **NOT** be used to save files!

   Another problem related to this *diskette emulation mode* is that it might not work on some (SCSI) systems because of subtle differences in the implementation of the El-Torrito standard used. When that happens, the symtoms might be anything from a hang during booting to simply booting from the harddisk ...

   Do note that for the floppy-emulation to work, diskette-support MUST be enabled in the BIOS. So if you have a laptop without a diskette, do NOT turn that BIOS support off or the CDROM will not boot either!

3. The CDROM is using FreeDOS and the DFSDOS executable

   While all DFSee versions share the same set of commands and menu options, and in general can perform the same actions, using a DOS environment does place some restrictions:

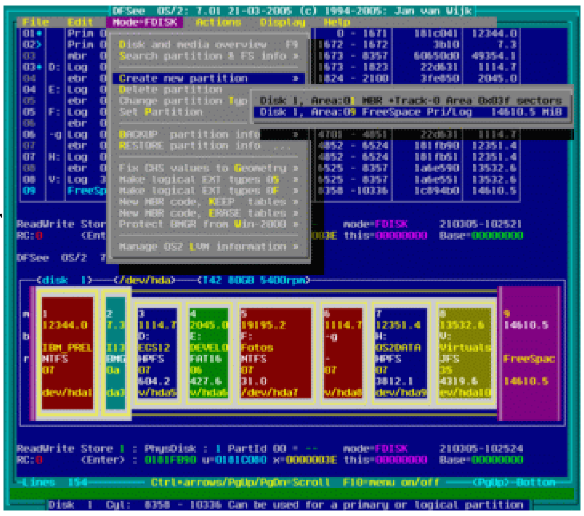
   - Only FAT (or FAT32 with FreeDOS or DOS-7) are available for output files.
     This means all logfiles, imagefiles and other files to be written by or accessed by DFSee need to reside on a FAT filesystem.

   - DFSee will use the BIOS to access disks, so might be limited in some ways
     The most common limitation is that large disks with more than 1024 cylinders can only be accessed completely if the BIOS has working INT13 extensions. Another is that SCSI, USB, Firewire and other non-standard disks are probably not accessible unless they have INT13 support built in to their disk-controllers.

     INT13 is a standard for low-level disk-services available at PC-startup time (and later when running DOS). They can reside in the system-BIOS, an additional SCSI on-board BIOS, an on-board BIOS of other disk controllers or in software modules (disk-drivers) that load as part of the operating system.
     The original implementation of INT13 services have been limited to the first 1024 cylinders of disk space (typically 7.8 GiB), but later implementations called 'Extended INT13' have lifted that limitation.

   - The current FreeDOS version still seems to have some problems accessing files deeply nested in directory structures. This is probably not much of a problem for most DFSee usage, but it might explain some strange behavior like not showing any directory contents in deeply nested structures while browsing with a file-dialog.

The DFSee menu system and how to use it



```
DFSee  OS/2: 7.01 21-03-2005 (c) 1994-2005: Jan van Wijk
 File   Edit   Mode=FDISK   Actions   Display   Help
01*      Prim   Disk and media overview   F9        0 -  1671   181c041  12344.0
02>      Prim   Search partition & FS info »    1672 -  1672      3b10      7.3
03       mbr                                    1673 -  8357   60650d0  49354.1
03*  D:  Log    Create new partition      »     1673 -  1823    22d631   1114.7
04       ebr    Delete partition                1824 -  2100    3fe050   2045.0
04   E:  Log    Change partition Typ  Disk 1, Area:01 MBR +Track-0 Area 0x03f sectors
05       ebr    Set Partition         Disk 1, Area:09 FreeSpace Pri/Log    14610.5 MiB
05   F:  Log
06       ebr    BACKUP  partition info    »     4701 -  4851    22d631   1114.7
06   -g  Log    RESTORE partition info  ...     4852 -  6524   181fb90  12351.4
07       ebr                                    4852 -  6524   181fb51  12351.4
07   H:  Log    Fix CHS values to Geometry »    6525 -  8357   1a6e590  13532.6
08       ebr    Make logical EXT types 05  »    6525 -  8357   1a6e551  13532.6
08   V:  Log    Make logical EXT types 0F  »    8358 - 10336   1c894b0  14610.5
09       FreeSp New MBR code, KEEP  tables »
                New MBR code, ERASE tables »
ReadWrite Stor  Protect BMGR from Win-2000 »       mode=FDISK     210305-102521
RC:0      <Ent                               003E this=00000000  Base=00000000
                Manage OS2 LVM information »
DFSee  OS/2  7

<disk  1>──</dev/hda>──<T42 80GB 5400rpm>
m  1          2     3         4        5           6       7          8          9
   12344.0    7.3   1114.7    2045.0   19195.2     1114.7  12351.4    13532.6    14610.5
b             D:    E:       F:          -g      H:         V:
   IBM_PREL   I13   ECS12    DEVELO   Fotos               OS2DATA    Virtuals
r  NTFS       BMG   HPFS     FAT16    NTFS        -        HPFS       JFS        FreeSpac
   07         0a    07       06       07          07       07         35
                    604.2    427.6    31.0                 3812.1     4319.6     14610.5
   dev/hda1   da3   v/hda5   v/hda6   /dev/hda7   v/hda8   dev/hda9   ev/hda10

ReadWrite Store 1 : PhysDisk : 1 PartId 00 = --    mode=FDISK     210305-102524
RC:0      <Enter> : 0181F890 u=0181C080 x=0000003E this=00000000  Base=00000000
─Lines  154──────── Ctrl+arrows/PgUp/PgDn=Scroll  F10=menu on/off ──<PgUp>─Bottom
  Disk  1  Cyl:  8358 - 10336 Can be used for a primary or logical partition
```

Most users of computer systems these days are used to graphical user interfaces as used on Windows, MAC or even more recent Linux systems. These interfaces are controlled using windows on your screen, a menu-system to select actions to be performed, a mouse to point at objects on that screen and the keyboard to enter text or commands. This offers very good feedback and reduces the chances of making mistakes.

The other extreme, the classic interface used before the GUI's is the command line interface, with the screen displaying text output by the program and the keyboard used to enter commands. This requires the users to know or learn quite a lot about the program to be able to use all available functionality.

Since it is very hard to use a GUI program from a minimal system like a boot-diskette, DFSee is not using any GUI at all, instead it uses a compromise, where windows, menus, help-screens and dialogs are used but the interface is not graphical, it is still implemented as TEXT-mode.

It its current version **DFSee does NOT support or use a mouse** to navigate its user interface. When running under a GUI (text-window) like OS/2 or Windows you CAN use some mouse functionality like the clipboard however. Future versions of DFSee might support the mouse for navigation as well, and even real GUI-versions for some platforms are considered.

Navigating the DFSee menu

The following keys perform the basic navigation in the menu:

Enter	when just menu-headings are visible, will open the highlighted pulldown menu
Enter	when a pulldown is open, will activate or execute the highlighted menu item
Esc	when just menu-headings are visible, will close the menu and activate the commandline
Esc	when a pulldown is open, will close the pulldown
F10	when the menu is active, will close the menu and activate the commandline
F10	when the commandline is active, will activate the menu and open the default pulldown
Right arrow	when a submenu-item is highlighted in a pulldown, will open that submenu
Right arrow	when no submenu-item is highlighted in a pulldown, will move to the next pulldown
Left arrow	when a submenu is opened, will close that submenu
Left arrow	when no submenu is opened, will move to the previous pulldown
Down arrow	will move the highlight to the previous menu-item in the pulldown, and wrap arround
Up arrow	will move the highlight to the next menu-item in the pulldown, and wrap arround at the top

When only the menu-headings are visible, the first letter of each heading can be used as a quick-select key to open that menu-heading. Almost any other key used will open the highlighted heading. When the commandline is active the command ***menu x*** will activate the menu and open the heading with quick-select letter ***x***.

When a pulldown menu is open, the letters that are highlighted (yellow) can be used as a quick-select key to activate (execute) that specific menu-item.

Context sensitive help and status bar description

Since menu-headings and item text can be rather cryptic, additional information is supplied:

1. The status bar, at the bottom of the screen, will display a full line of additional description about the menu-heading or menu-item currently selected. This is updated while you are scrolling through the menu.

2. At any time you can use the **F1** function-key to get help on the currently selected heading or menu-item. This will present you with a help-window dedicated to the task at hand.

Changing the default menu behaviour

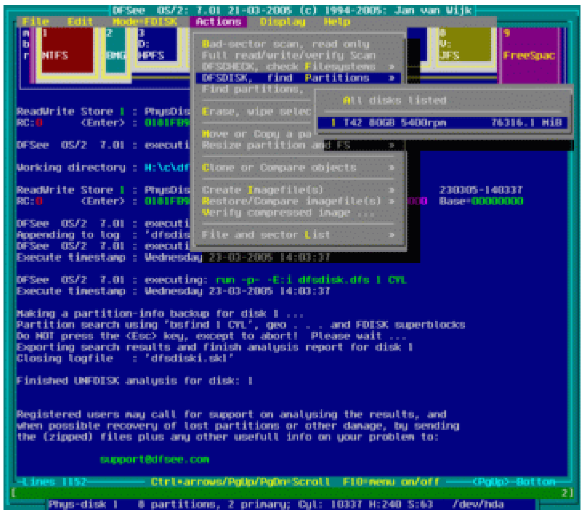
The default behavior of the menu will cause the menu to be present, but without any pull-down menu opened after startup and after completing each command.
This ensures that the output from the command being executed is visible, while having the menu available to select the next action.

The menu behavior can be adapted to personal taste using switches on DFSee startup:

DFSxxx -menu-	Do not activate the menu on startup, and do not automatically re-activate it after executing a menu selection
DFSxxx -M:1	Do not open submenu when using **right-arrow** , instead the **Enter** key is required to open the submenu
DFSxxx -M:2	Do not automatically open pulldown menus , instead an explicit key-press is required to open the pulldown
DFSxxx -M:3	Combination of **-M:1** and **-M:2**

In the above **DFSxxx** stands for any of of the available DFSee executables for the DOS, WINdows, Linux or OS2 platform.

DFSee DFSDISK procedures


DFSee OS/2: 7.01 21-03-2005 (c) 1994-2005: Jan van Wijk
File
Edit
Mode=FDISK
Actions
Display
Help
NTFS
HPFS
JFS
FreeSpac
Bad-sector scan, read only
Full read/write/verify Scan
DFSCHECK, check Filesystems »
DFSDISK, find Partitions »
Find partitions,
Erase, wipe selec
Move or Copy a pa
Resize partition and FS »
Clone or Compare objects »
Create Imagefile(s) »
Restore/Compare imagefile(s) »
Verify compressed image ...
File and sector List »
All disks listed
1 T42 80GB 5400rpm 76316.1 MiB
Lines 1152
Ctrl+arrows/PgUp/PgDn=Scroll F10=menu on/off
<PgUp>-Bottom
Phys-disk 1 8 partitions, 2 primary; Cyl: 10337 H:240 S:63 /dev/hda

```
ReadWrite Store 1 : PhysDis
RC:0       <Enter> : 0101FB9

DFSee  OS/2  7.01 : executi

Working directory : H:\c\df

ReadWrite Store 1 : PhysDis                            230305-140337
RC:0       <Enter> : 0101FB9                      000  Base=00000000

DFSee  OS/2  7.01 : executi
Appending to log  : 'dfsdis
DFSee  OS/2  7.01 : executi
Execute timestamp : Wednesday 23-03-2005 14:03:37

DFSee  OS/2  7.01 : executing: run -p- -E:i dfsdisk.dfs 1 CYL
Execute timestamp : Wednesday 23-03-2005 14:03:37

Making a partition-info backup for disk 1 ...
Partition search using 'bsfind 1 CYL', geo . . . and FDISK superblocks
Do NOT press the <Esc> key, except to abort!  Please wait ...
Exporting search results and finish analysis report for disk 1
Closing logfile    : 'dfsdiski.skl'

Finished UNFDISK analysis for disk: 1


Registered users may call for support on analysing the results, and
when possible recovery of lost partitions or other damage, by sending
the (zipped) files plus any other usefull info on your problem to:

               support@dfsee.com
```

The nightmare for every PC user, if you find yourself looking at:

- Blinking cursor on startup, PC does not boot
- Scaring messages like:
    - Error reading disk
    - Operating system not found
    - Invalid drive specification
    - Invalid partition table
    - Sector not found
- Or simply partitions missing after a mistake in FDISK or other tool ?

Most often you can **recover lost partitions** using DFSee!

The DFSDISK functionality in DFSee is based on an extensive search of the disk(s) for any remaining partition-tables, bootsectors or LVM related sectors. The results of this search is stored in several files for every disk examined (6 of them with DFSee 10.x).
These files (DFSDISKI.*) are the basis for an analysis that may result in the cration of a recovery script (.DFS) that will recreate the missing or damaged partitions, and/or fix any other problems found.

Because of the complexity of the matter, and the many variations is disk layout and filesystems, the analysis is NOT automatic and requires someone knowledgable about disks, partitions and the problems that may occur with them. It is usually done by FSYS-software *SUPPORT*, and in that case does **require** a valid registration.

Getting the DFSDISKI. files*

To create the required analysis files you will use the ***dfsdproc.dfs*** script that comes with the standard DFSee distributions including the CDROM. This script requires that the **current directory** when running this script is writable, and has enough space for the files (typically e few hundred Kb per analyzed disk).

There are two ways to run the DFSee DFSDISK procedure:

DFSDISK from the menu inside DFSee

To collect the required files for one or all disks use the following menu selections:

- Actions -> DFSDISK, find Partitions -> ... select one or ALL disks

  Then fill in the dialog using mostly the defaults, except for the base filename to use.

  In case nothing was found due to geometry problems, you could instruct DFSee to search ALL sectors instead of just the ones on cylinder boundaries, in that same dialog.

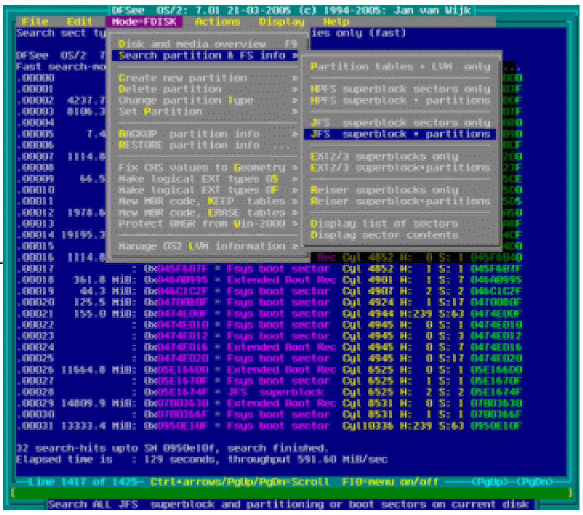
DFSDISK from the operating system command line

You would need the DFSDPROC.DFS script that comes with DFSee, plus:

- For DOS or Win9x bootdiskettes DFSDISK.BAT and DFSDOS.EXE.
- For Win-NT/2000/XP DFSDISK.BAT and DFSWIN.EXE
- For OS/2 DFSDISK.CMD and DFSOS2.EXE
- For Linux the 'dfsdisk' script and the 'dfsee' executable

You simply run the script-file (.BAT or .CMD) without any parameters and it will collect SIX files for every physical disk you have. (DFSDISK?.*) By default it will handle all disks, but you can specify parameters to do just a single disk, or search in ALL sectors on a disk. Use *dfsdisk -?* to get usage information

Analysis of the results


DFSee OS/2: 7.01 21-03-2005 (c) 1994-2005: Jan van Wijk
File Edit Mode=FDISK Actions Display Help
Disk and media overview F5
Search partition & FS info »
Create new partition »
Delete partition »
Change partition Type »
Set Partition »
BACKUP partition info »
RESTORE partition info ...
Fix CHS values to Geometry »
Make logical EXT types 05 »
Make logical EXT types 0F »
New MBR code, KEEP tables »
New MBR code, ERASE tables »
Protect BMGR from Win-2000 »
Manage OS2 LVM information »
Partition tables + LVM only
HPFS superblock sectors only
HPFS superblock + partitions
JFS superblock sectors only
JFS superblock + partitions
EXT2/3 superblocks only
EXT2/3 superblock+partitions
Reiser superblocks only
Reiser superblock+partitions
Display list of sectors
Display sector contents

```
.00017          : 0x045F687F = Fsys boot sector   Cyl 4852 H:  1 S: 1  045F687F
.00018  361.8 MiB: 0x046A0995 = Extended Boot Rec  Cyl 4901 H:  1 S: 7  046A0995
.00019   44.3 MiB: 0x046C1C2F = Fsys boot sector   Cyl 4907 H:  2 S: 2  046C1C2F
.00020  125.5 MiB: 0x0470080F = Fsys boot sector   Cyl 4924 H:  1 S:17  0470080F
.00021  155.0 MiB: 0x0474E00F = Fsys boot sector   Cyl 4944 H:239 S:63  0474E00F
.00022          : 0x0474E010 = Fsys boot sector   Cyl 4945 H:  0 S: 1  0474E010
.00023          : 0x0474E012 = Fsys boot sector   Cyl 4945 H:  0 S: 3  0474E012
.00024          : 0x0474E016 = Extended Boot Rec  Cyl 4945 H:  0 S: 7  0474E016
.00025          : 0x0474E020 = Fsys boot sector   Cyl 4945 H:  0 S:17  0474E020
.00026 11664.8 MiB: 0x05E16400 = Extended Boot Rec  Cyl 6525 H:  0 S: 1  05E16400
.00027          : 0x05E1670F = Fsys boot sector   Cyl 6525 H:  1 S: 1  05E1670F
.00028          : 0x05E1674F = JFS  superblock    Cyl 6525 H:  2 S: 2  05E1674F
.00029 14809.9 MiB: 0x07B03630 = Extended Boot Rec  Cyl 8531 H:  0 S: 1  07B03630
.00030          : 0x07B0364F = Fsys boot sector   Cyl 8531 H:  1 S: 1  07B0364F
.00031 13333.4 MiB: 0x0950E10F = Fsys boot sector   Cyl10336 H:239 S:63  0950E10F

32 search-hits upto SN 0950e10f, search finished.
Elapsed time is    : 129 seconds, throughput 591.60 MiB/sec
```

Line 1417 of 1425 Ctrl+arrows/PgUp/PgDn=Scroll F10=menu on/off <PgUp> <PgDn>
Search ALL JFS superblock and partitioning or boot sectors on current disk

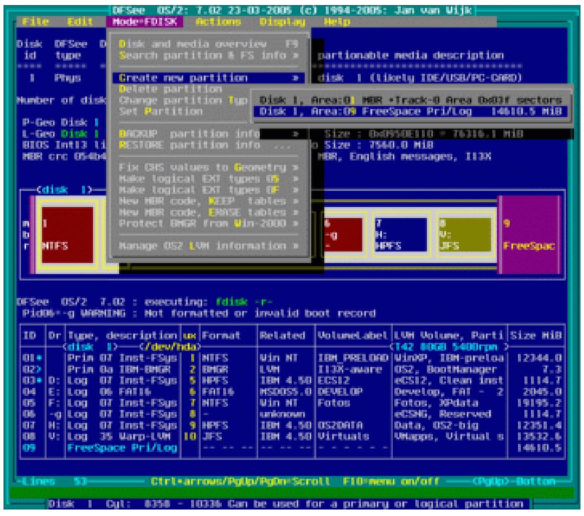
Based on the DFSDISK?.* information a recovery script can be created that can simply be run from the operating system command line like:

DFSxxx.exe run recover.dfs

You will most likely need assistance to do analyse the information, and that DOES require you to have or buy a registration!
If you have the wanted information collected in the files, you can send them to DFSee SUPPORT at: support@dfsee.com
To save space, I advice to compress all the files before sending them, for example to a single DFSDISKI.ZIP

If you want to attempt the analysis yourself, or simply want to learn more about the matter you can also check the DFSee DFSDISK descriptions and usage

CREATE new partitions in freespace areas



```
DFSee  OS/2: 7.02 23-03-2005 (c) 1994-2005: Jan van Wijk
 File   Edit   Mode=FDISK   Actions   Display   Help

Disk  DFSee  D  Disk and media overview       F9
 id   type      Search partition & FS info    »  partionable media description
====  =====                                      ================================
  1   Phys      Create new partition          »  disk  1 (likely IDE/USB/PC-CARD)
                Delete partition
Number of disk  Change partition Typ  Disk 1, Area:01 MBR +Track-0 Area 0x003f sectors
                Set Partition         Disk 1, Area:09 FreeSpace Pri/Log   14610.5 MiB
 P-Geo Disk 1
 L-Geo Disk 1   BACKUP  partition info       »   Size : 0x0950E110 = 76316.1 MiB
 BIOS Int13 li  RESTORE partition info  ...     o Size : 7560.0 MiB
 MBR crc 0540b4                                  MBR, English messages, I13X
                Fix CHS values to Geometry    »
                Make logical EXT types 05     »
  <disk  1>     Make logical EXT types 0F     »
                New MBR code, KEEP  tables    »
 m  1           New MBR code, ERASE tables    »    6      7      8      9
 b              Protect BMGR from Win-2000    »   -g     H:     V:
 r  NTFS                                           -     HPFS   JFS    FreeSpac
                Manage OS2 LVM information    »

DFSee  OS/2  7.02 : executing: fdisk -r-
 Pid06=-g WARNING : Not formatted or invalid boot record

ID  Dr  Type, description ux Format    Related    VolumeLabel  LVM Volume, Parti Size MiB
       <disk  1>--</dev/hda>                                  <T42 80GB 5400rpm >
01*     Prim 07 Inst-FSys  1 NTFS      Win NT     IBM_PRELOAD  WinXP, IBM-preloa   12344.0
02>     Prim 0a IBM-BMGR   2 BMGR      LVM        I13X-aware   OS2, BootManager        7.3
03* D:  Log  07 Inst-FSys  5 HPFS      IBM 4.50   ECS12        eCS12, Clean inst    1114.7
04  E:  Log  06 FAT16      6 FAT16     MSDOS5.0   DEVELOP      Develop, FAT  -  2   2045.0
05  F:  Log  07 Inst-FSys  7 NTFS      Win NT     Fotos        Fotos, XPdata       19195.2
06  -g  Log  07 Inst-FSys  8 -         unknown                 eCSMG, Reserved      1114.7
07  H:  Log  07 Inst-FSys  9 HPFS      IBM 4.50   OS2DATA      Data, OS2-big       12351.4
08  V:  Log  35 Warp-LVM  10 JFS       IBM 4.50   Virtuals     VMapps, Virtual s   13532.6
09          FreeSpace Pri/Log  -- -- --  -- -- --  - - - - - -                     14610.5

-Lines  53------ Ctrl+arrows/PgUp/PgDn=Scroll  F10=menu on/off ----<PgUp>-Bottom-
 Disk  1  Cyl:  8358 - 10336 Can be used for a primary or logical partition
```

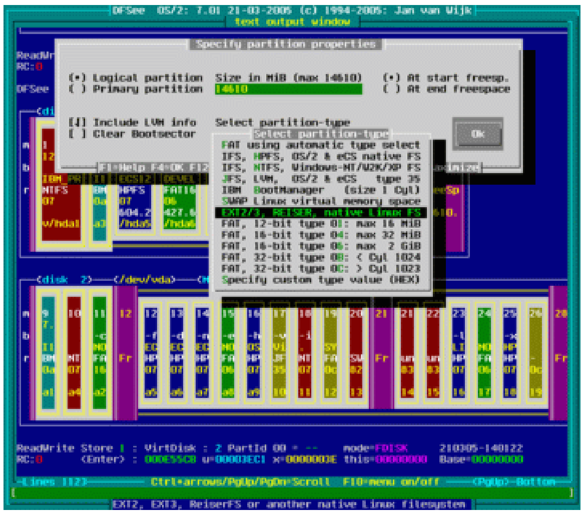
You can create new partitions from the DFSee commandline using the CR command, see DFSee COMMAND overview, or from the menu as shown above.

When using the menu, the CREATE selection opens a submenu with all available freespace areas.

Only freespace areas that are large enough, and in a proper location to contain new partitions will be selectable. Freespace areas might not be selectable when:

- They are designated 'wasted' because they are outside an existing extended container, and/or no more primaries can be created. The limit is FOUR primaries, or one extended container plus THREE primaries.
  A primary partition can NEVER be between two logical partitions, all logicals need to be within a single area called the extended container.
- The freespace area is too small to contain a minimal size cylinder-aligned partition

Select the one you want to use for the new partition, and on ENTER you will be presented with a CREATE specific dialog that allows you to specify all relevant information.



```
DFSee  OS/2: 7.01 21-03-2005 (c) 1994-2005: Jan van Wijk
text output window

Specify partition properties

(•) Logical partition  Size in MiB (max 14610)   (•) At start freesp.
( ) Primary partition  14610                     ( ) At end freespace

[√] Include LVM info   Select partition-type                      Ok
[ ] Clear Bootsector
                        Select partition-type
                        FAT using automatic type select
                        IFS, HPFS, OS/2 & eCS native FS
                        IFS, NTFS, Windows-NT/W2K/XP FS
                        JFS, LVM,  OS/2 & eCS   type 35
                        IBM  BootManager    (size 1 Cyl)
                        SWAP Linux virtual memory space
                        EXT2/3, REISER, native Linux FS
                        FAT, 12-bit type 01: max 16 MiB
                        FAT, 16-bit type 04: max 32 MiB
                        FAT, 16-bit type 06: max  2 GiB
                        FAT, 32-bit type 0B: < Cyl 1024
                        FAT, 32-bit type 0C: > Cyl 1023
                        Specify custom type value (HEX)

ReadWrite Store 1 : VirtDisk : 2 PartId 00 = --     mode=FDISK     210305-140122
RC:0       <Enter> : 000E55C8 u=00003EC1 x=0000003E this=00000000  Base=00000000

Lines 1123   Ctrl+arrows/PgUp/PgDn=Scroll  F10=menu on/off     <PgUp>-Bottom

EXT2, EXT3, ReiserFS or another native Linux filesystem
```

The CREATE dialog allows you to specify:

- The kind of partition, which can be either of:
    - Logical partition
    - Primary partition

  If creating either type is not possible, the option will not be shown ...

- Location of the new partition, either of:
    - At start freespace
    - At end freespace

  If you want to place the partition somewhere in the MIDDLE of a freespace area, you will have to use the CR command manually, and use the '-at:' option with a megabyte or cylinder offset.

- The size in megabytes for the new partition
  This will be rounded up to make the new partition align to cylinder boundaries. In practice this may increase the specified size with up to 7 megabytes.

- The partition type
  The most common types can be selected directly from the selection list, and for more obscure values you can use the 'Specify custom type value (HEX)' selection to specify any value between 0x01 and 0xff.

- Include LVM info
  This option causes the LVM dialog to be activated after the partition has been created, so you can specify the required (OS2 type) LVM information for this partition/volume in one go.

- Create NEW mode, clear existing bootsector and old LVM info
  This option will instruct the CREATE command to CLEAR the bootsector for the newly created partition with a 0xF6 pattern, just like regular FDISK programs do. This avoids problems when you want to format the new partition and the FORMAT program might pick up 'old' size values from the bootsector instead of using the new partition size.

  For recovery purposes however, you do NOT want the bootsector to be cleared, so use:

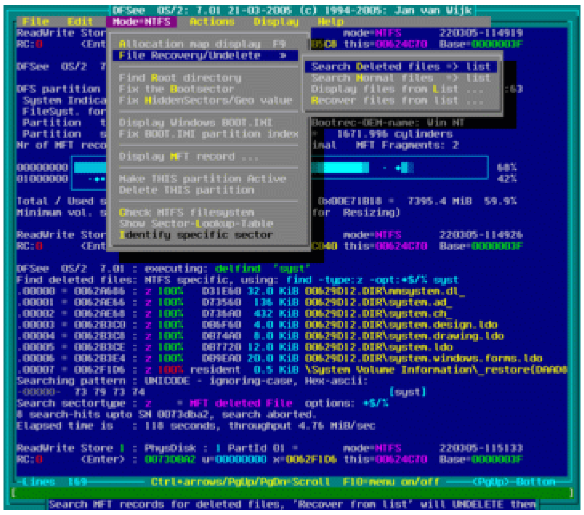
- Recovery mode, keep existing bootsector and LVM info intact

After completing the CREATE dialog, you will get an aditional confirmation dialog with the new partition details displayed on the screen so you can verify them.

UNDELETE / RECOVER files from HPFS, NTFS, FAT, JFS

Find your deleted file(s) on an HPFS/NTFS partition, or find regular files on such a partition that has become inaccessible for the operating system (no driveletter assigned, not 'mounted'), or that has been formatted by accident.

Recover the file-data for all or selected files to another volume (driveletter).


DFSee OS/2: 7.01 21-03-2005 (c) 1994-2005: Jan van Wijk
File
Edit
Mode=NTFS
Actions
Display
Help
Allocation map display F9
File Recovery/Undelete »
Find Root directory
Fix the Bootsector
Fix HiddenSectors/Geo value
Display Windows BOOT.INI
Fix BOOT.INI partition index
Display MFT record ...
Make THIS partition Active
Delete THIS partition
Check NTFS filesystem
Show Sector-Lookup-Table
Identify specific sector
Search Deleted files => list
Search Normal files => list
Display files from List ...
Recover files from list ...
-Lines 169
Ctrl+arrows/PgUp/PgDn=Scroll F10=menu on/off
<PgUp>-Bottom
Search MFT records for deleted files, 'Recover from list' will UNDELETE them

```
ReadWrite Stor                          mode=NTFS       220305-114919
RC:0       <Ent                    B5C8 this=00624C70   Base=0000003F

DFSee  OS/2  7

DFS partition                                                      :63
 System Indica
 FileSyst. for
 Partition   t                     Bootrec-OEM-name: Win NT
 Partition   s                     =   1671.996 cylinders
Nr of MFT reco                     inal   MFT Fragments: 2

00000000                                                          68%
01000000                                                          42%

Total / Used s                     0x00E71818 =  7395.4 MiB  59.9%
Minimum vol. s                     for  Resizing)

ReadWrite Stor                          mode=NTFS       220305-114926
RC:0       <Ent                    C040 this=00624C70   Base=0000003F

DFSee  OS/2  7.01 : executing: delfind  'syst'
Find deleted files: NTFS specific, using: find -type:z -opt:+$/% syst
.00000 = 0062A606 : z 100%   D31E60 32.0 KiB 00629D12.DIR\mmsystem.dl_
.00001 = 0062AE66 : z 100%   D73560  136 KiB 00629D12.DIR\system.ad_
.00002 = 0062AE68 : z 100%   D736A0  432 KiB 00629D12.DIR\system.ch_
.00003 = 0062B3C0 : z 100%   D86F60  4.0 KiB 00629D12.DIR\system.design.ldo
.00004 = 0062B3C8 : z 100%   D874A0  8.0 KiB 00629D12.DIR\system.drawing.ldo
.00005 = 0062B3CE : z 100%   D87720 12.0 KiB 00629D12.DIR\system.ldo
.00006 = 0062B3E4 : z 100%   D89EA0 20.0 KiB 00629D12.DIR\system.windows.forms.ldo
.00007 = 0062F1D6 : z 100% resident  0.5 KiB \System Volume Information\_restore{DAAD8
Searching pattern : UNICODE - ignoring-case, Hex-ascii:
-00000-   73 79 73 74                                   [syst]
Search sectortype : z     = MFT deleted File  options: +$/%
8 search-hits upto SN 0073dba2, search aborted.
Elapsed time is   : 118 seconds, throughput 4.76 MiB/sec

ReadWrite Store 1 : PhysDisk : 1 PartId 01 =    mode=NTFS       220305-115133
RC:0       <Enter> : 0073DBA2 u=00000000 x=0062F1D6 this=00624C70   Base=0000003F
```

Undelete or file-recovery in DFSee is a three to four step process:

1. Select the partition in question

   For **UNDELETE** this must be an HPFS, JFS or NTFS partition, for recovery of normal files it can also be a FAT(32) partition. Select the partition using:

   - File -> Open partition to work with

2. Find deleted or normal files, collecting found ones in a list. Use one of:

   - Mode=***xxx*** -> File Recovery/Undelete -> Search deleted files => list
   - Mode=***xxx*** -> File Recovery/Undelete -> Search normal files => list

   Depending on the current filesystem ***xxx*** you can specify part of the name for the file(s) to be found in the next dialog.

   While searching, a reference will be added to the DFSee sector-list for every file found that matches this partial filename and the full path+filename for the file will be displayed together with a recovery prognosis.

   Note that searching for files on a large disk, may take a very long time. Expect between less than 1 to more than 10 minutes per gigabyte, depending on the speed of your harddisk, the filesystem used and the amount of freespace.

3. Display the list, using a selection wildcard specification (**optional**):

   - Mode=***xxx*** -> File Recovery/Undelete -> Display files from list ...

   This optional step might be usefull to find out what the best wildcard is to get exactly the file(s) you need to recover. The wildcard may describe any part of the full path+filename displayed while searching, and it can contain multiple wildcard-characters:

   ***** representing one or more characters in the path+filename

   ? representing exctly one character in the path+filename

   As an example: ***mydocs*test?****.doc*

   would display/recover all **.DOC** files with a name starting with **test** plus just one character that have **mydocs** somewhere in the directory path.

4. Recover the file-data for all or selected files to another volume (driveletter).

   - Mode=***xxx*** -> File Recovery/Undelete -> Recover files from list ...

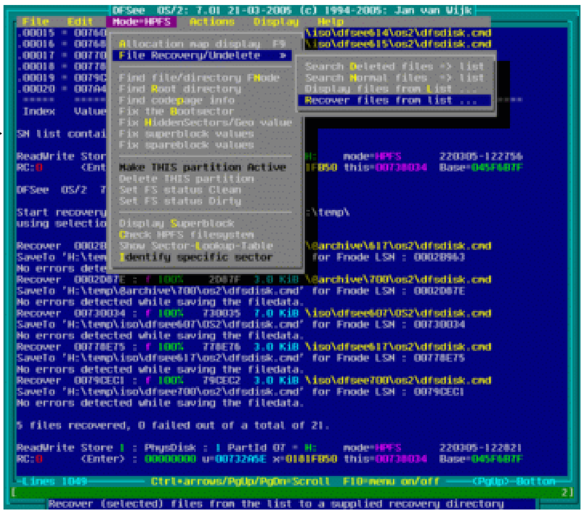
   This will first present a dialog where you need to specify the directory where the filedata will be recovered to. Of course this must be a writable location with enough freespace to hold the filedata for all files to be recovered. In this destination directory, the files will be recreated with their full original path and filename when available, and the data for the file is copied over.

   Note: For HPFS each component in the path and the filename will be limited to a maximum of 15 characters due to the limited-length names as stored in the file and directory FNODE structures. This limitation might be lifted in future DFSee releases.

   After specifying the destination directory, the next dialog allows you to specify a selection wildcard, exactly as with the optional display step described above.

   After this the files will be recovered one by one, with progress information displayed.

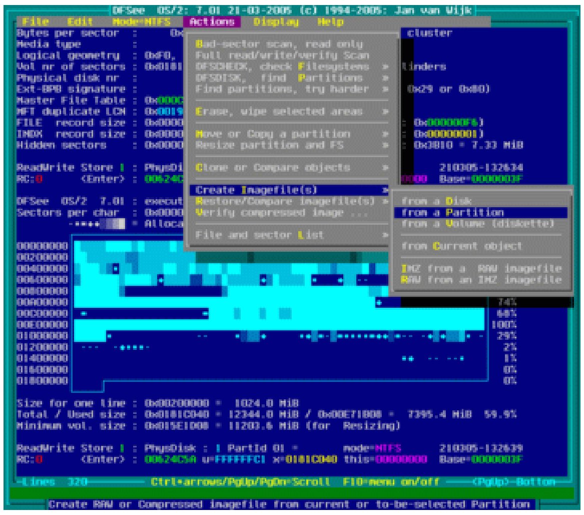
   For later reference and checking the results, it is advised to start a logfile before starting the recovery procedure.



```
.00015 = 00760                                    \iso\dfsee614\os2\dfsdisk.cmd
.00016 = 00768                                    \iso\dfsee615\os2\dfsdisk.cmd
.00017 = 00770
.00018 = 00778
.00019 = 0079C
.00020 = 007A4
 =====   =====                                                               =====
 Index   Value

SN list contai

ReadWrite Stor                                    H:     mode=HPFS      220305-122756
RC:0      <Ent                                    1F050 this=00730034  Base=045F687F

DFSee  OS/2  7

Start recovery                                    :\temp\
using selectio

Recover  00028                                    \@archive\617\os2\dfsdisk.cmd
SaveTo 'H:\tem                                     for Fnode LSN : 00028963
No errors dete
Recover  0002D87E : f 100%    2D87F   3.0 KiB \@archive\700\os2\dfsdisk.cmd
SaveTo 'H:\temp\@archive\700\os2\dfsdisk.cmd'  for Fnode LSN : 0002D87E
No errors detected while saving the filedata.
Recover  00730034 : f 100%   730035   7.0 KiB \iso\dfsee607\OS2\dfsdisk.cmd
SaveTo 'H:\temp\iso\dfsee607\OS2\dfsdisk.cmd'  for Fnode LSN : 00730034
No errors detected while saving the filedata.
Recover  00778E75 : f 100%   778E76   3.0 KiB \iso\dfsee617\os2\dfsdisk.cmd
SaveTo 'H:\temp\iso\dfsee617\os2\dfsdisk.cmd'  for Fnode LSN : 00778E75
No errors detected while saving the filedata.
Recover  0079CEC1 : f 100%   79CEC2   3.0 KiB \iso\dfsee700\os2\dfsdisk.cmd
SaveTo 'H:\temp\iso\dfsee700\os2\dfsdisk.cmd'  for Fnode LSN : 0079CEC1
No errors detected while saving the filedata.

5 files recovered, 0 failed out of a total of 21.

ReadWrite Store 1 : PhysDisk : 1 PartId 07 = H:     mode=HPFS      220305-122821
RC:0      <Enter> : 00000000 u=00732A5E x=0181F050 this=00730034  Base=045F687F
Recover (selected) files from the list to a supplied recovery directory
```

IMAGING using RAW or compressed files

Create an imagefile from the currently selected object (disk/partition) or restore an imagefile.


DFSee OS/2: 7.01 21-03-2005 (c) 1994-2005: Jan van Wijk
File
Edit
Mode=NTFS
Actions
Display
Help
Bad-sector scan, read only
Full read/write/verify Scan
DFSCHECK, check Filesystems
DFSDISK, find Partitions
Find partitions, try harder
Erase, wipe selected areas
Move or Copy a partition
Resize partition and FS
Clone or Compare objects
Create Imagefile(s)
Restore/Compare imagefile(s)
Verify compressed image ...
File and sector List
from a Disk
from a Partition
from a Volume (diskette)
from Current object
IMZ from a RAW imagefile
RAW from an IMZ imagefile
-Lines 320
Ctrl+arrows/PgUp/PgDn=Scroll F10=menu on/off
(PgUp)-Bottom

```
Size for one line : 0x00200000 =  1024.0 MiB
Total / Used size : 0x0181C040 = 12344.0 MiB / 0x00E71808 =  7395.4 MiB  59.9%
Minimum vol. size : 0x015E1D08 = 11203.6 MiB (for  Resizing)

ReadWrite Store 1 : PhysDisk : 1 PartId 01 =       mode=NTFS      210305-132639
RC:0      <Enter> : 00624C5A u=FFFFFFC1 x=0181C040 this=00000000  Base=0000003F

Create RAW or Compressed imagefile from current or to-be-selected Partition
```

Imagefiles are (binary) files that hold a complete representation of a disk-partition or even a complete disk. There use is in backup, system recovery and moving contents from one system to another. In DFSee there are two main types of imagefiles:

1. **RAW**
   These are one-to-one exact sector copies of the original partition or disk in a binary file. The data is NOT compressed or changed in any way and nothing is added to the files for identification or other purposes.

   These are the kind of images that may be shared with other applications since it is a defacto standard. It is used a lot with diskette images, but also by Virtual-machine implementations like VPC or SVISTA as far as uncompressed disk images are used to represent the hard-disk of the virtual PC.

2. **Compressed**
   The main difference with the RAW format is that they are well, *compressed* meaning smaller ... DFSee uses a mixture of LZW and RLE compression methods to achieve maximum compression ratio and imaging speed for 'typical' situations. In addition it may use *SmartUse* filesystem information to skip unused areas of partitions when creating or restoring imagefiles. This results in tremendous savings in filesize and processing-time for filesystems that have lots of unused (free) space.

   Currently *SmartUse* imaging is implemented for **HPFS**, **NTFS, JFS, EXT2/3, Reiser** and **FAT** filesystems.

There are three other properties that are useful with *Compressed* images mainly,
but do work for RAW as well:

- **Info header**
  This adds a DFSee specific ASCII header to the imagefiles, thay can be very usefull to identify the imagefile in question. You can view this info quite easily using the standard 'TYPE filename' command on the operating system command line or a 'view' option as offered by many filemanagers. Adding this header can be suppressed using the **-Raw** option on the SIM command or checking the corresponding checkbox in the dialog.

  Note that DFSee compressed images are NOT ZIP-files! First of all, they use a slightly different compression method, and second it is not a 'file-archive' with a directory like regular ZIP-files are.

- **Size limit**
  This limits the maximum size of the imagefile(s) being created to the specified size (or 2 GiB when not specified). This is usefull to create files that will fit on a diskette, a CDROM or DVD or that are compatible with the maximum filesize for the filesystem used to store the imagefiles.

- **Media Change**
  This informs the DFSee imaging process that the files will be written to removable media (like diskette or CDROM) and that it should prompt the user to change the media involved before starting each imagefile.

  Note that to write to multiple CDROMs using DFSee, your CD-writer software must support *Streaming* write mode, where the CDROM gets a diveletter assigned that can be written to just like any other drive.
  RSJ for OS/2 or Windows is such a product, and for Windows only you can use Adaptec Easy CD creator or Roxio DirectCD (which should allow writing to DVD's too).

Selecting the object

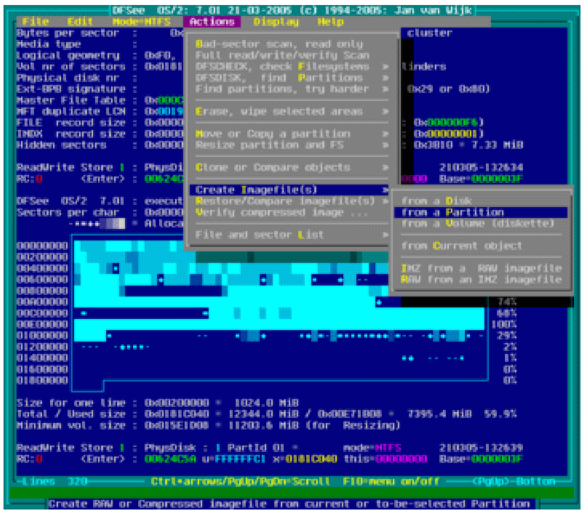
Allthough you can use the "File -> Open object to work with" menu to open an object and than create an image "from Current object", it is much more convenient to use the available menu selections in the imaging submenu. That way all selections needed to create the image are made from that single menu-selection plus a dialog:

- Actions -> Create Imagefile(s) -> from a Disk ...
- Actions -> Create Imagefile(s) -> from a Partition ...
- Actions -> Create Imagefile(s) -> from a Volume (diskette) ...

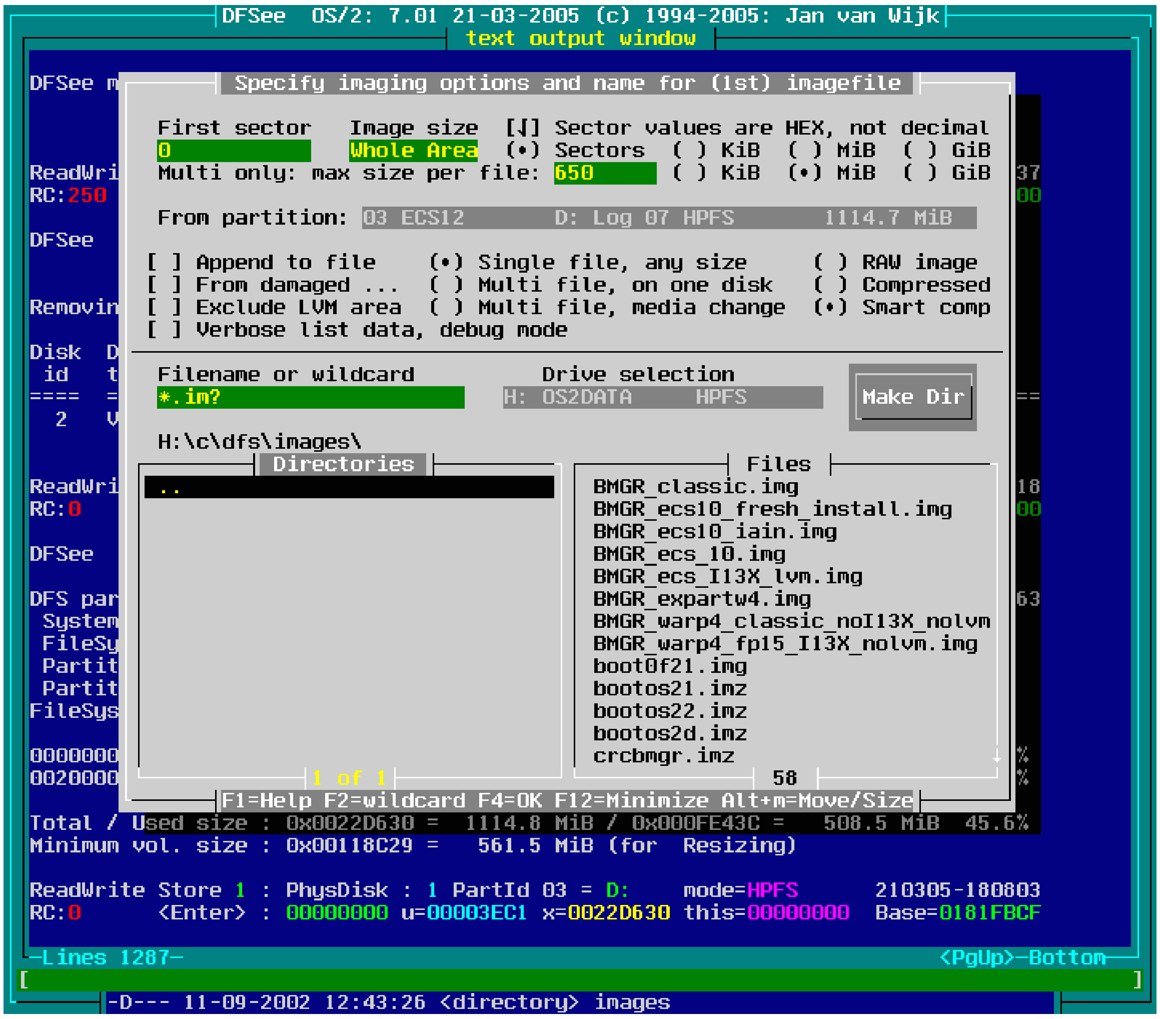
For diskette-images you would use a Volume, in most other situations you would use a Partition and in some rare cases you might want images for a complete disk.

Creating an image

You can create images from the DFSee commandline using the IMAGE command, see DFSee COMMAND overview, or from the menu as shown above. When using the menu, or when specifying an incomplete IMAGE command, you will be presented with an imaging specific dialog that allows you to specify all relevant information.



```
                 DFSee  OS/2: 7.01 21-03-2005 (c) 1994-2005: Jan van Wijk
 File   Edit   Mode=NTFS   Actions   Display   Help
Bytes per sector    :     0x   Bad-sector scan, read only             cluster
Media type          :          Full read/write/verify Scan
Logical geometry    : 0xF0,    DFSCHECK, check Filesystems    »      linders
Vol nr of sectors   : 0x0181   DFSDISK,  find  Partitions     »
Physical disk nr    :          Find partitions, try harder    »      0x29 or 0x80)
Ext-BPB signature   :
Master File Table   : 0x000C   Erase, wipe selected areas     »
MFT duplicate LCN   : 0x0019                                         0x000000F6)
FILE  record size   : 0x0000   Move or Copy a partition       »      0x00000001)
INDX  record size   : 0x0000   Resize partition and FS        »      0x3810 = 7.33 MiB
Hidden sectors      : 0x0000
                               Clone or Compare objects       »      210305-132634
ReadWrite Store 1   : PhysDi                                   0000  Base=0000003F
RC:0        <Enter> : 00624C   Create Imagefile(s)            »
                               Restore/Compare imagefile(s)   »  from a Disk
DFSee  OS/2  7.01   : execut   Verify compressed image ...       from a Partition
Sectors per char    : 0x0000                                     from a Volume (diskette)
         -****      = Alloca   File and sector List           »
                                                                 from Current object
00000000
00200000                                                         IMZ from a  RAW imagefile
00400000                                                         RAW from an IMZ imagefile
00600000
00800000                                                                   74%
00A00000                                                                   60%
00C00000                                                                  100%
00E00000                                                                   29%
01000000                                                                    2%
01200000                                                                    1%
01400000                                                                    0%
01600000                                                                    0%
01800000

Size for one line   : 0x00200000 =   1024.0 MiB
Total / Used size   : 0x0181C040 = 12344.0 MiB / 0x00E71808 =   7395.4 MiB  59.9%
Minimum vol. size   : 0x015E1D08 = 11203.6 MiB (for  Resizing)

ReadWrite Store 1   : PhysDisk : 1 PartId 01 =       mode=NTFS       210305-132639
RC:0        <Enter> : 00624C5A u=FFFFFFC1 x=0181C040 this=00000000  Base=0000003F
-Lines  320-      Ctrl+arrows/PgUp/PgDn=Scroll  F10=menu on/off      <PgUp>-Botton
   Create RAW or Compressed imagefile from current or to-be-selected Partition
```



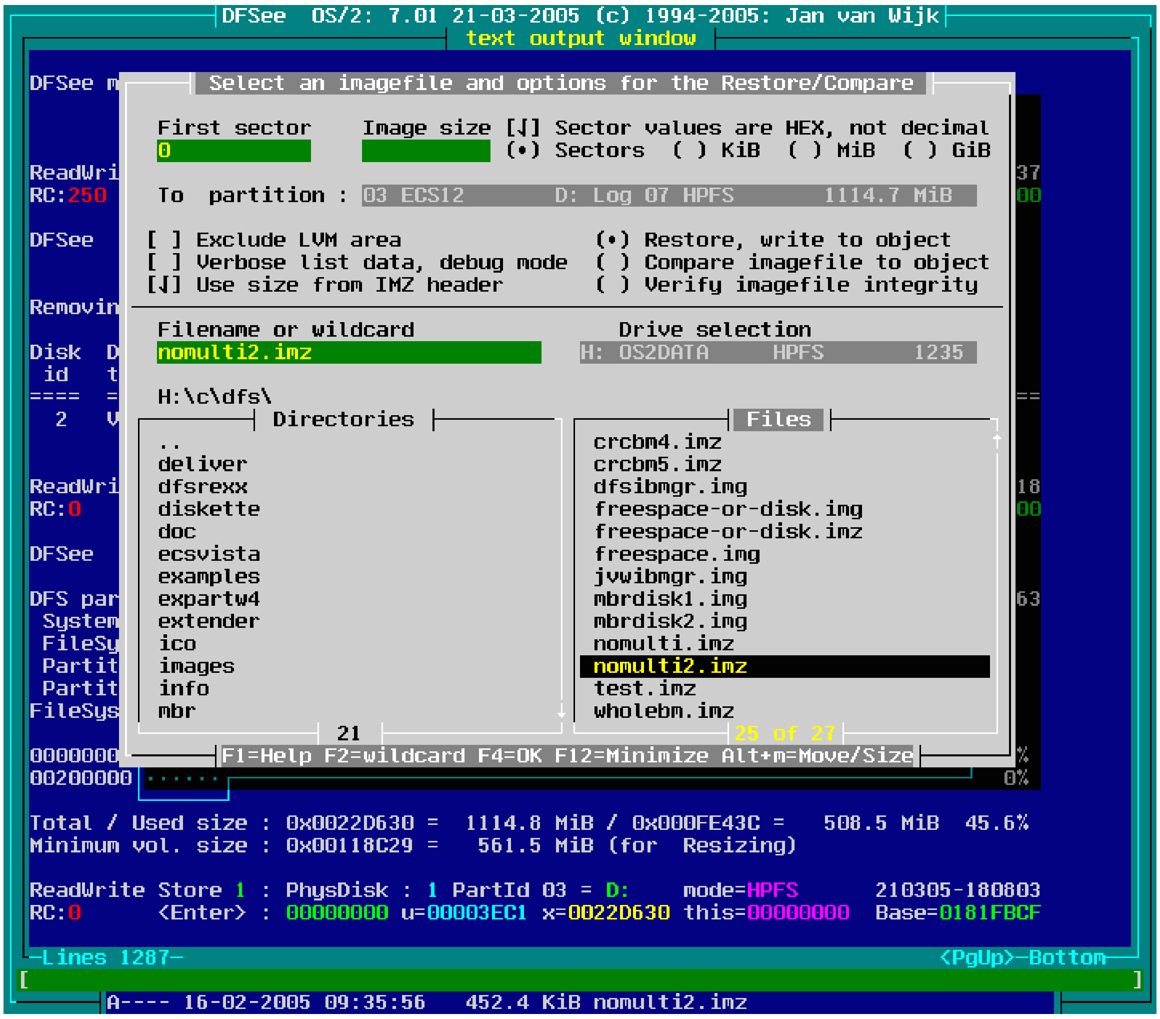
```
                DFSee  OS/2: 7.01 21-03-2005 (c) 1994-2005: Jan van Wijk
                                  text output window
DFSee m  Specify imaging options and name for (1st) imagefile

           First sector    Image size   [√] Sector values are HEX, not decimal
           0               Whole Area   (•) Sectors   ( ) KiB   ( ) MiB   ( ) GiB
ReadWri    Multi only: max size per file: 650          ( ) KiB   (•) MiB   ( ) GiB     37
RC:250                                                                                 00
           From partition: 03 ECS12          D: Log 07 HPFS          1114.7 MiB
DFSee
         [ ] Append to file        (•) Single file, any size          ( ) RAW image
         [ ] From damaged ...      ( ) Multi file, on one disk        ( ) Compressed
Removin  [ ] Exclude LVM area      ( ) Multi file, media change       (•) Smart comp
         [ ] Verbose list data, debug mode
Disk  D
 id   t    Filename or wildcard          Drive selection               Make Dir
====  =    *.im?                         H:  OS2DATA      HPFS                          ==
  2   V
           H:\c\dfs\images\
              Directories                          Files
ReadWri    ..                               BMGR_classic.img                             18
RC:0                                        BMGR_ecs10_fresh_install.img                 00
                                            BMGR_ecs10_iain.img
DFSee                                       BMGR_ecs_10.img
                                            BMGR_ecs_I13X_lvm.img
DFS par                                     BMGR_expartw4.img                            63
 System                                     BMGR_warp4_classic_noI13X_nolvm
 FileSy                                     BMGR_warp4_fp15_I13X_nolvm.img
 Partit                                     boot0f21.img
 Partit                                     bootos21.imz
FileSys                                     bootos22.imz
                                            bootos2d.imz
0000000                                     crcbmgr.imz                                  %
0020000                  1 of 1                          58                              %
         F1=Help F2=wildcard F4=OK F12=Minimize Alt+m=Move/Size
Total / Used size : 0x0022D630 =  1114.8 MiB / 0x000FE43C =   508.5 MiB  45.6%
Minimum vol. size : 0x00118C29 =   561.5 MiB (for  Resizing)

ReadWrite Store 1 : PhysDisk : 1 PartId 03 = D:     mode=HPFS      210305-180803
RC:0       <Enter> : 00000000 u=00003EC1 x=0022D630 this=00000000  Base=0181FBCF
-Lines 1287-                                                         <PgUp>-Bottom
[                                                                                  ]
      -D--- 11-09-2002 12:43:26 <directory> images
```

Restoring an image

You can create images from the DFSee commandline using the RESTORE command, see DFSee COMMAND overview, or from the menu using:

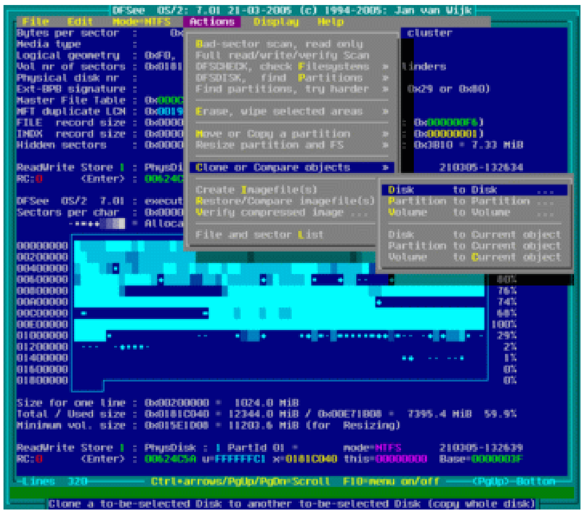
- Actions -> Restore/Compare Imagefile(s) ...
  This will present you with a combined File-Open and options dialog where you can select an imagefile to be restored as well as any specific options.

  The restore logic will automatically handle compression, multiple files *SmartUse* and media-change where needed.



```
DFSee  OS/2: 7.01 21-03-2005 (c) 1994-2005: Jan van Wijk
                        text output window
DFSee m   Select an imagefile and options for the Restore/Compare

          First sector      Image size [√] Sector values are HEX, not decimal
ReadWri   0                            (•) Sectors  ( ) KiB  ( ) MiB  ( ) GiB     37
RC:250                                                                            00
           To  partition : 03 ECS12        D: Log 07 HPFS         1114.7 MiB
DFSee
          [ ] Exclude LVM area                (•) Restore, write to object
          [ ] Verbose list data, debug mode   ( ) Compare imagefile to object
          [√] Use size from IMZ header        ( ) Verify imagefile integrity
Removin
          Filename or wildcard                  Drive selection
Disk  D   nomulti2.imz                          H: OS2DATA     HPFS        1235
 id   t
====  =   H:\c\dfs\                                                                ==
  2   V            Directories                         Files
          ..                                  crcbm4.imz
          deliver                             crcbm5.imz
ReadWri   dfsrexx                             dfsibmgr.img                        18
RC:0      diskette                            freespace-or-disk.img               00
          doc                                 freespace-or-disk.imz
DFSee     ecsvista                            freespace.img
          examples                            jvwibmgr.img
DFS par   expartw4                            mbrdisk1.img                        63
 System   extender                            mbrdisk2.img
 FileSy   ico                                 nomulti.imz
 Partit   images                              nomulti2.imz
 Partit   info                                test.imz
FileSys   mbr                                 wholebm.imz
                       21                               25 of 27
0000000     F1=Help F2=wildcard F4=OK F12=Minimize Alt+m=Move/Size                 %
00200000  ......                                                                 0%

Total / Used size : 0x0022D630 =  1114.8 MiB / 0x000FE43C =  508.5 MiB  45.6%
Minimum vol. size : 0x00118C29 =   561.5 MiB (for  Resizing)

ReadWrite Store 1 : PhysDisk : 1 PartId 03 = D:    mode=HPFS      210305-180803
RC:0      <Enter> : 00000000 u=00003EC1 x=0022D630 this=00000000 Base=0181FBCF
-Lines 1287-                                                      <PgUp>-Bottom
[                                                                              ]
      A---- 16-02-2005 09:35:56   452.4 KiB nomulti2.imz
```

CLONE partitions or whole disks


DFSee OS/2: 7.01 21-03-2005 (c) 1994-2005: Jan van Wijk
File
Edit
Mode=NTFS
Actions
Display
Help
Bad-sector scan, read only
Full read/write/verify Scan
DFSCHECK, check Filesystems »
DFSDISK, find Partitions »
Find partitions, try harder »
Erase, wipe selected areas »
Move or Copy a partition »
Resize partition and FS »
Clone or Compare objects »
Create Imagefile(s)
Restore/Compare imagefile(s)
Verify compressed image ...
File and sector List
Disk to Disk ...
Partition to Partition ...
Volume to Volume ...
Disk to Current object
Partition to Current object
Volume to Current object
Lines 320
Ctrl+arrows/PgUp/PgDn=Scroll F10=menu on/off
(PgUp)-Bottom

```
Bytes per sector    :       0x
Media type          :
Logical geometry    : 0xF0,
Vol nr of sectors   : 0x0181
Physical disk nr    :
Ext-BPB signature   :
Master File Table   : 0x000C
MFT duplicate LCN   : 0x0019
FILE  record size   : 0x0000
INDX  record size   : 0x0000
Hidden sectors      : 0x0000

ReadWrite Store 1   : PhysDi
RC:0        <Enter> : 00624C

DFSee  OS/2  7.01   : execut
Sectors per char    : 0x0000
         -*****     = Alloca

Size for one line : 0x00200000 =   1024.0 MiB
Total / Used size : 0x0181C040 = 12344.0 MiB / 0x00E71808 =  7395.4 MiB  59.9%
Minimum vol. size : 0x015E1008 = 11203.6 MiB (for  Resizing)

ReadWrite Store 1 : PhysDisk : 1 PartId 01 =        mode=NTFS      210305-132639
RC:0      <Enter> : 00624C5A u=FFFFFFC1 x=0181C040 this=00000000  Base=0000003F

Clone a to-be-selected Disk to another to-be-selected Disk (copy whole disk)
```

Copy the contents of another disk/partition to the currently selected object (disk/partition).

This will result in an exact sector-by-sector copy called a CLONE.

Selecting the object

You can use either the "File -> Open object to work with" menu to open an object and than clone from another object "to Current object", or use the more specific menu selections in the imaging submenu.

Either way, most selections needed are made from that single menu-selection plus a dialog:

- Actions -> Clone or Compare objects -> Disk to Disk
  This would be useful to make a copy of an existing disk to a new, larger one without having to install everything again on the new disk. Note that any partitions will be exact clones, NO resizing takes place. This means the new disk, when larger, will leave you with a freespace area at the end of the disk that you can use to create new partitions, or to use with resizing and moving the existing partitions.

  Another purpose would be cloning a DAMAGED disk (bad sectors) to try and get as much data off it as possible. To do this, make sure you check the "From damaged" option in the dialog, to optimize the cloning process for this purpose.

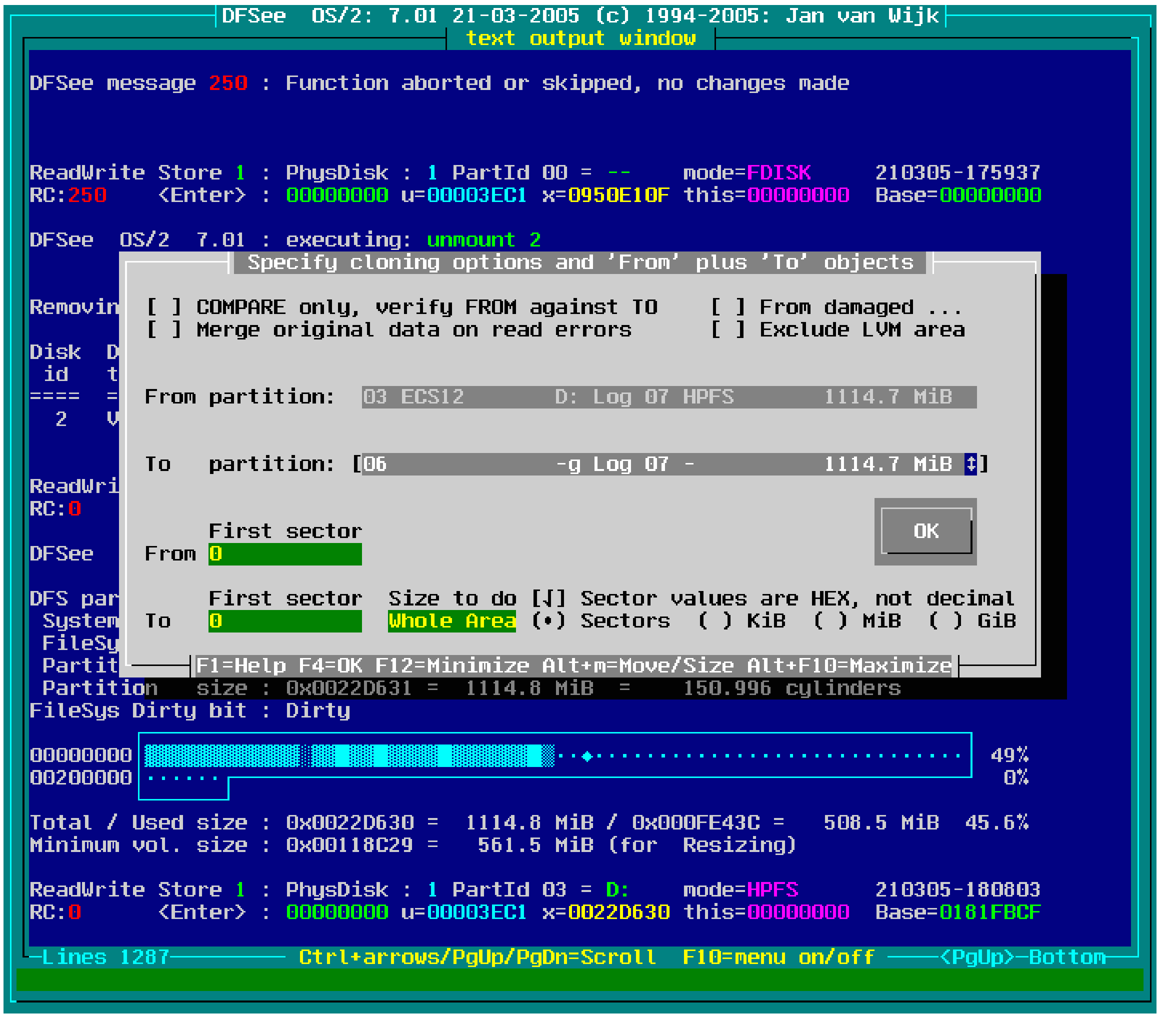
- Actions -> Clone or Compare objects -> Partition to Partition
  This is very useful to make a quick backup copy of partition contents to an identical sized one, preferably on another disk. Making a backup copy of your boot-partition(s) in a fully installed and configured state, but clean of any garbage and viruses, allows a very quick recovery in case a virus or other disaster hits.
  Simply use the clone "partition to Partition" again to copy the partition contents back ...

- Actions -> Clone or Compare objects -> Volume to Volume
- Actions -> Clone or Compare objects -> Disk to Current object
- Actions -> Clone or Compare objects -> Partition to Current object
- Actions -> Clone or Compare objects -> Volume to Current object

Performing the CLONE operation

You can clone objects from the DFSee commandline using the CLONE command, see [DFSee COMMAND overview](), or from the menu as shown above.

When using the menu, or when specifying an incomplete CLONE command, you will be presented with a cloning specific dialog that allows you to specify all relevant information.



```
DFSee  OS/2: 7.01 21-03-2005 (c) 1994-2005: Jan van Wijk
text output window

DFSee message 250 : Function aborted or skipped, no changes made


ReadWrite Store 1 : PhysDisk : 1 PartId 00 = --    mode=FDISK     210305-175937
RC:250     <Enter> : 00000000 u=00003EC1 x=0950E10F this=00000000  Base=00000000

DFSee  OS/2  7.01 : executing: unmount 2
         Specify cloning options and 'From' plus 'To' objects
Removin  [ ] COMPARE only, verify FROM against TO    [ ] From damaged ...
         [ ] Merge original data on read errors      [ ] Exclude LVM area
Disk  D
 id   t
====  =  From partition:  03 ECS12        D: Log 07 HPFS        1114.7 MiB
  2   V

         To   partition: [06              -g Log 07 -           1114.7 MiB ↕]
ReadWri
RC:0                                                            OK
              First sector
DFSee    From 0

DFS par       First sector  Size to do [√] Sector values are HEX, not decimal
 System  To   0             Whole Area (•) Sectors   ( ) KiB  ( ) MiB  ( ) GiB
 FileSy
 Partit      F1=Help F4=OK F12=Minimize Alt+m=Move/Size Alt+F10=Maximize
 Partition    size : 0x0022D631 =  1114.8 MiB  =     150.996 cylinders
FileSys Dirty bit : Dirty

00000000                                                                   49%
00200000                                                                    0%

Total / Used size : 0x0022D630 =  1114.8 MiB / 0x000FE43C =   508.5 MiB  45.6%
Minimum vol. size : 0x00118C29 =   561.5 MiB (for  Resizing)

ReadWrite Store 1 : PhysDisk : 1 PartId 03 = D:    mode=HPFS      210305-180803
RC:0       <Enter> : 00000000 u=00003EC1 x=0022D630 this=00000000  Base=0181FBCF
-Lines 1287-          Ctrl+arrows/PgUp/PgDn=Scroll  F10=menu on/off  <PgUp>-Bottom
```

Some of the options available are:

- COMPARE only, verify FROM against TO
  This will COMPARE the sectors of the TO and FROM objects instead of copying them, to allow a verification of a cloning operation, or simply to see if two objects have exactly the same contents.

- Merge original data on read errors
  This will leave the original data on the destination object when read-errors happen during cloning instead of filling them with a fixed 0xFE pattern.
  This can be useful to clone damaged disks that have random failures in a few passes, or to 'merge' a freshly formatted filesystem with a damaged one containing data.

- From damaged ...
  This will reduce the buffersize during cloning to 1 sector, making the operation MUCH slower but also reducing the number of sectors affected by any read errors (bad sectors).

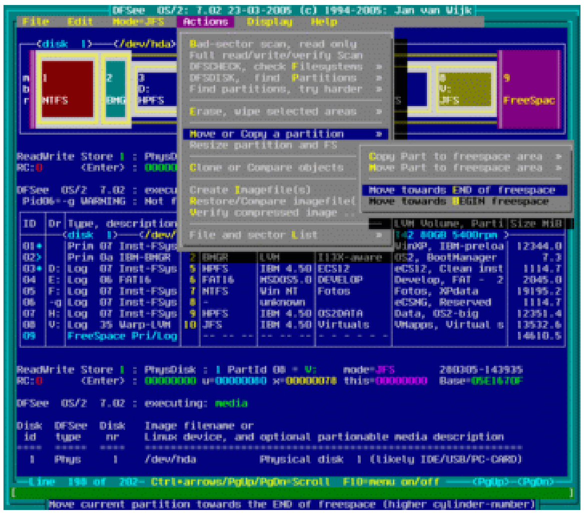
- Exclude LVM area
  This will exclude the area at the end of (OS/2 style) LVM partitions that holds the bad-block relocation and drive-linking information. This can be useful in recovery situations, since after cloning that information will be invalid and needs to be recreated anyway.

- First sector
  You can specify to start the clone at a specific sector instead of the start of the object. Since you can specify the start for the TO and FROM object seperately, you can use this to MOVE data within a partition or relative to the start of the object.

  Note that the CLONE operation supports overlapping TO and FROM areas, so it is possible to move data WITHIN a partition or other object.

- Size to do
  This can limit the size to be copied to a value less that the whole object.

COPY or MOVE partitions



```
DFSee  OS/2: 7.02 23-03-2005 (c) 1994-2005: Jan van Wijk
 File   Edit   Mode=JFS   Actions   Display   Help
 <disk  1>──</dev/hda>  Bad-sector scan, read only
                        Full read/write/verify Scan
 m  1      2   3        DFSCHECK, check Filesystems  »
 b             D:       DFSDISK,  find  Partitions   »    8        9
 r  NTFS   BMG HPFS     Find partitions, try harder  »    V:
                                                          JFS      FreeSpac
                        Erase, wipe selected areas   »

                        Move or Copy a partition     »
ReadWrite Store 1 : PhysD Resize partition and FS
RC:0      <Enter> : 00000                       Copy Part to freespace area  »
                        Clone or Compare objects   Move Part to freespace area  »
DFSee  OS/2  7.02 : execu
 Pid06=-g WARNING : Not f Create Imagefile(s)      Move towards END of freespace
                        Restore/Compare imagefile( Move towards BEGIN freespace
                        Verify compressed image ..
 ID  Dr Type, description                          ─ LVM Volume, Parti Size MiB
    ──<disk  1>──</dev/  File and sector List    »  142 80GB 5400rpm >
 01*    Prim 07 Inst-FSys                           WinXP, IBM-preloa  12344.0
 02>    Prim 0a IBM-BMGR  2 BMGR    LVM     I13X-aware OS2, BootManager    7.3
 03* D: Log  07 Inst-FSys 5 HPFS    IBM 4.50 ECS12    eCS12, Clean inst  1114.7
 04  E: Log  06 FAT16     6 FAT16   MSDOS5.0 DEVELOP  Develop, FAT  - 2  2045.0
 05  F: Log  07 Inst-FSys 7 NTFS    Win NT   Fotos    Fotos, XPdata     19195.2
 06  -g Log  07 Inst-FSys 8 -       unknown           eCSMG, Reserved    1114.7
 07  H: Log  07 Inst-FSys 9 HPFS    IBM 4.50 OS2DATA  Data, OS2-big     12351.4
 08  V: Log  35 Warp-LVM 10 JFS     IBM 4.50 Virtuals VMapps, Virtual s 13532.6
 09     FreeSpace Pri/Log   -- -- -- -- -- -- - - - - - - -               14610.5

ReadWrite Store 1 : PhysDisk : 1 PartId 08 = V:    mode=JFS      280305-143935
RC:0      <Enter> : 00000000 u=00000000 x=00000078 this=00000000  Base=05E1670F

DFSee  OS/2  7.02 : executing: media

Disk  DFSee  Disk   Image filename or
 id   type    nr    Linux device, and optional partionable media description
====  =====  ====   ===========================================================
  1   Phys     1    /dev/hda          Physical disk  1 (likely IDE/USB/PC-CARD)
─Line  198 of  202─ Ctrl+arrows/PgUp/PgDn=Scroll  F10=menu on/off ──<PgUp>─<PgDn>─
[                                                                              ]
   Move current partition towards the END of freespace (higher cylinder-number)
```

Moving or copying a partition deals with the partition contents as well as the partition information (partition-tables and LVM), and is the easiest way to do this. It 'adds' functionality to the basic CLONE command.

You can MOVE or COPY partitions from the DFSee command line using the MOVE command (and -c option), see DFSee COMMAND overview, or from the menu using one of following selections:

- Actions -> Move or Copy a partition -> Copy Part to freespace area
  Create a copy of the currently selected partition in a freespace area to be selected from a submenu-list. Only freespace areas that are large enough to contain the copy will be selectable. The size of the partition will stay exactly the same, there is NO automatic resize. When applicable, LVM information will be created that is derived from the old partition, with post-fixes to make the names and IDs unique.

- Actions -> Move or Copy a partition -> Move Part to freespace area
  Create a copy of the currently selected partition in a freespace area to be selected from a submenu-list, and delete the original one. Only freespace areas that are large enough to contain the partition will be selectable. The size of the partition will stay exactly the same, there is NO automatic resize. When applicable, LVM information will be moved with the partition.

- Actions -> Move or Copy a partition -> Move towards END of freespace
  This will MOVE the currently partition towards the end of the freespace area that is directly after the partition. You can specify how far the partition should be moved, with a maximum of the freespace size. The result will be that some or all of the freespace will now be IN FRONT of the partition.

- Actions -> Move or Copy a partition -> Move towards BEGIN freespace
  This will MOVE the currently partition towards the begin of the freespace area that is directly before the partition. You can specify how far the partition should be moved, with a maximum of the freespace size. The result will be that some or all of the freespace will now be AFTER of the partition.

The actual copying or moving of the partition data will be done using a CLONE command, and the required partitioning and LVM commands will be determined and executed where needed.