

TestDisk Step By Step

From CGSecurity

 **english version**  **deutsche Version**  **version française**  **Русская версия**

This ***Recovery example*** guides you through TestDisk step by step to recover a missing partition and repair a corrupted one. Translation of this TestDisk manual to other languages are welcome.

Contents

- 1 Example problem
- 2 Symptoms
- 3 Running TestDisk executable
- 4 Log creation
- 5 Disk selection
- 6 Partition table type selection
- 7 Current partition table status
- 8 Quick Search for partitions
- 9 Save the partition table or search for more partitions?
- 10 A partition is still missing: Deeper Search
- 11 Partition table recovery
- 12 NTFS Boot sector recovery
- 13 Recover deleted files

Example problem

We have a 36GB hard disk containing 3 partitions. Unfortunately:

- the boot sector of the primary NTFS partition has been damaged, and
- a logical NTFS partition has been accidentally deleted.

This *recovery example* guides you through TestDisk, step by step, to recover these 'lost' partitions by:

- rewriting the corrupted NTFS boot sector, and
- recovering the accidentally deleted logical NTFS partition.

Recovery of a FAT32 partition (instead of an NTFS partition) can be accomplished by following exactly the same steps. Other recovery examples are also available. For Information about FAT12, FAT16, ext2/ext3, HFS+, ReiserFS and other partition types, read [Running the TestDisk Program](#).

One condition:

- TestDisk must be executed with "Administrator privileges."

Important points for using TestDisk:

- To navigate in TestDisk, use the `Arrow` and `PageUp/PageDown` keys.
- To proceed, confirm your choice(s) with the `Enter` key.
- To return to a previous display or quit TestDisk, use the *q* (Quit) key.
- To save modifications under TestDisk, you must confirm them with the *y* (Yes) and/or `Enter` keys, and
- To actually write partition data to the MBR, you must choose the "Write" selection and press the `Enter` key.

Symptoms

If this hard disk's primary partition contained an operating system, it would most likely no longer boot up; due to its corrupted boot sector. If the hard disk was a secondary (data) drive or you can connect the drive to another computer in its secondary channel (usually where a CD/DVD drive is connected), the following symptoms would be observed:

1. Windows Explorer or Disk Manager displays the first primary partition as *raw* (unformatted) and Windows prompts: `The drive is not formatted, do you want to format it now?`
[You should *never* do so without knowing why!]
2. A logical partition is missing. In Windows Explorer, that logical drive is no longer available. The Windows Disk Management Console now displays only "unallocated space" where this logical partition had been located.

Running TestDisk executable

If TestDisk is not yet installed, it can be downloaded from [TestDisk Download](#). Extract the files from the archive including the sub-directories.

To recover lost partition or repair filesystem from hard disk, USB key, Smart Card..., you need enough rights to access physical device.

-  Under Dos, run TestDisk.exe
-  Under Windows, start TestDisk (ie testdisk-6.9/win/testdisk_win.exe) from an account in the Administrator Group. Under Vista, use right-click "run as administrator" to launch TestDisk.
-  Under Unix/Linux/BSD, you need to be root to run TestDisk (ie. `sudo testdisk-6.9/linux/testdisk_static`)
-  Under MacOSX, if you are not root, TestDisk (ie testdisk-6.9/darwin/TestDisk) will restart itself using sudo after confirmation on your part.
-  Under OS/2, TestDisk doesn't handle physical device, only disk image, sorry.

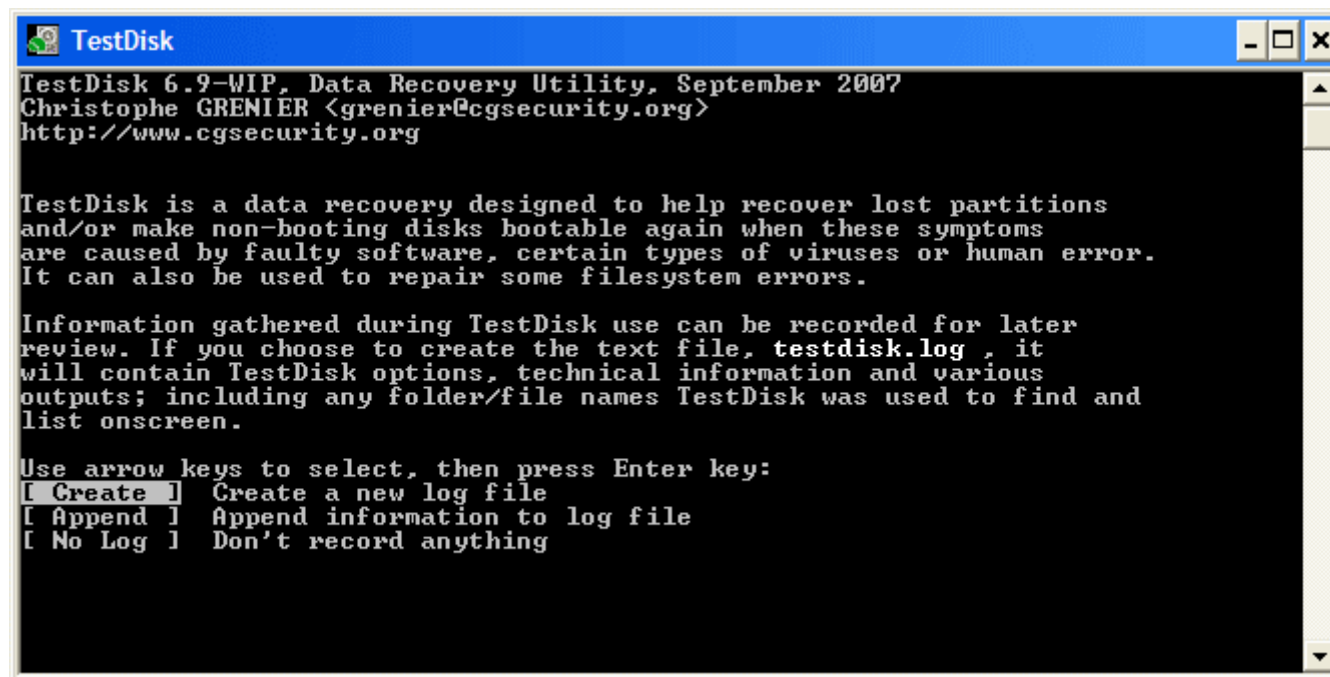
To recover partition from a media image or repair a filesystem image, run

- `testdisk image.dd` to carve a raw disk image
- `testdisk image.E01` to recover files from an Encase EWF image
- `testdisk 'image.*'` if the Encase image is splitted in several files.

  To repair a filesystem not listed by TestDisk, run `testdisk device`, i.e.

- `testdisk /dev/mapper/truecrypt0` or `testdisk /dev/loop0` to repair the NTFS or FAT32 boot sector files from a TrueCrypt partition. The same method works with filesystem encrypted with cryptsetup/dm-crypt/LUKS.
- `testdisk /dev/md0` to repair a filesystem on top of a Linux Raid device.

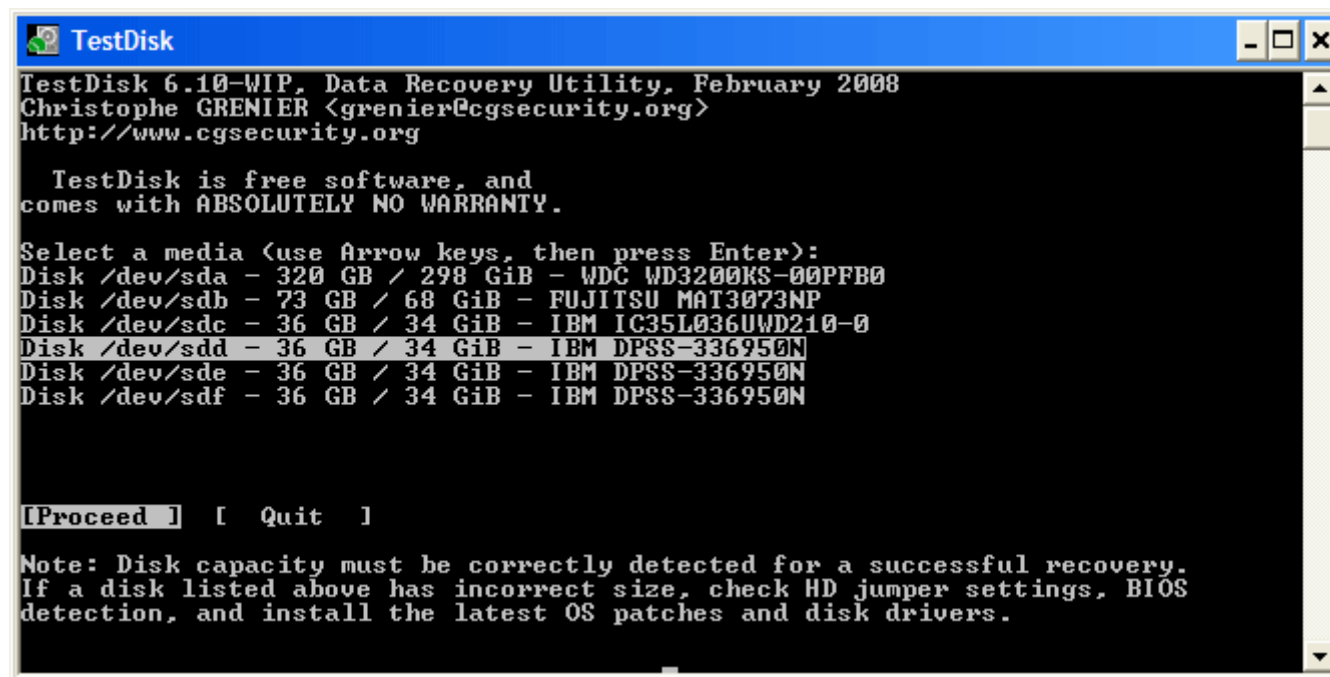
Log creation



- Choose Create unless you have a reason to append data to the log or if you execute TestDisk from a read only media and nowhere else to create it.
- Press Enter to proceed.

Disk selection

All harddrives should be detected and listed with the correct size by TestDisk:



```
TestDisk 6.10-WIP, Data Recovery Utility, February 2008
Christophe GRENIER <grenier@cgsecurity.org>
http://www.cgsecurity.org

TestDisk is free software, and
comes with ABSOLUTELY NO WARRANTY.

Select a media (use Arrow keys, then press Enter):
Disk /dev/sda - 320 GB / 298 GiB - WDC WD3200KS-00PFB0
Disk /dev/sdb - 73 GB / 68 GiB - FUJITSU MAT3073NP
Disk /dev/sdc - 36 GB / 34 GiB - IBM IC35L036UWD210-0
Disk /dev/sdd - 36 GB / 34 GiB - IBM DPSS-336950N
Disk /dev/sde - 36 GB / 34 GiB - IBM DPSS-336950N
Disk /dev/sdf - 36 GB / 34 GiB - IBM DPSS-336950N

[Proceed ] [ Quit ]

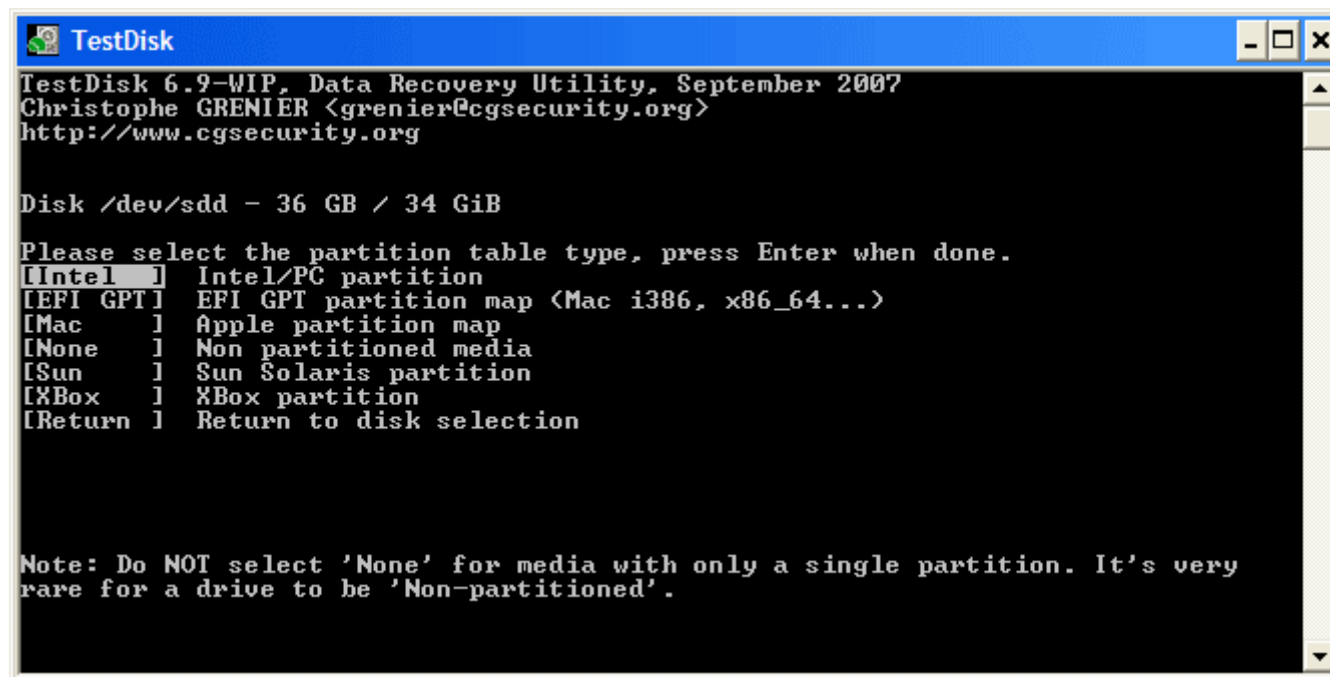
Note: Disk capacity must be correctly detected for a successful recovery.
If a disk listed above has incorrect size, check HD jumper settings, BIOS
detection, and install the latest OS patches and disk drivers.
```

- Use up/down arrow keys to select your harddrive with the lost partition/s.
- Press Enter to Proceed.

X If available, use raw device `/dev/rdisk*` instead of `/dev/disk*` for faster data transfer.

Partition table type selection

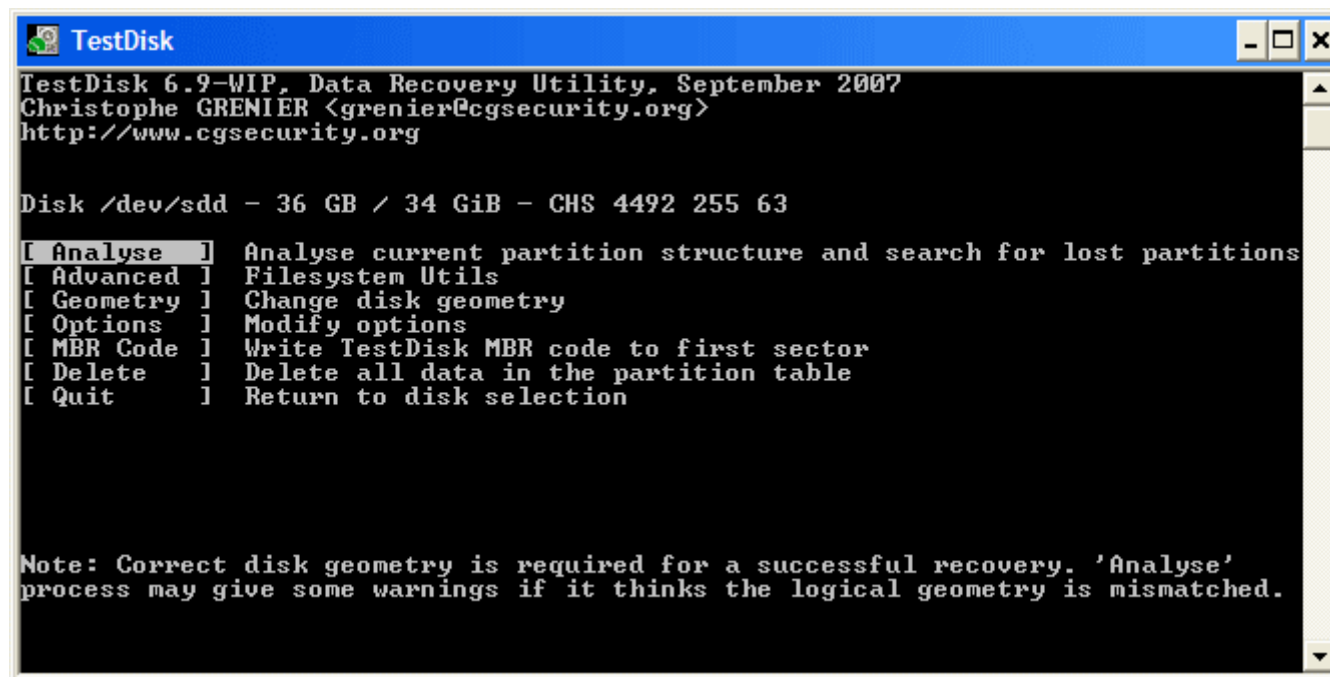
TestDisk displays the partition table types.



- Select the partition table type, usually the default value is the correct one as TestDisk auto-detects the partition table type.
- Press Enter to Proceed.

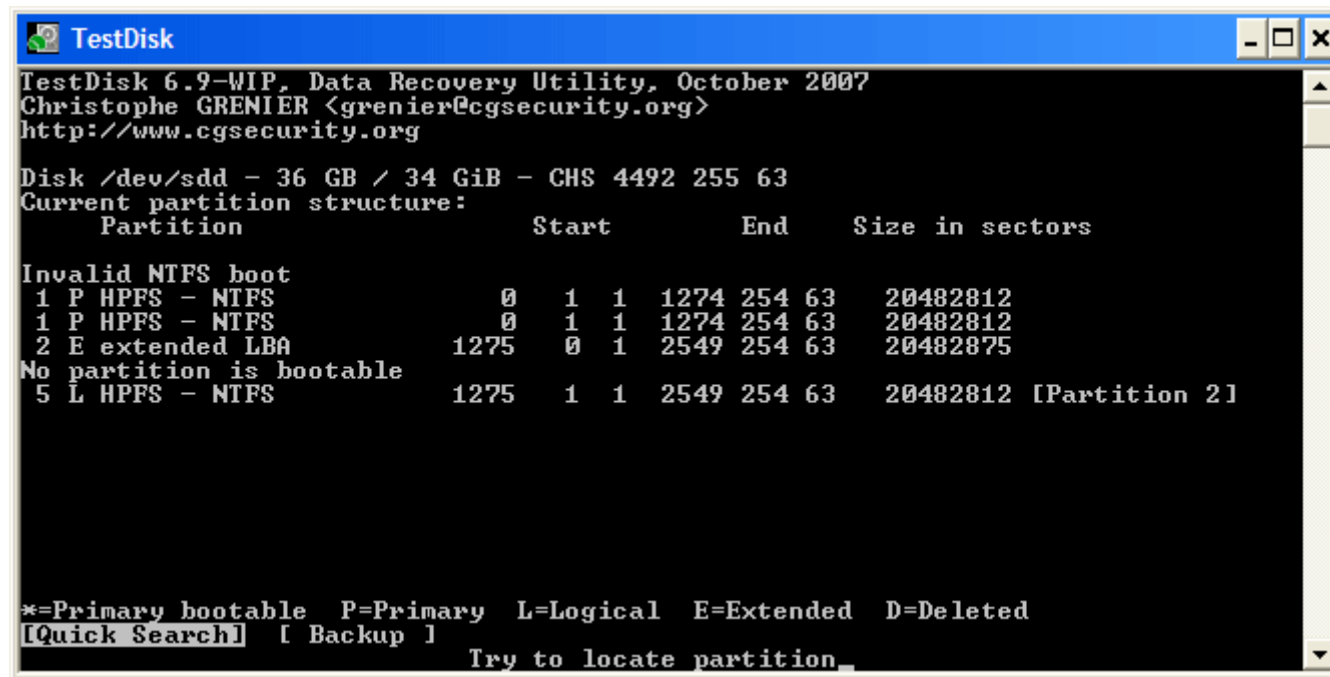
Current partition table status

TestDisk displays the menus (also see TestDisk Menu Items).



- Use the default menu "Analyse" to check your current partition structure and search for lost partitions.
- Confirm at Analyse with Enter to proceed.

Now, your current partition structure is listed. Examine your current partition structure for missing partitions and errors.



```

TestDisk
TestDisk 6.9-WIP, Data Recovery Utility, October 2007
Christophe GRENIER <grenier@cgsecurity.org>
http://www.cgsecurity.org

Disk /dev/sdd - 36 GB / 34 GiB - CHS 4492 255 63
Current partition structure:
  Partition              Start          End      Size in sectors
Invalid NTFS boot
 1 P HPFS - NTFS          0      1 1 1274 254 63    20482812
 1 P HPFS - NTFS          0      1 1 1274 254 63    20482812
 2 E extended LBA        1275     0 1 2549 254 63    20482875
No partition is bootable
 5 L HPFS - NTFS        1275     1 1 2549 254 63    20482812 [Partition 2]

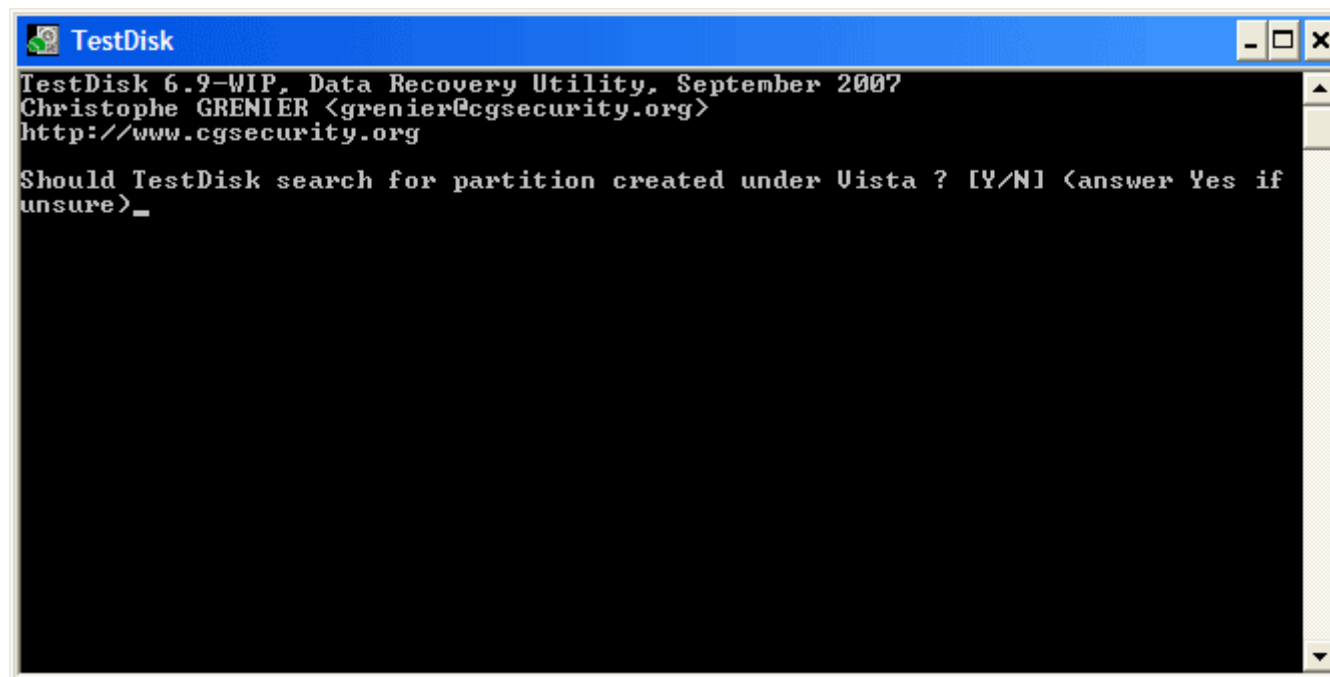
*=Primary bootable  P=Primary  L=Logical  E=Extended  D=Deleted
[Quick Search]  [ Backup ]
Try to locate partition_

```

The first partition is listed twice which points to a corrupted partition or an invalid partition table entry, Invalid NTFS boot points to a faulty NTFS boot sector, so it's a corrupted filesystem. Only one logical partition (label Partition 2) is available in the extended partition. One logical partition is missing.

- Confirm at *Quick Search* to proceed.

Quick Search for partitions



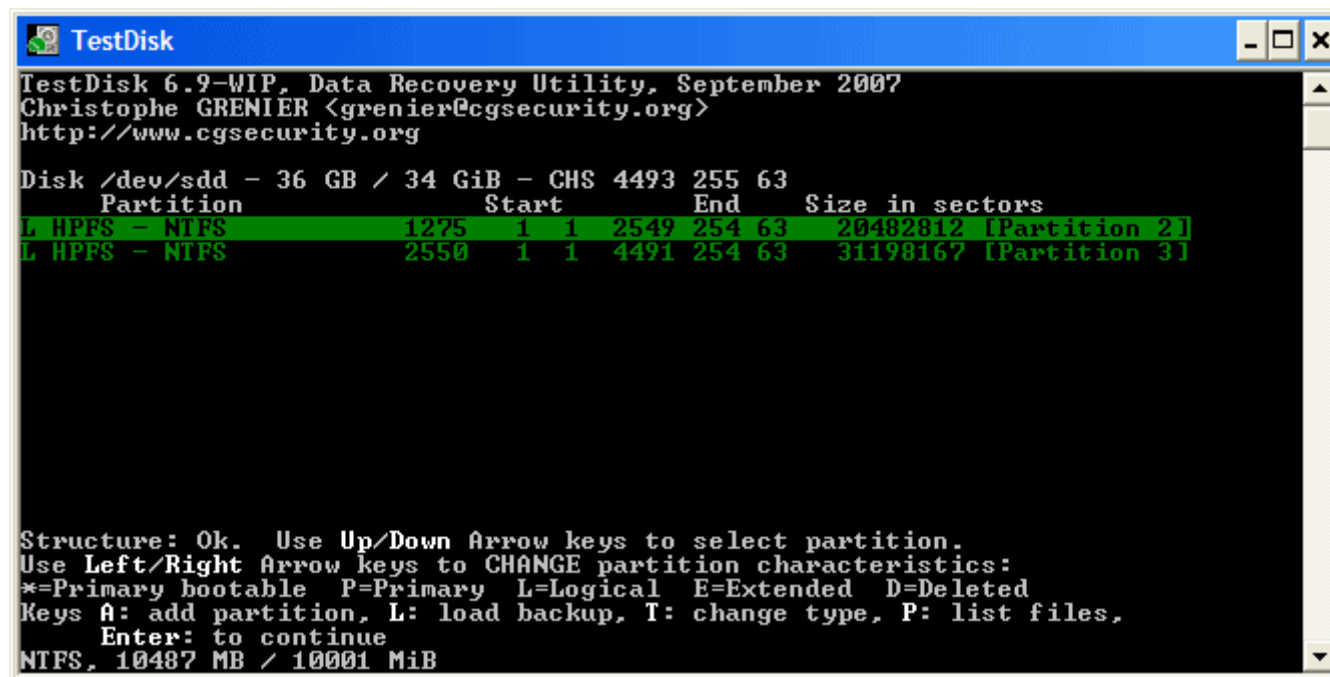
- Confirm according to your OS and created partitions to proceed.

TestDisk displays the first results in real time.



(click on thumb to display the image).

During the **Quick Search**, TestDisk has found two partitions including the missing logical partition labeled *Partition 3*.



The screenshot shows the TestDisk 6.9-WIP interface. The title bar is blue with the text 'TestDisk'. The main window has a black background with green text. It displays the following information:

```
TestDisk 6.9-WIP, Data Recovery Utility, September 2007
Christophe GRENIER <grenier@cgsecurity.org>
http://www.cgsecurity.org

Disk /dev/sdd - 36 GB / 34 GiB - CHS 4493 255 63
Partition      Start      End      Size in sectors
L HPFS - NTFS   1275      1  1  2549 254 63   20482812 [Partition 2]
L HPFS - NTFS   2550      1  1  4491 254 63   31198167 [Partition 3]
```

Below the table, it says:

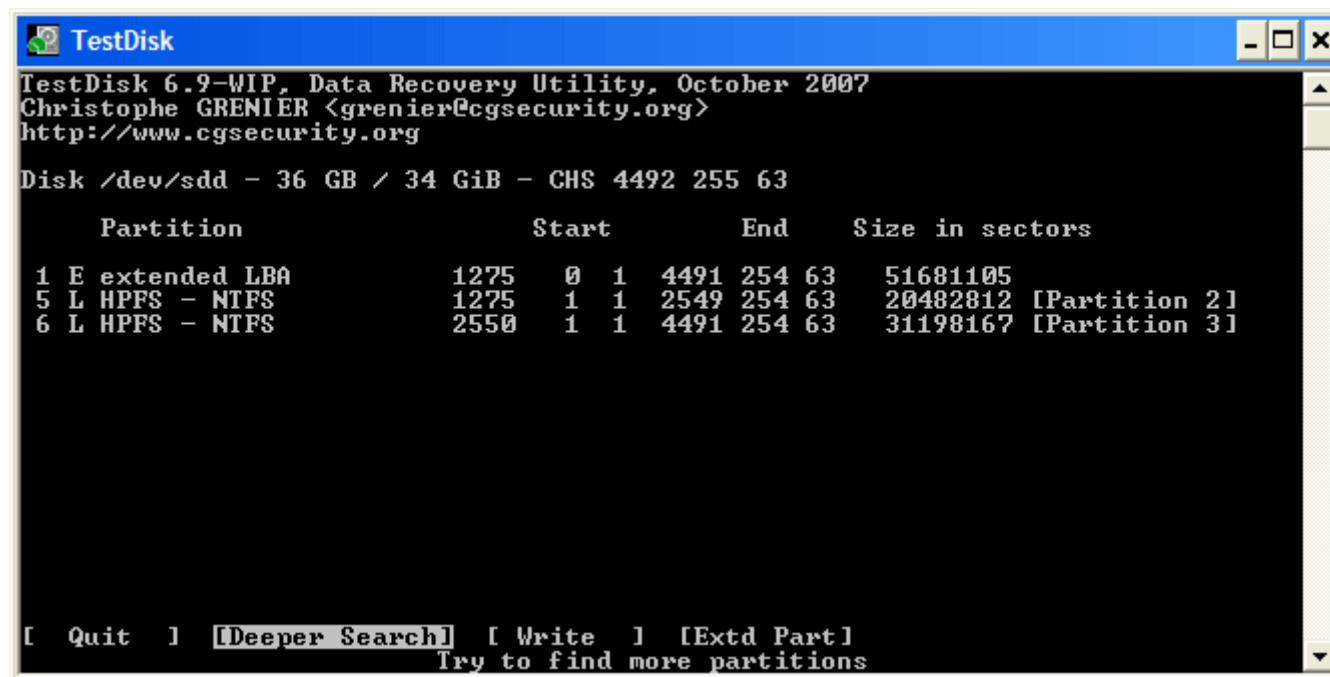
```
Structure: Ok. Use Up/Down Arrow keys to select partition.
Use Left/Right Arrow keys to CHANGE partition characteristics:
*=Primary bootable P=Primary L=Logical E=Extended D=Deleted
Keys A: add partition, L: load backup, T: change type, P: list files,
Enter: to continue
NTFS, 10487 MB / 10001 MiB
```

- Highlight this partition and press **p** to list your files (to go back to the previous display, press q to Quit).

All directories and data are correctly listed.

- Press Enter to proceed.

Save the partition table or search for more partitions?



- *When all partitions are available* and data correctly listed, you should go to the menu **Write** to save the partition structure. The menu `Extd Part` gives you the opportunity to decide if the extended partition will use all available disk space or only the required (minimal) space.
- *Since a partition, the first one, is still missing*, highlight the menu **Deeper Search** (if already not done automatically) and press Enter to proceed.

A partition is still missing: Deeper Search

Deeper Search will also search for FAT32 backup boot sector, NTFS backup boot superblock, ext2/ext3 backup superblock to detect more partitions,

it will scan each cylinder

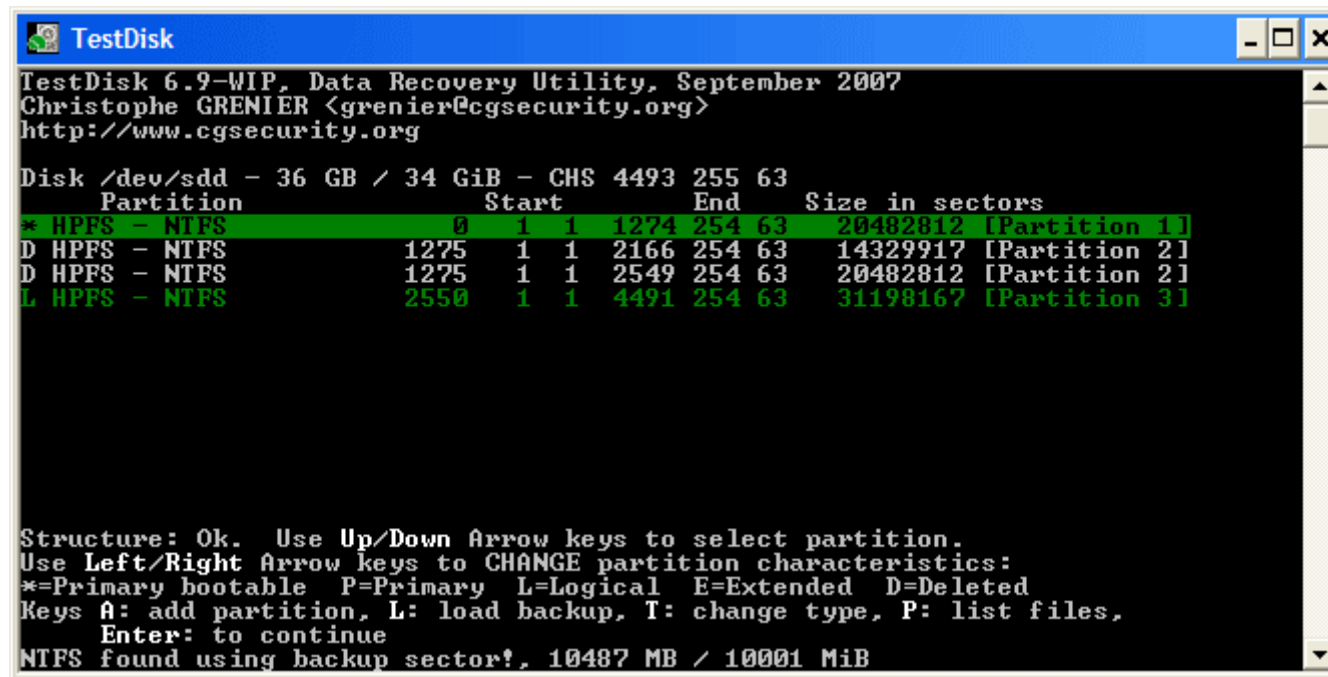


(click on thumb).

After the Deeper Search, the results are displayed as follows:

The first partition **"Partition 1"** was found by using backup boot sector. In the last line of your display, you can read the message **"NTFS found using backup sector!"** and the size of your partition. The "partition 2" is displayed twice with different size.

Both partitions are listed with status **D** for deleted, because they overlap each other.



```

TestDisk
TestDisk 6.9-WIP, Data Recovery Utility, September 2007
Christophe GRENIER <grenier@cgsecurity.org>
http://www.cgsecurity.org

Disk /dev/sdd - 36 GB / 34 GiB - CHS 4493 255 63
Partition      Start      End      Size in sectors
* HPFS - NTFS   0         1274    20482812 [Partition 1]
D HPFS - NTFS   1275      2166    14329917 [Partition 2]
D HPFS - NTFS   1275      2549    20482812 [Partition 2]
L HPFS - NTFS   2550      4491    31198167 [Partition 3]

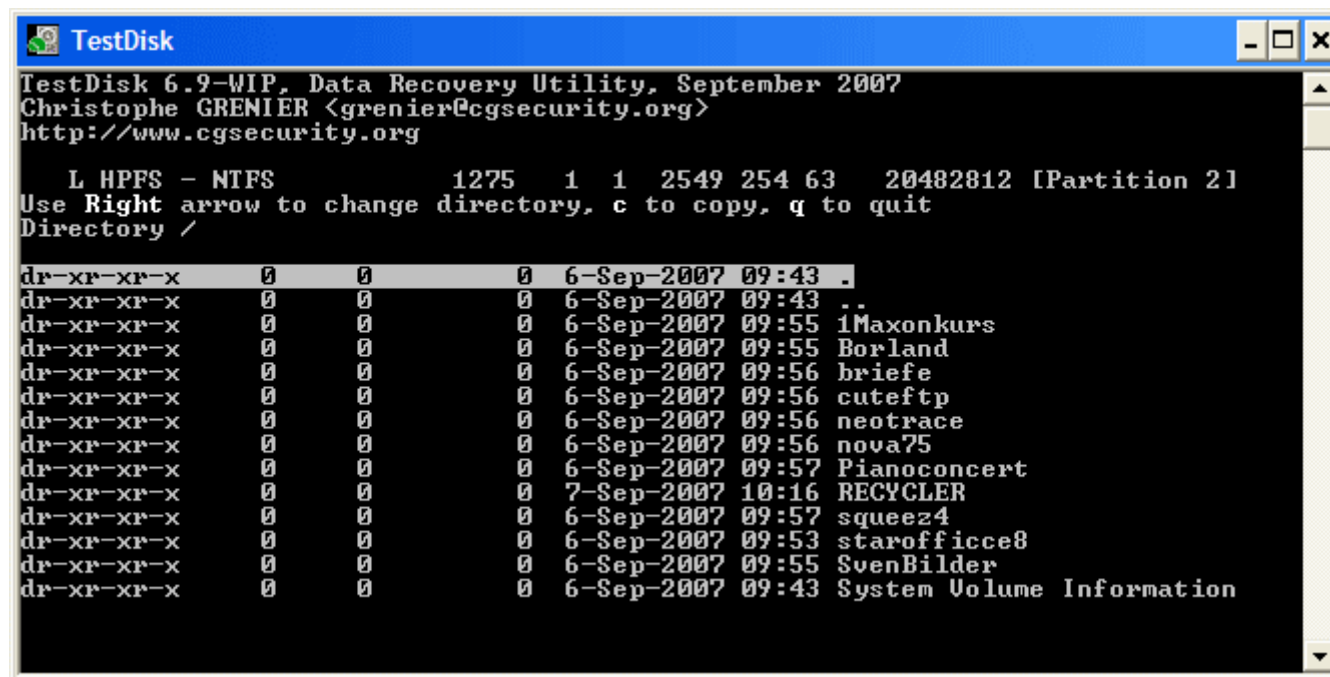
Structure: Ok. Use Up/Down Arrow keys to select partition.
Use Left/Right Arrow keys to CHANGE partition characteristics:
*=Primary bootable P=Primary L=Logical E=Extended D=Deleted
Keys A: add partition, L: load backup, T: change type, P: list files,
Enter: to continue
NTFS found using backup sector!, 10487 MB / 10001 MiB

```

- Highlight the first partition Partition 2 and press **p** to list its data.

The file system of the upper logical partition (label Partition 2) is damaged  (click on thumb).

- Press **q** for Quit to go back to the previous display.
- Let this partition Partition 2 with a damaged file system marked as **D**(deleted).
- Highlight the second partition Partition 2 below
- Press **p** to list its files.



```

TestDisk
TestDisk 6.9-WIP, Data Recovery Utility, September 2007
Christophe GRENIER <grenier@cgsecurity.org>
http://www.cgsecurity.org

  L HPFS - NTFS              1275   1   1  2549 254 63   20482812 [Partition 2]
Use Right arrow to change directory, c to copy, q to quit
Directory /

dr-xr-xr-x  0   0   0  6-Sep-2007 09:43 .
dr-xr-xr-x  0   0   0  6-Sep-2007 09:43 ..
dr-xr-xr-x  0   0   0  6-Sep-2007 09:55 iMaxonkurs
dr-xr-xr-x  0   0   0  6-Sep-2007 09:55 Borland
dr-xr-xr-x  0   0   0  6-Sep-2007 09:56 briefe
dr-xr-xr-x  0   0   0  6-Sep-2007 09:56 cuteftp
dr-xr-xr-x  0   0   0  6-Sep-2007 09:56 neotrace
dr-xr-xr-x  0   0   0  6-Sep-2007 09:56 nova75
dr-xr-xr-x  0   0   0  6-Sep-2007 09:57 Pianoconcert
dr-xr-xr-x  0   0   0  7-Sep-2007 10:16 RECYCLER
dr-xr-xr-x  0   0   0  6-Sep-2007 09:57 squeez4
dr-xr-xr-x  0   0   0  6-Sep-2007 09:53 starofficce8
dr-xr-xr-x  0   0   0  6-Sep-2007 09:55 SvenBilder
dr-xr-xr-x  0   0   0  6-Sep-2007 09:43 System Volume Information

```

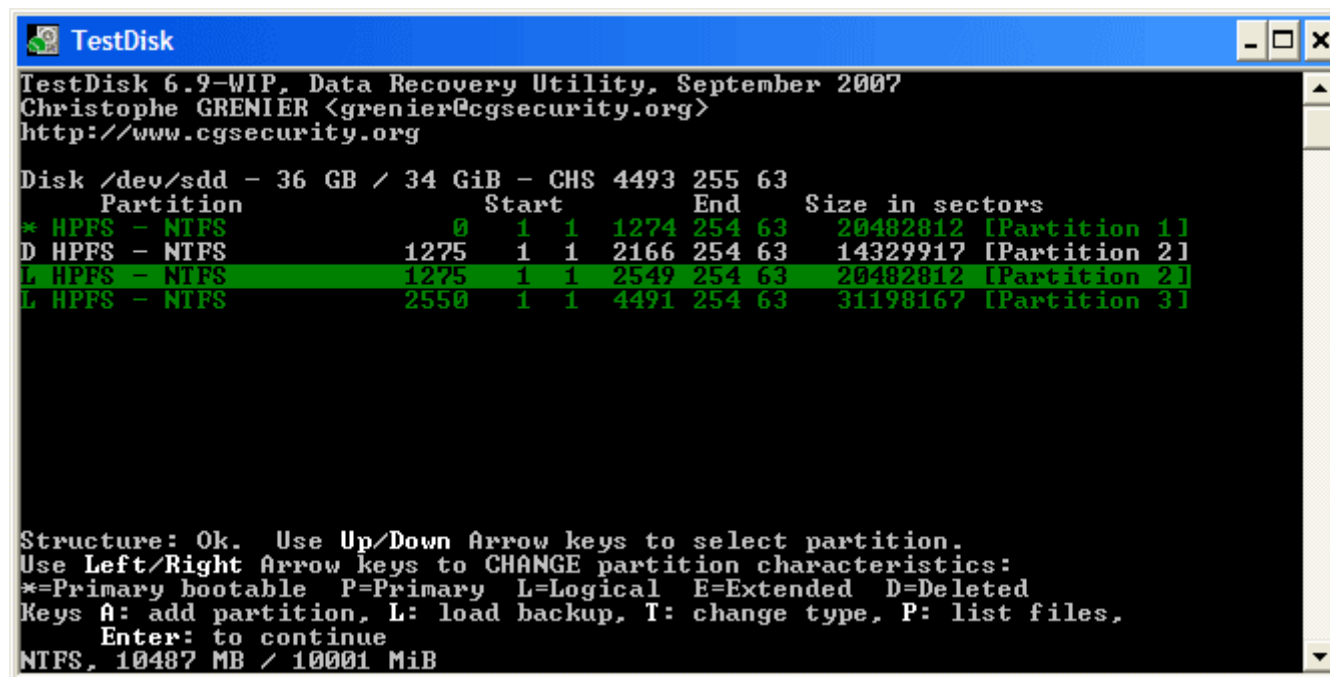
It works, you have found the correct partition!

- Use the left/right arrow to navigate into your folders and watch your files for more verification

Note: FAT directory listing is limited to 10 clusters, some files may not appears but it doesn't affect recovery.

- Press q for Quit to go back to the previous display.
- The available status are Primary, * bootable, Logical and Deleted.

Using the left/right arrow keys, change the status of the selected partition to *L* (*ogical*)



```

TestDisk
TestDisk 6.9-WIP, Data Recovery Utility, September 2007
Christophe GRENIER <grenier@cgsecurity.org>
http://www.cgsecurity.org

Disk /dev/sdd - 36 GB / 34 GiB - CHS 4493 255 63
Partition      Start      End      Size in sectors
* HPFS - NTFS   0          1274    20482812 [Partition 1]
D HPFS - NTFS   1275       2166    14329917 [Partition 2]
L HPFS - NTFS   1275       2549    20482812 [Partition 2]
L HPFS - NTFS   2550       4491    31198167 [Partition 3]

Structure: Ok. Use Up/Down Arrow keys to select partition.
Use Left/Right Arrow keys to CHANGE partition characteristics:
*=Primary bootable P=Primary L=Logical E=Extended D=Deleted
Keys A: add partition, L: load backup, T: change type, P: list files,
Enter: to continue
NTFS, 10487 MB / 10001 MiB

```

Hint: read *How to recognize primary and logical partitions?*

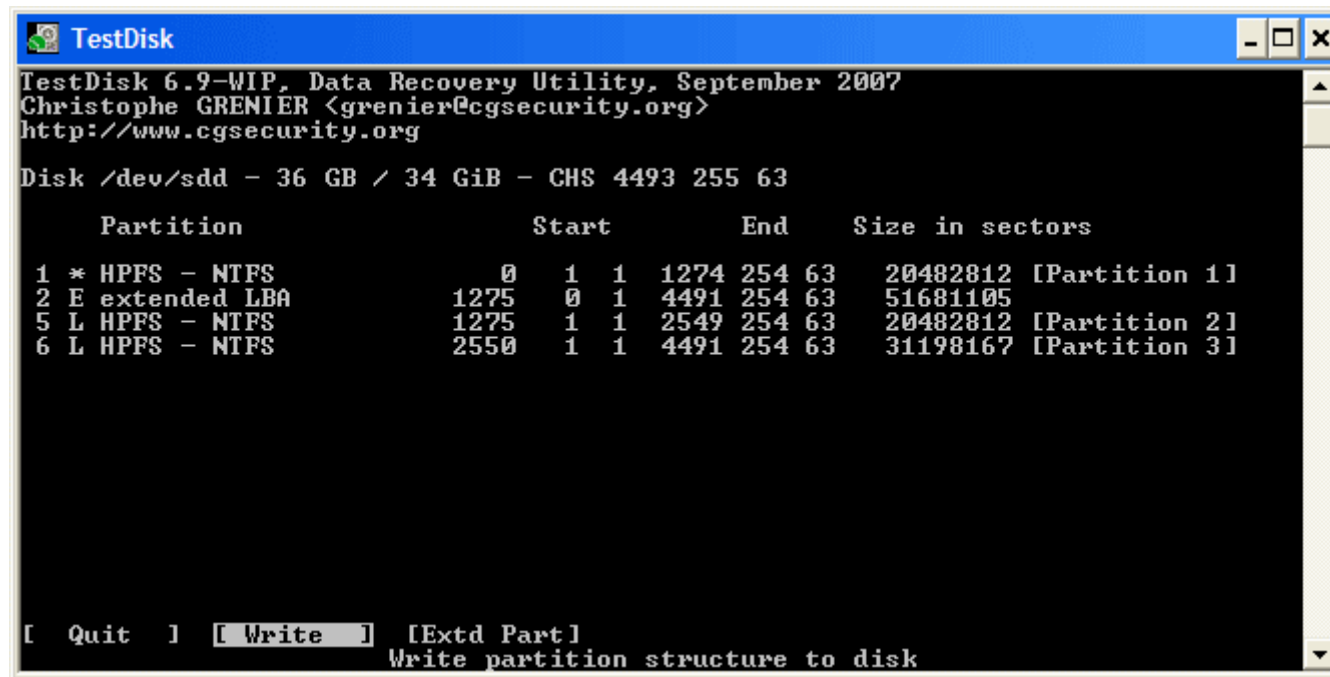
Note: If a partition is listed *(bootable) but if you don't boot from this partition, you can change it to *P* Primary partition.

- Press Enter to proceed.

Partition table recovery

It's now possible to write the new partition structure.

Note: The extended partition is automatically set. TestDisk recognizes this using the different Partition structure.



```

TestDisk
TestDisk 6.9-WIP, Data Recovery Utility, September 2007
Christophe GRENIER <grenier@cgsecurity.org>
http://www.cgsecurity.org

Disk /dev/sdd - 36 GB / 34 GiB - CHS 4493 255 63

    Partition              Start      End      Size in sectors
  1 * HPFS - NTFS           0         1 1274 254 63    20482812 [Partition 1]
  2 E extended LBA        1275      0 1 4491 254 63    51681105
  5 L HPFS - NTFS          1275      1 1 2549 254 63    20482812 [Partition 2]
  6 L HPFS - NTFS          2550      1 1 4491 254 63    31198167 [Partition 3]

[ Quit ] [ Write ] [Extd Part]
Write partition structure to disk

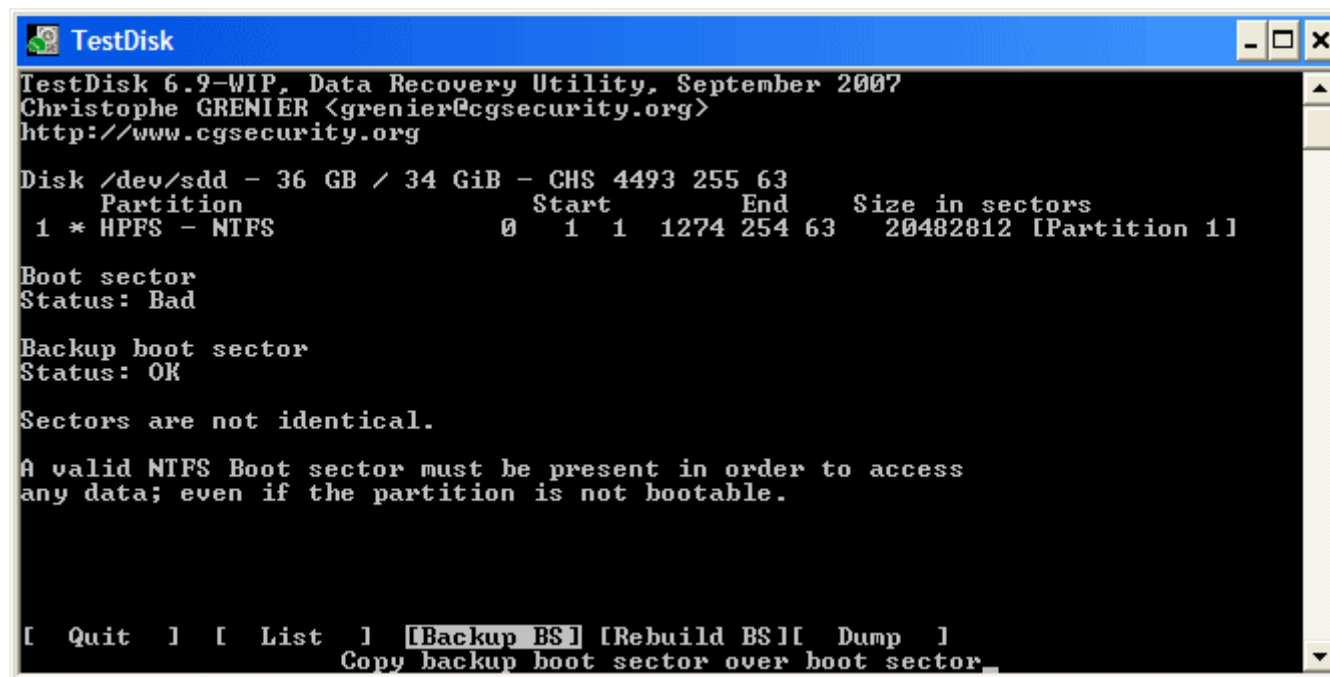
```

- Confirm at **Write** with Enter, y and Ok.

Now, all partitions are registered in the partition table.

NTFS Boot sector recovery

The boot sector of the first partition named `Partition 1` is still damaged. It's time to fix it. The status of the NTFS boot sector is bad and the backup boot sector is valid. Boot sectors are not identical.



```
TestDisk
TestDisk 6.9-WIP, Data Recovery Utility, September 2007
Christophe GRENIER <grenier@cgsecurity.org>
http://www.cgsecurity.org

Disk /dev/sdd - 36 GB / 34 GiB - CHS 4493 255 63
Partition      Start      End      Size in sectors
1 * HPFS - NTFS    0  1  1 1274 254 63  20482812 [Partition 1]

Boot sector
Status: Bad

Backup boot sector
Status: OK

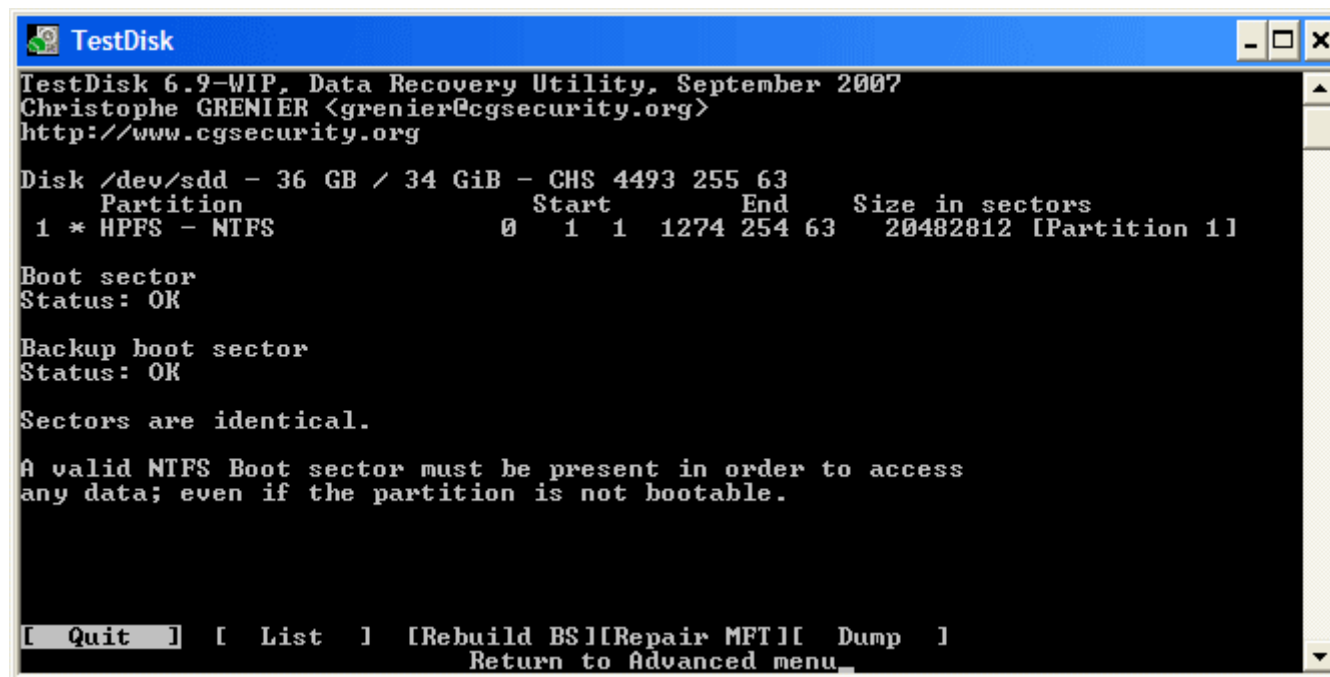
Sectors are not identical.

A valid NTFS Boot sector must be present in order to access
any data; even if the partition is not bootable.

[ Quit ] [ List ] [Backup BS] [Rebuild BS][ Dump ]
Copy backup boot sector over boot sector
```

- To copy the backup of the boot sector over the boot sector, select **Backup BS**, validate with Enter, use y to confirm and next Ok.

More Information about repairing your boot sector under TestDisk Menu Items. The following message is displayed:



```
TestDisk
TestDisk 6.9-WIP, Data Recovery Utility, September 2007
Christophe GRENIER <grenier@cgsecurity.org>
http://www.cgsecurity.org

Disk /dev/sdd - 36 GB / 34 GiB - CHS 4493 255 63
  Partition      Start      End      Size in sectors
  1 * HPFS - NTFS    0  1  1 1274 254 63    20482812 [Partition 1]

Boot sector
Status: OK

Backup boot sector
Status: OK

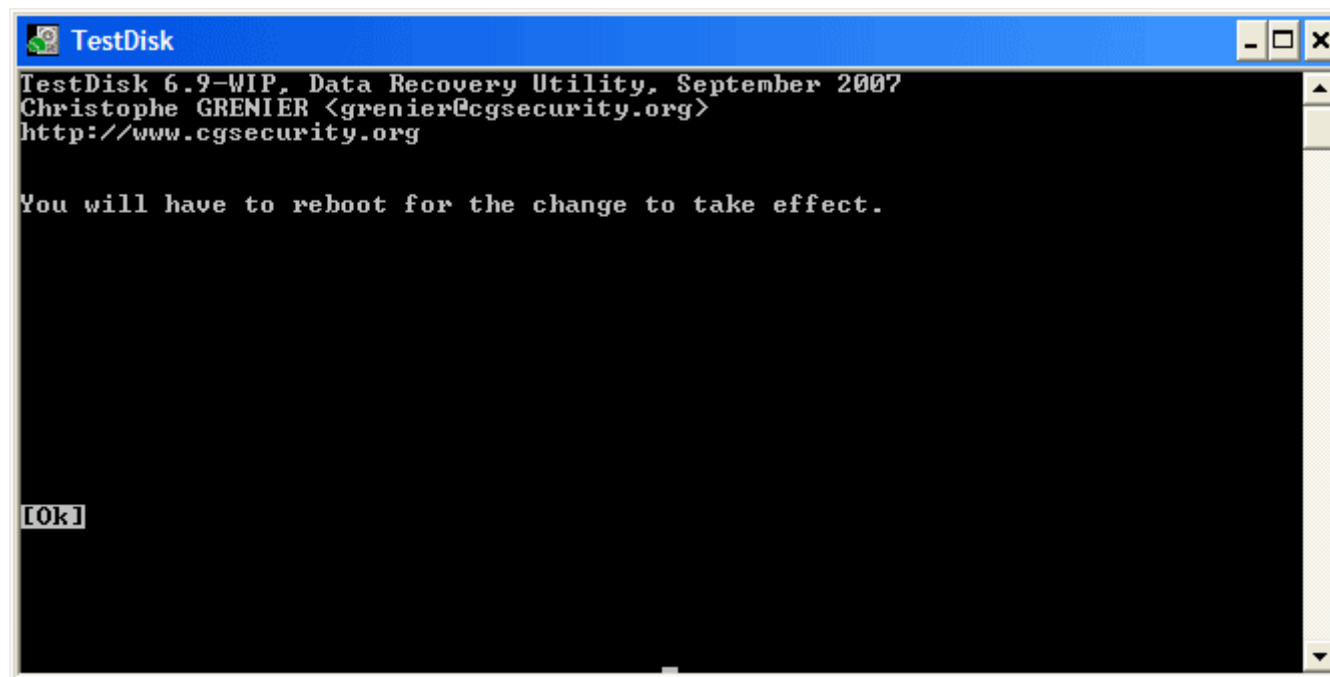
Sectors are identical.

A valid NTFS Boot sector must be present in order to access
any data; even if the partition is not bootable.

[ Quit ] [ List ] [Rebuild BS][Repair MFT][ Dump ]
                        Return to Advanced menu
```

The boot sector and its backup are now both ok and identical: the NTFS boot sector has been successfully recovered.

- Press Enter to quit.



- TestDisk displays *You have to restart your Computer to access your data* so press `Enter` a last time and reboot your computer.

Recover deleted files

TestDisk can undelete

- files and directory from FAT12, FAT16 and FAT32 filesystem,
- files from ext2 filesystem,
- files from NTFS partition since version 6.11.

If it doesn't work or for other filesystem, try PhotoRec, a signature based file recovery utility.

[Return to TestDisk main page](#)

Category: Data Recovery

- This page was last modified on 5 November 2009, at 22:24.

- Content is available under GNU Free Documentation License 1.2.