



# Hard Disk Data Recovery

Computers have become ubiquitous repositories for all of our information and all of our digital assets. We trust our computers and tend to forget that our information is at risk. There are many causes of data loss including problems with hard disks or computer hardware, power glitches, viruses, software problems, human error, deliberate action by others, and more. With increasing hard disk capacity, the creation and management of back-ups has become more difficult and so tends to get overlooked. The good news is that when problems do occur your data may not be lost, in most cases it only becomes inaccessible. Data Recovery may be able to salvage much of your information. Overleaf is a list of some items you should be aware of, as well as illustrative information to assist in understanding of hard disk storage.

Opensource and commercial software applications may assist you in recovering data yourself, however, in some cases these may further compound your problems. Unless you feel confident it is advisable to seek professional assistance; experimenting with data recovery in the midst of problems is not advisable.

There are many data recovery methods. The selection of the most appropriate method is dependent on the nature and type of failure or problem. The most important precaution that should be taken in every case is the creation an exact copy of the suspect physical drive (at least of all but the problematic areas). Data Recovery actions should only be attempted on a copy. This ensures that further degradation of original drive is minimized and it remains available for alternate or additional recovery actions.

The following process is used by HDrevive, when ever practical<sup>1</sup>:

- Visually inspect the hard disk exterior and circuit board assembly
- Power up the hard disk in our test fixtures (with write protection activated), run start-up diagnostic tests
- Make a literal copy of the drive onto a secondary device, defective blocks are initially skipped
  - Retry to copy data from the areas that were initially skipped
- Evaluate the copy to identify the most appropriate recovery method
- Characterize and determine the amount of data and the types of files available for recovery
- Obtain customers authorization to perform recovery
- Execute recovery and copy results onto DVD's or a replacement drive
- Optionally, virus scan recovered material using up to date software
- Optionally, following customers acceptance of recovery, erase the original drive
- On completion and acceptance of the recovery, permanently erase all of our working copies

Data recovery can only be performed on a best effort basis, the degree of success is dependent on many factors. Some of the recovered files to be corrupted and unusable, others may be truncated and incomplete. HDrevive does not examine recovered files, however few may be opened to assess the quality or success of the recovery. You should be aware that file and directory names will be visible during any recovery process.

For additional information on Data Recovery and to discuss your specific needs, please contact us.

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<sup>1</sup> HDrevive will not take any actions that would invalidate a manufacturer's warranty

## How does a hard disk work?

A hard disk a complex storage device<sup>2</sup>, to help in understanding it can be considered as a large container based, storage warehouse. The warehouse operator (file system) knows which containers are available and which are not in use. When you want to store something he gives you the number for the first available container, you put a name on the outside and once it fills up you get the number for the next available one, you write the number of the next one on the container you had just filled up or mark it as your last container. The warehouse operator records in his ledger (stored in a specific container) your name and the number of your first container, he does not actually record the individual numbers your other containers, only identifies them as in use (by someone).

**File deletion** - once you no longer need the stored material, you inform the operator and he erases your record (i.e. number of your first container) and marks as available all the other containers you had been using, the material in as well as any labels on the container remains in place until the next person needs that container. **Formatting** is similar to discarding of the warehouse ledger and the starting a new one, making all of the containers available (but the containers are not emptied).

If you change your mind it may be possible to rebuild the container sequences if they have not been re-used. In some cases the first container will be found; but a later one has been re-used it will not be possible to recover the full file as other content is attached and replaces content – file corruption.

## Some safety measures (not an all inclusive list):

- If you hear any strange sounds from the computer, e.g. clicking, scrapping, whines, etc.. you should power down
- If you suspect loss of data related to hard disk problems, you should not perform diagnostic tests on a suspect device e.g. CHKDSK, etc.., such tests may further obliterate data
- Minimize the use of any suspect drive, this applies both the logical drive as well as host physical hard disk (any other logical drives on that hard disk)
- If you suspect data loss on a boot or primary drive, you should stop using it, do not install recovery or other software on this drive
- If the operating system (Windows, Mac, etc.) does not come up you can try to repair using the original disk, but do not re-install or upgrade the OS
- Do not run the computer manufacturers utility or application to restore the systems to original condition
- Do not open the disk drive
- Do not freeze, heat, shake or hit a suspect drive; they have <writes> too!
- Limit the number of recovery attempts – try and try again does not always work and may result in additional data losses.

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<sup>2</sup> For a technical, detailed explanation of hard disks and file systems you should refer to Wikipedia or other reference material.