

HDDRecovery

HOW TO RECOVER DATA FROM FAT & NTFS FILE SYSTEMS



IMPORTANT NOTICES

DO NOT use or download any files to the hard drive that you need to recover data from until after your lost data has been recovered to your satisfaction.

READ this ENTIRE document BEFORE DOING ANYTHING!

Make sure you have EVERYTHING you need BEFORE YOU START!

This how to guide describes the process for recovering data from a single IDE, SATA or SCSI hard drive. The processes used here may cause damage or present unreliable outcomes if used on any other operating system, disk configuration or non disk data storage device.

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Before we start

When to use data recovery software

Data recovery using software tools can only be successful if the following criteria are met. The hard drive that requires the data recovery procedure must meet the following states.

- The hard drive has not suffered any physical damage
- The hard drive has not suffered any electrical damage
- The hard drive can be consistently and correctly identified by your computer's BIOS

There is little point attempting to recovery games or program files as these make changes to registry settings in order to run on your PC. Reinstall these once you have your data back.

Deleted files are not lost

- That's right, they are still there till the space they occupy on your hard drive is needed by another file.
- So, if you are deleting files for privacy reasons use software designed for that purpose. Be Careful, and choose software that targets files only and not your entire disk.

Formatted and repartitioned hard drives still have recoverable data

- The same goes for formatting or re partitioning your hard drive, the files are still there till the space they occupy on the hard drive is needed by another file.
- If you are formatting or re partitioning hard drive to protect your privacy use disk sanitization software like "DESTROY" to do the job properly.

There is a safe minimum working knowledge

If you know how to perform the following tasks then you have the necessary skills to undertake data recovery from your hard drive.

- Can you safely remove a hard drive from a computer?
- Can you change a hard drive from a primary to a secondary drive?
- Are you able to tell the difference between partitions on a primary drive and a second hard drive in your PC without opening the case?
- Can you use the Admin tools in windows XP to identify hard drives, change drive letters, format and partition hard drives?
- Do you have a basic understanding of how filing systems operate with regards to deletes files and damaged FAT and NTFS file structures?

Check List : What equipment and software do you need?

Equipment List

- Spare hard drive (bigger than the target to be recovered) to store your image file and recovered data
- Blank CD / DVD's & Burner
- USB or Firewire external caddy
- Screw drivers and needle nose pliers to remove or change hard drive jumpers
- Anti static wrist strap
- Access to a second PC to perform the recovery operation.
- External hard drive enclosure to suite your hard drive (USB or Firewire).

You may not need all of the above items for every data recovery but it is highly recommended that you have them at hand "just in case".

Software Tools

Download either the demo version or the full version of R Studio Data Recovery Software (http://www.hddrecovery.com.au/Data_Recovery_for_Windows.htm) onto the computer you will be using to undertake the data recovery.

If time is short and you feel confident that the chances are good you can save several hours by getting the full product now before you start.

The demo version of R Studio is unable to recover files larger than about 64k.

Note : The image file created by the Demo version is complete and can be used by the full version of R Studio.

Let's get started.

First of all, and before attaching your precious hard drive to any computer read through this document.

The type of recovery described in this guide is called a logical recovery as there is no actual damage to the hard drive itself. The damage is to the filing system. The BIOS can see the hard drive the USB and firewire device drivers can see the hard drive its only windows that has a problem with your hard drive.

In most but not all of these cases the XP disk management tools will be able to see the drive but will show it as healthy but unformatted or full.

How big is your hard drive?

If you are going to do this recovery the safest possible way then you will be creating an image of your damaged hard drive first of all.

So, how big is your hard drive, if for example it is 80 gig you will need space somewhere on the computer that you will be using to store a file that is 80 gig in size. Now you know why you needed that other hard drive.

Attach your hard drive to the computer.

Generally speaking we have found the recovery operation to be much easier, quicker and safer to perform if the target hard drive, that is, the one with your lost data an the hard drive for the image file are on external caddy's attached to the PC via USB or Firewire.

Why?

Because you only have to pull one computer apart and you can quickly determine if there are problems with the hard drive that need to be fixed before you can start the recovery process, without having to pull another computer apart, plus there is no real need to touch any of the jumper setting on the hard drive. (One less thing that you have to document and or remember)

If this approach is not for you, maybe you like pulling computers apart, then the hard drive needs to be mounted in a computer that is fully operational with Microsoft XP ® as a second (or third) hard drive, at this point it does not matter which cable it is attached to as long as you remember which hard drive is which.

Restarting and testing with your hard drive installed.

If the drive that you are recovering from is either a SATA or SCSI hard drive make sure that any RAID features are turned off for the duration of the recovery process.

Restart the computer with your hard drive safely attached and check that everything is working and the computer is aware of your hard drive at a system level i.e. if your hard drive is attached to an IDE cable the BIOS can see the hard drive on boot or the USB or firewire device drivers can see the hard drive once windows has started.

If you have attached a second hard drive for the image file and any data files presuming that there is enough free space make sure that it is partitioned, formatted and ready to roll.

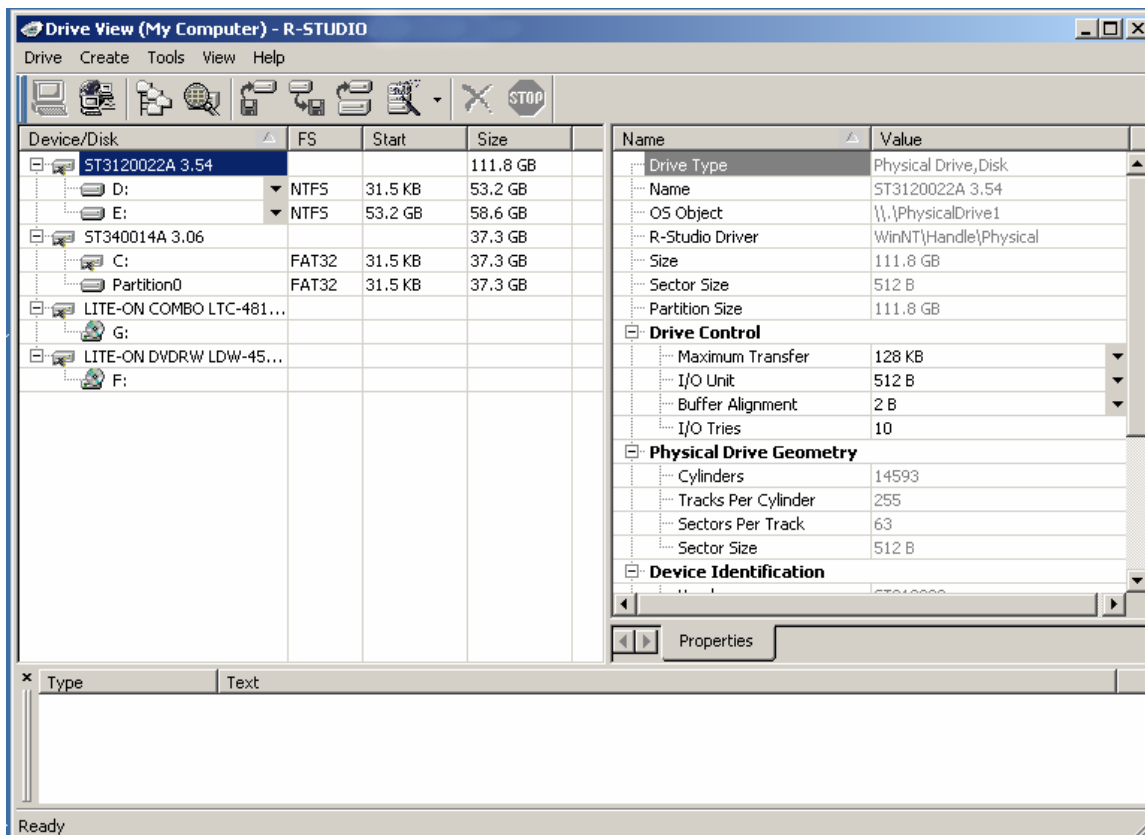
Testing the recovery process.

Congratulation, if you are reading this then that must mean that the R Studio software and your hard drive were installed correctly and the computer knows that they exist.

Find the shortcut to R Studio and start the program.



R Studio icon



The opening screen for R Studio

As you can see from the R Studio screen this computer has 2 Seagate hard drives the larger of the 2 is partitioned into 2 NTFS partitions D and E and the small has a single FAT32 partition. The information on the right hand panel describes the highlighted drive, partition or device in the left hand panel.

When you start up R Studio you will be able to see your C drive, and other devices, Floppy drives, CD Roms DVD Roms plus the hard drive that you will be attempting to get your data back from and the new hard drive for the image and recovered data files. Your hard drive, that is the hard drive that you will be attempting to get your data back from may or may not have a drive letter, there is no need to worry as it is not important at this point.

Playing it safe. Creating an image of the damaged hard drive.

Why go to all the trouble of creating an image of your hard drive before you start?

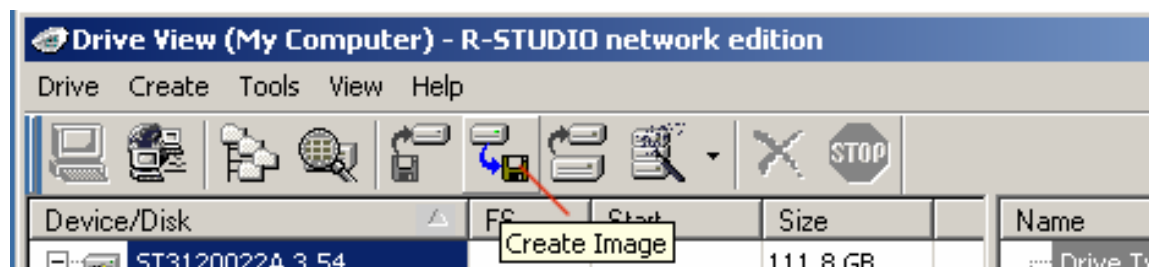
Well, you don't have to do this however you may like to consider the following benefits to this approach.

First of all, it puts your hard drive out of danger; any recovery work is carried out on the image. If something goes wrong you can create another image and restart without any trouble. Your hard disk and the precious information stored on it are safe.

An image is an exact, byte by byte, copy of any object on the Device/Disk panel. When created, images can be processed like their original objects.

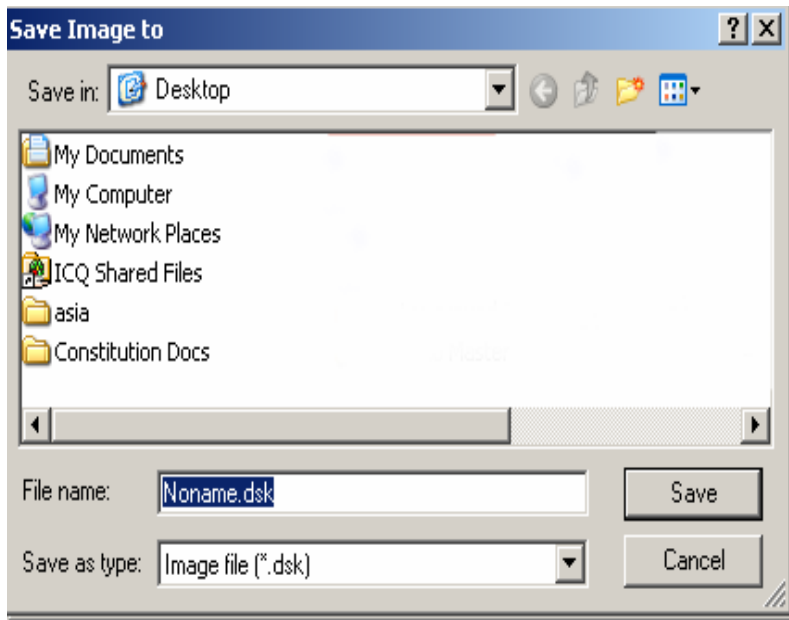
Images are very useful if there is a risk of total data loss due to hardware malfunction. If bad blocks are constantly appearing on a hard drive, you must immediately create an image of this drive. All data search, scan and restoring can be done from this image.

Image creation; The Process



The R Studio Tool Bar

If R Studio is not already running restart it now. Select the Create Image button on the tool bar and click your mouse on it.



The R Studio Save Image box

A screen like the one displayed here will appear. In the **save in** area select the hard drive that is going to store the image that you are about to create. Give the image a name and choose save. Depending on the speed of the computer you are using and the size of the image (the size of the hard drive that is being imaged) this can take some time. Several hours is not uncommon for the bigger hard drives.



R Studio is now creating an image file

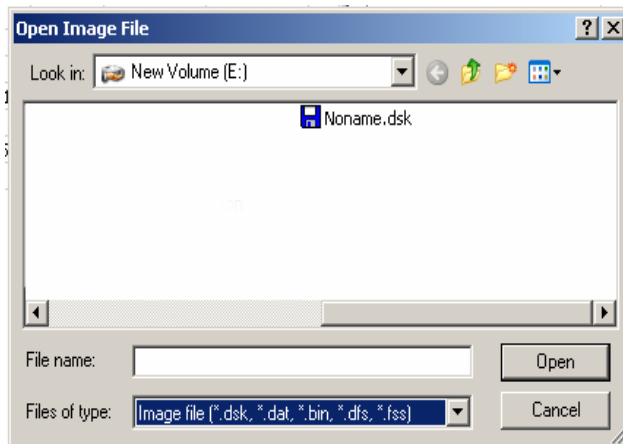
To check that the imaging process has started look for the word "copying" in the bottom left corner of the R Studio screen. After awhile a blue progress bar will also appear. Once the image creation has finished the blue bar and the word "copying" will disappear. The word "ready" will appear in its place.

Loading and using your image file



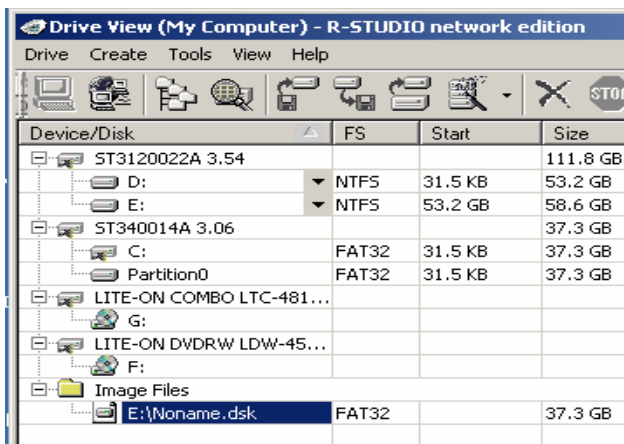
The R Studio Tool Bar

If R Studio is not already running restart it now. Select the Open Image button and click your mouse on it.



The R Studio Open Image File box

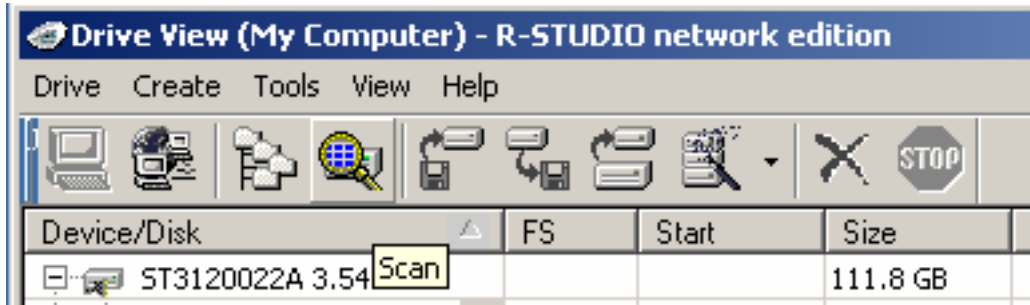
A screen like the one displayed here will appear. In the body of this screen identify your image file in just the same way as you would if you were opening a word file.



The image file now loaded into R Studio

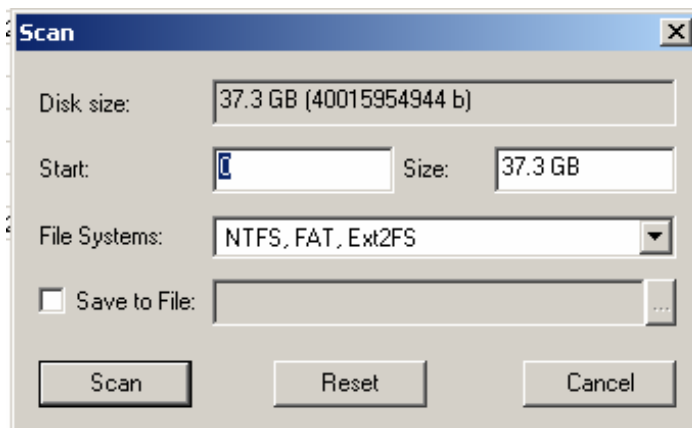
With the image file now loaded into the main R Studio window you can now begin searching for your lost files by selecting the Scan button on the tool bar.

Searching (scanning) for lost files

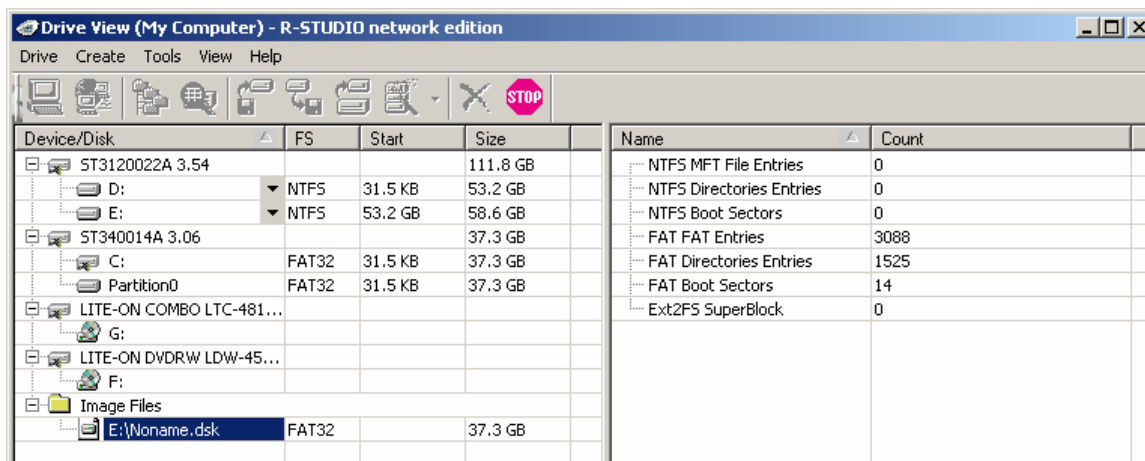


The Scan button

The scan button brings up this dialog box displayed below; choose Scan to begin your search for lost files. There is no need to alter any of the settings here.



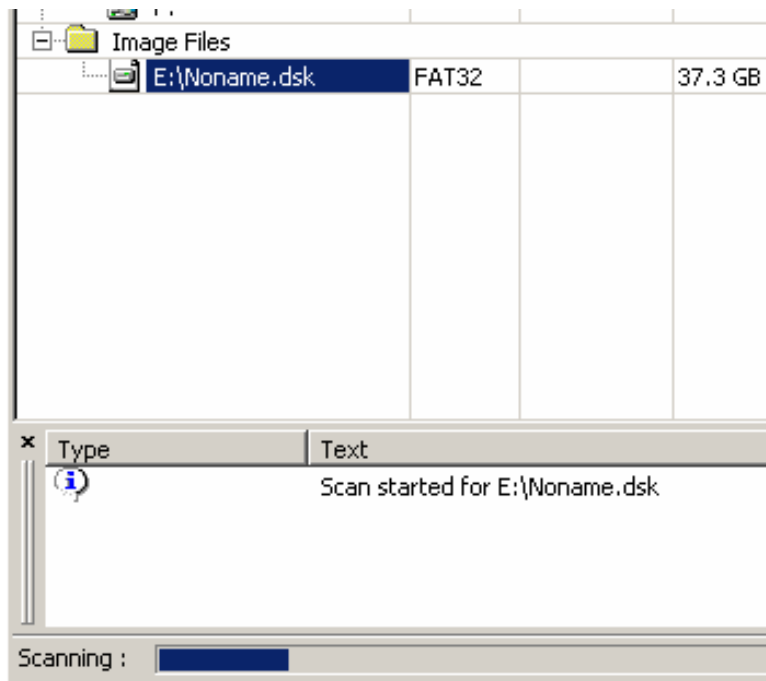
Scan properties box



The image file in place and ready to go

The image file once loaded will be clearly displayed as an image file

Once the scan has started the progress bar will appear once again across the bottom of the R Studio window.

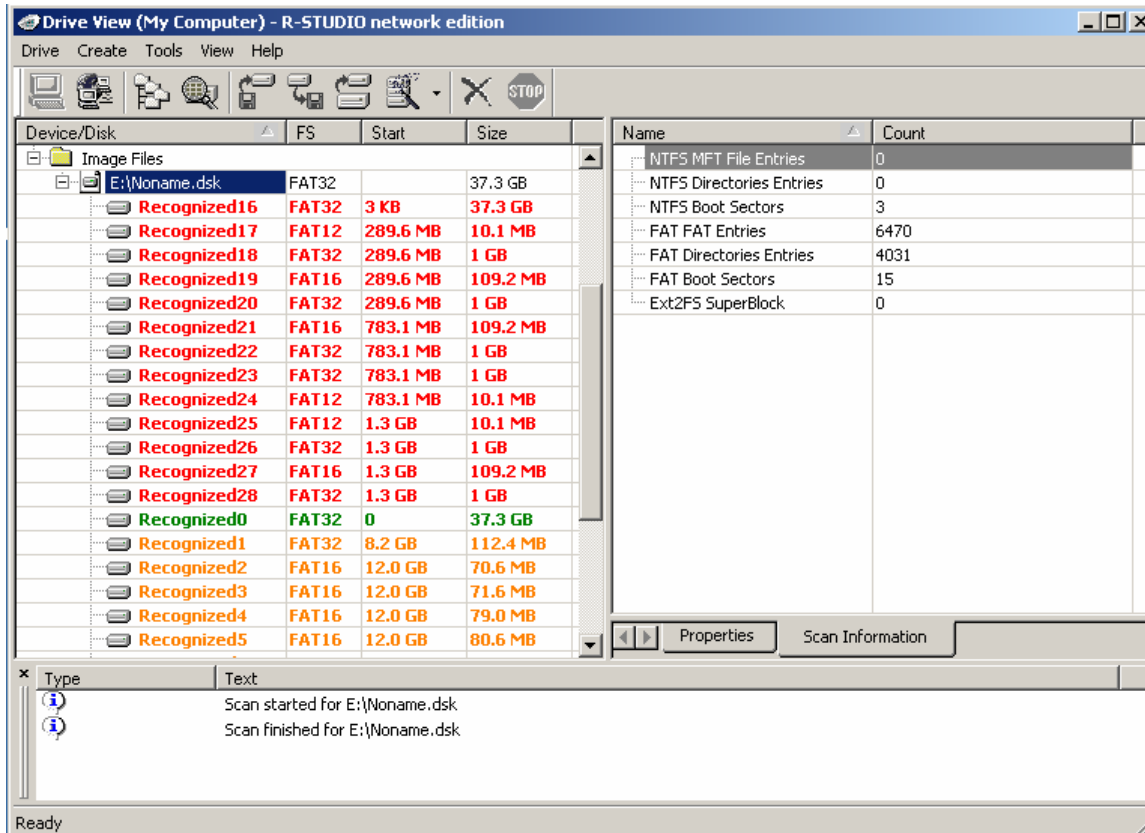


The scan in action

At the same time all of the buttons on the tool bar will be disabled (greyed out) with the exception of STOP and you will be able to see the number of files found on the right hand side of the screen.

This process can take a while. In the worst case with an older PC it can take many hours. Once scanning has finished you will be presented with something that looks similar to this. It took us 2.5 hours to scan a 27 gig image when we where building the examples. So you do the math, and if the disk image is a big one a faster PC will make a difference to how long it takes to scan the disk image.

Looking for your lost data

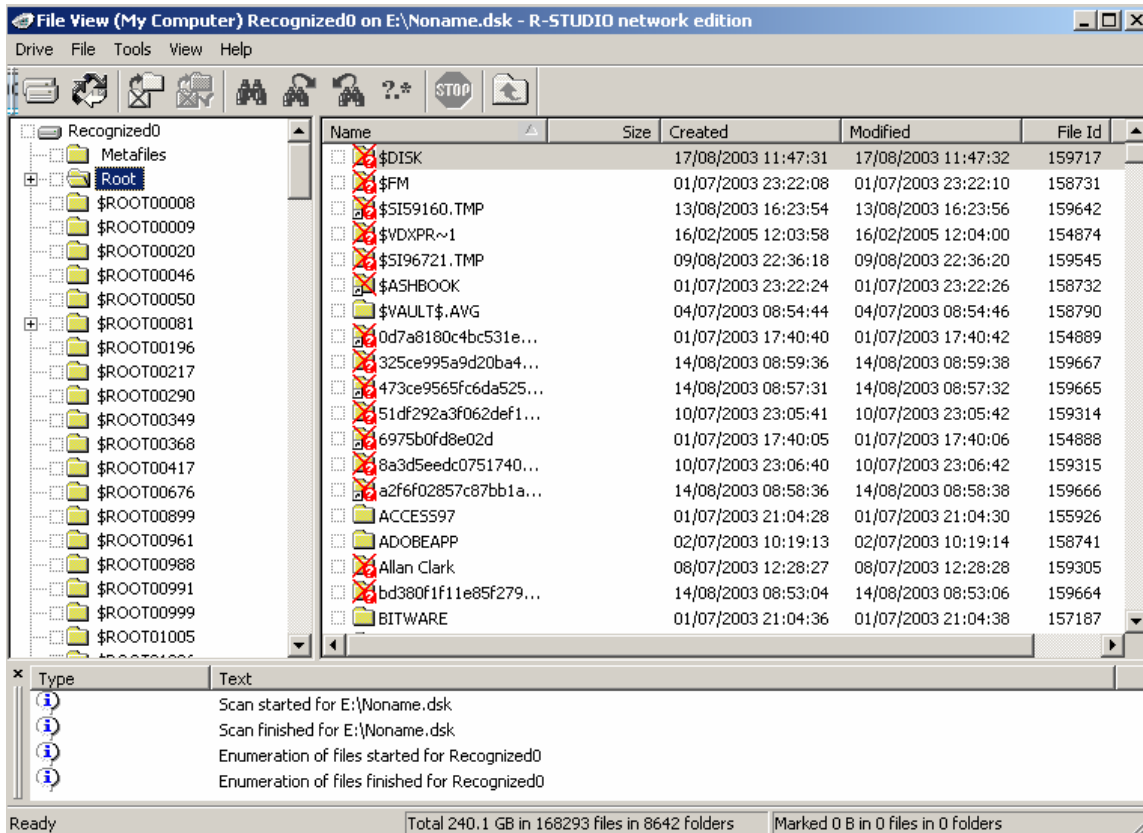


Scan finished and results on display

Once scanning is complete R Studio will present you with a number of options or possibilities.

The words Recognized and a number in Green Orange and Red are now displayed. Each of these is a representation of the structure of the hard disk before the failure. As a rule GREEN is good, ORANGE is not so good and RED, well if you cannot find what you are looking for in either the green or orange options then the red ones are worth investigating.

To investigate the contents of each option choose one and then double click it.



The contents of Recognized0

The R Studio screen will change and now display the contents of the Recognized item that you chose on the previous screen.

As you can see from the screen shot the display has a *Windows Explorer* look about it. On the left is the directory or folder layout of this particular *Recognized Option* with the contents of the highlighted folder displayed on the right.

Metafiles are the file system's internal files invisible to any user, or file system data, which R-Studio represents as files. These files do not contain user data directly. Unless you want to scrutinize disk's file system, do not restore them.

Root is similar to the root folder in any FAT or NTFS system the difference being that here any damaged or deleted folders and files are displayed as well. Any file or folder with a red cross through it has been deleted by you or another person using your computer at some point.

Cross linked file or folders. Any file or folder with both the red cross and a question mark is a cross linked file or folder. R-Studio attributes the content of cross-linked folders to one folder called a target folder. When recovering, R-Studio places the content to the target folder.

You may view the list of cross-linked folders. To do so,

- Select a cross-linked folder.
- Right-click the selected folder and select Cross Linked Folders in the pop-up menu.

A list of cross-linked folders will appear. You may go to any folder in this list by clicking it.

To find a target folder,

- Select a cross-linked folder.
- Right-click the selected folder and select Go Target in the pop-up menu.

If Go Target is gray, this folder is already the target folder.

\$ROOT58448 on FAT partitions mean that some folders have been found, but they cannot be included into the folder structure for this FAT partition. Sometimes, such folders may contain other folder structures.

\$\$\$Folder58448 on NTFS partitions mean that the folder has not been found on the drive but some references to it have been. For example, folders 'My documents', 'Work', 'Photos' have been found and all they have one parent folder, whose description has not actually been found on drive, so its name is unknown and therefore re presented as \$\$\$Folder58448. It may happen that the description of such folders was outside of the scan area, so try to enlarge the region or scan the entire hard disk. If that does not help, most likely that the description of the folder has been overwritten.

In most but not all cases the file that you need to recover will be easy to find by starting in the root folder and then moving through till you find the directory containing the files that you need.

Remember that there is no point trying to recover software applications, including games, because there are often registry entries that are also needed to all the program to operate successfully.

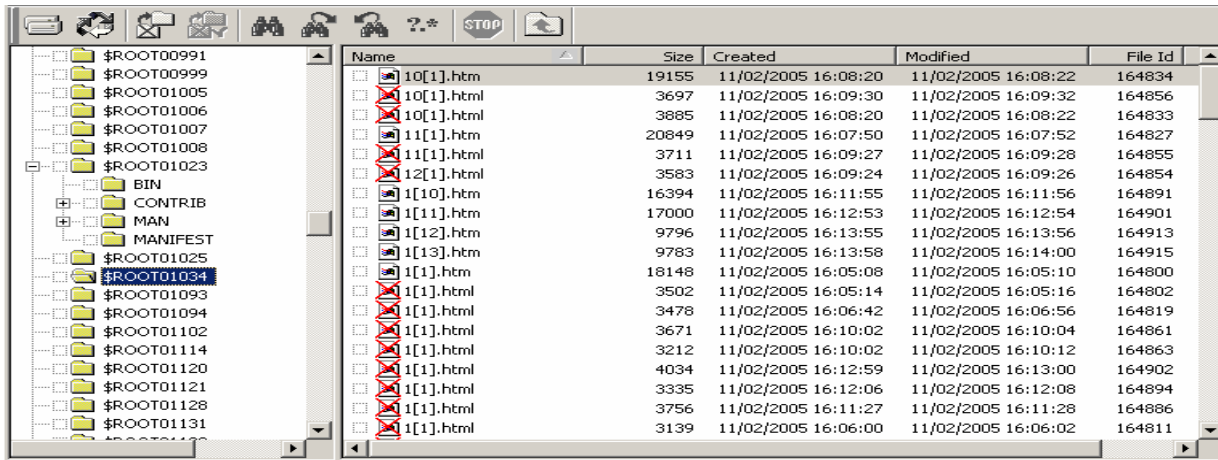
Using the Search feature



The Search buttons

If you cannot find the data that you need in the Root folder start looking in the \$ROOT's (FAT file system) or \$\$\$FOLDER's (NTFS file system). You can use the search tools (they look like binoculars) to speed up the process.

Remember that there can be a subsidiary file structure in the \$ROOT and \$\$FOLDER files as well.



A subsidiary file structure within \$ROOT01023

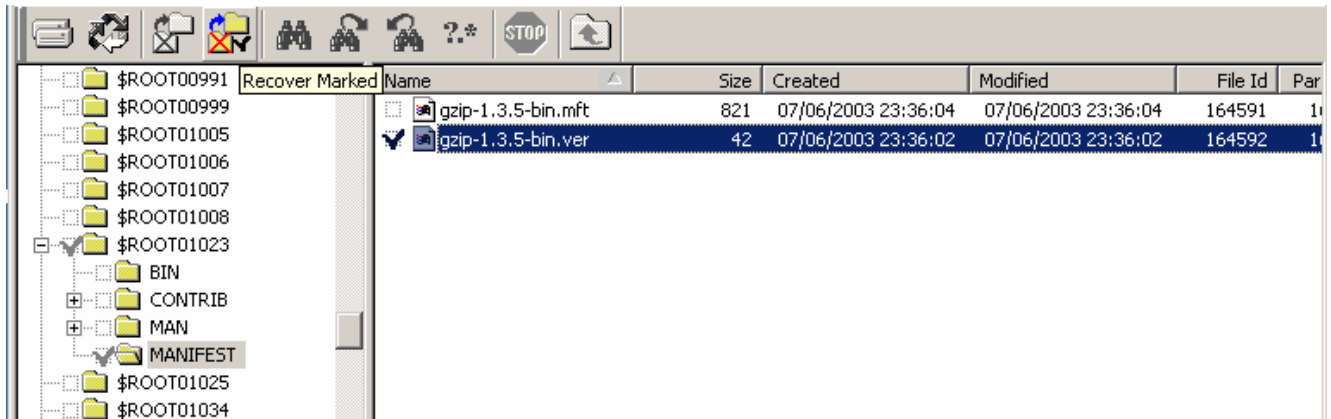
Files found and ready to be recovered to someplace safe

Decision Time! If you have been using the full version of R Studio, skip to the next section. If you have been using the demonstration version of R Studio as suggested earlier, you now need to decide whether or not to go ahead and buy a full copy of the software from <http://www.r-tt.com>.

You will be unable to save any files that are larger than about 64k in size with the demo version of R Studio.

If you have just upgraded there are some things we need to do first before continuing on.

- Close down and uninstall the demo version of R Studio
- Install the full copy of R Studio
- Pick up the image file you created with the demo and restart the scan process
- Once the scan has finished proceed to the next step



An example of an individual file marked for recovery

The process used to copy recovered file to a safe location is very similar to that used when restoring files from a backup. The individual files or entire folders are selected by clicking the box on the left of the files or folder needed. A tick will appear in the box. If you have chosen to recover a folder the entire contents will show ticks as well.

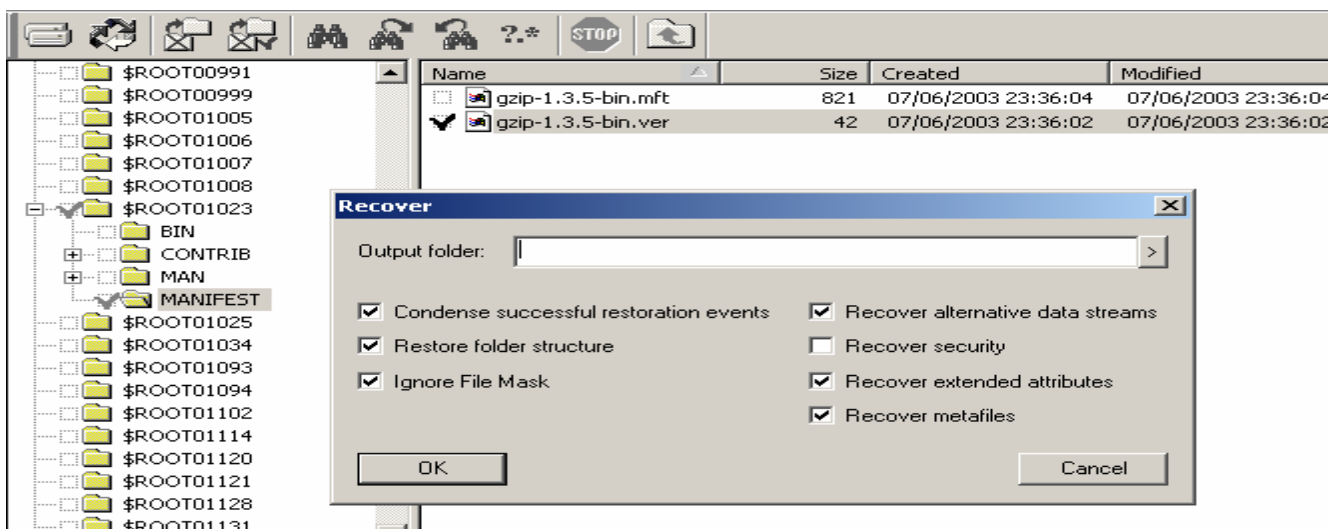
Two methods for recovering files and folders

Method 1... one or more files from different folders at a time



To recovery single files use this button

To copy the files select the recover marked button on the toolbar

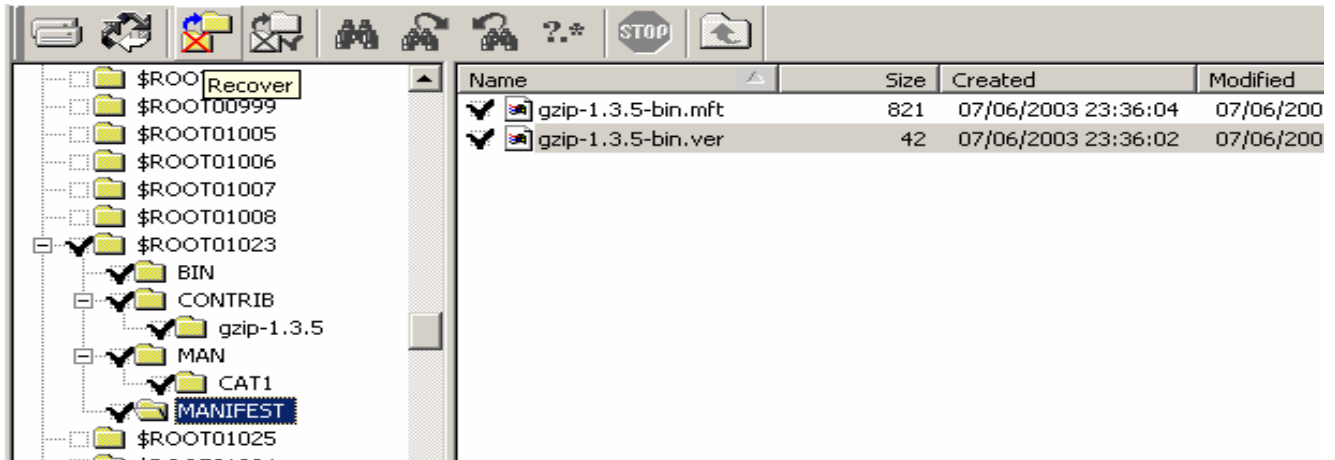


Selecting a new destination for the recovered files

In the dialog box that appears enter the location that you want the file to go to once you start the recovery. Then click OK to start the process.

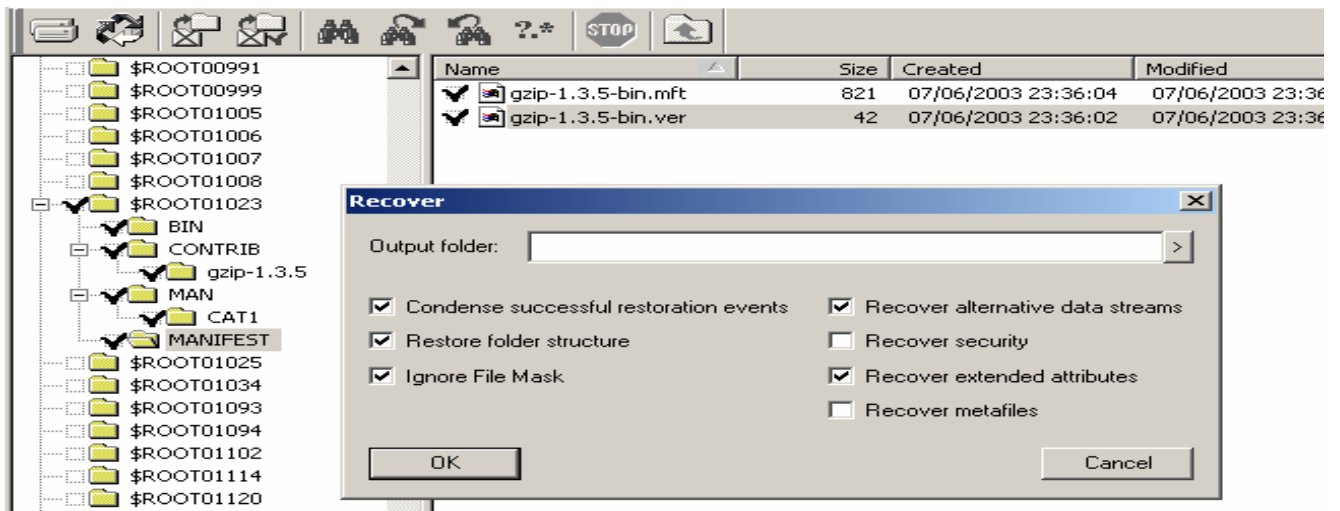
As the recovery process goes along the ticks will vanish as the files are successfully copied.

Method 2... one or more folders and contents at a time



To recover whole folders use this button

The process is basically the same when recovering whole folders of data. The only difference is that the button you select on the tool bar is the one on the left of the one used for individual files.



Selecting a new destination for the recovered files

In the dialog box that appears entry the location that you want the file to go to once you start the recovery. Then click OK to start the process.

As the recovery process goes along the ticks will vanish as the files and folders are successfully copied. When the transfer is finished there may be some grey ticks left. This is an indication that there was a folder or file of 0 bytes in size and these could not be copied.

Check these to confirm that you have not missed anything and then check the transferred data to confirm that the transfer was successful.

Finished

Finished, now you not only have your data back, but you can appreciate the value of backing up your files and in the event of a similar thing happening in the future you have both the tools and the ability to overcome the problem. Well done!

We would like to hear from you.

If this document has been helpful or you have comments on how we can improve please let us know.

There are more of these How 2 guides being written. Let us know of ones you would like to see.

Email us at recover@hddrecovery.com.au

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