**User's Manual** 



## R-UNDELETE



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I

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## I Start

## II Quick Start Guide in 3 Steps

## 2.1 Step 1. Disk Selection

• Locate the physical storage device where lost files resided.



#### Storage Device Icons



| 37.3GB<br>USB           | USB storage devices like external hard drives or memory sticks   |
|-------------------------|--|
| 238.5GB<br>M4-CT256M    | SSD storage devices. File recovery from such devices has some peculiarities described in the SSD and NVME storage devices [42] section.  |
| 128gb<br>NVME disk      | NVME storage devices. SSD storage devices connected to the computer through a special interface. They have the same file recovery peculiarities of SSD devices described in the SSD and NVME storage devices 42 section. |
| 3.7GB<br>D:/rdi_virtual | Disk image 50. A file that contains exact, byte by byte, copies of storage devices or disks. Files from such images can be recovered as if those images were real disks.   |
| 3.7GB<br>E:             | CD/2DVD discs or virtual disks.  |

• Check if the hardware of the storage device with lost files is in a good condition. If the storage device has hardware problems, R-Undelete marks such a device with an exclamation mark and gives a S.M.A.R.T. Monitoring warning. Disk imaging 29 is the best solution in this situation.

• Select the disk on the device where the lost files might reside.

Recovery of deleted files or lost files from a formatted disk with the same file system

These files most likely reside on an existing disk.

To see the files resided on the disk, right-click and select Show Files (Quick Scan operation 43). Depending on the disk size, the number of files, and your computer hardware, it may take a few seconds or more. When files are found, R-Undelete switches to the Files panel where found files are selected for recovery 4.

Recovery of lost files from a formatted disk with a different file system These files most likely reside on an existing disk.

To see the files resided on the formatted disk, right-click and select Show Files (Quick Scan operation 43). Depending on the disk size, the number of files, and your computer hardware,

it may take a few seconds or more. When R-Undelete switches to the Files panel, click the Deep scan button, wait for Deep Scan 26 to finish, and select the previous partition 42 where lost files resided. Then select files for recovery 4.

#### Recovery of lost files from a deleted disk

Deleted disks are usually found on the unallocated space.

Right-click the unallocated space on the storage device of the disk, select Scan for partitions, and wait for R-Undelete to finish scanning the device. Note that it may take a long time if the device is large. When the disk is found, right-click Show Files then select files for recovery 4

# Recovery of lost files from a damaged disk or a partition with an unsupported file system

Damaged disks or partitions with unsupported file system are usually found on the unrecognized space.

This recovery is very similar to the case of lost files from a deleted disk.

Right-click the unrecognized space on the storage device of the disk, select Scan, and wait for R-Undelete to finish scanning the device. Note that it may take a long time if the device is large. When the disk or a partition is found, right-click Show Files then select files for recovery 4.

If the files are to be recovered from a partition with an unsupported files system, R-Undelete will use only raw file search, and, therefore, will not recover file names and the original folder structure. See the Definitions 4 help page for more details.

#### Disks, Unrecognized Space, and Unallocated Space Icons

| Disk area<br>occupied by files<br>Test_Disk(E:)<br>37.3GB(NTFS) | A logical disk with letter (E:). Deleted files or files from formatted disks might reside on such disks.  |
|---|---|
| Unallocated Space<br>74.5GB                                     | Unallocated space on a storage devices. A storage space that does not belong to any disk. A deleted disk (partition) might be found here.   |
| Unrecognized Space<br>37.3GB                                    | Unrecognized space on a storage devices. A storage space that is<br>supposed to belong to a disk or partition, but R-Undelete cannot detect<br>any because of its damaged or unsupported file system. A damaged disk<br>or a partition with an unsupported file system might be found here. |

#### 2.2 Step 2. File Marking

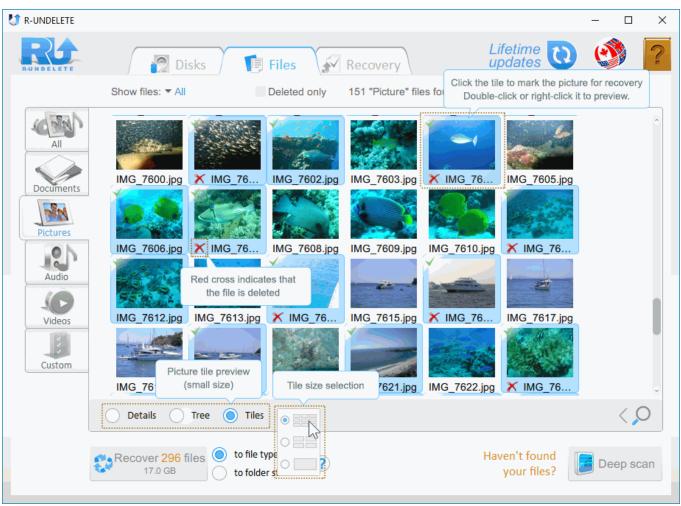
#### Mark files for recovery.

| 🔰 R-UNDELETE     | <b>y</b>  |                                    |   |  | – 🗆 ×  |
|------------------|---|------------------------------------|---|--|--|
| RUNDELETE        | Disks   | Files                              | Recovery  | Lifetime<br>updates                    | ) 🔮 🔽  |
|                  | Show files:  All  | Deleted only                       | 325 files found on disk Te  | est_NTFS(E:)                           |  |
| All              | Name<br>▼ SRECYCLE.BIN<br>► S-1-5-21-322<br>► V Documents<br>► V Photos | 962833694-1001                     | Recovery chances  | Size                                   | Date<br>2018-09-06<br>2018-09-06<br>2019-03-13<br>2019-03-13<br>2019-03-13 |
| Pictures         | Files marked for<br>recovery<br>Blue Skies (194                         | Information<br>6)erlin.Musical.avi | Estimates of chances for<br>successful file recovery<br>Good (Existing file)<br>Below Average (Wrong Si   | y<br>1.3 GB                            | 2018-09-10<br>2018-09-06<br>2019-03-13<br>2012-11-03<br>2013-06-26         |
| Videos<br>Custom |   | 4]                                 | <ul> <li>Below Average (Wrong Si</li> <li>Good (Existing file)</li> <li>Good (Existing file)</li> <li>Good (Existing file)</li> <li>Below Average (Wrong Si</li> <li>Good (Eviding file)</li> </ul> | 872.7 KB<br>2.0 MB<br>1.9 MB<br>6.0 GB | 2013-06-26<br>2013-06-26<br>2005-08-06<br>2005-08-06<br>2016-07-27         |
| FA               | Files can be s<br>either as a sing<br>as a folder stru                  | hown<br>e list or<br>ucture        | Good (Existing file) On to start file recovery  |  | 2013-12-12<br>earch button   |
| Shredder         | 🔵 Details 🔵 Tree  | It shows the                       | e number of files<br>very and their total size  |  | < 0  |
|                  | Recover 308 files<br>20.9 GB  | to for every to folder structure   | "Deep Scan" is an option to find  |  | Deep scan  |
|                  |   | Files                              |   |  |  |

Files panel.

The Recovery chances column shows the estimates of chances for successful file recovery [43].

Files are shown in a single file list with details or as a folder tree structure, or tiles on the Pictures tab.



Files panel - Pictures tab.

There are advanced sorting and searching options in R-Undelete. See the File Sorting and File Search 14 help pages for more details.

If a file is marked/cleared for recovery, it is applied to all tabs where it appears.

The build-in file viewer 15 allows you to estimate chances for successful file recovery or to find a necessary file to recover.

If the required files are not found, or you are recovering files from the reformatted disk with a different file system, use the advanced Deep scan option.

You may shred deleted files to render their content completely unrecoverable. Go to the Shredder 33 help page for more details.

When files are marked, click the Recover button to start the recovery 5.

#### 2.3 Step 3. Recovery

When the required files are found and marked for recovery, a sufficient storage space on another disk should be available to save them.

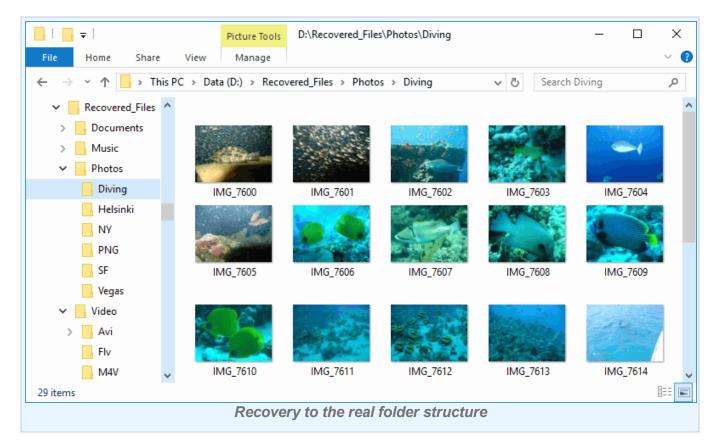
Never save the recovered files on the place where they resided, or you may completely loose them!

|  | Disks Files Recovery  | Lifetime 🔃 🚳 🔽   |
|--|---|--|
| RUNDELETE  |   | on disk NTFS_Test(E:)  |
| All<br>Documents<br>Documents<br>Pictures<br>Audio<br>Videos<br>Videos | <ul> <li>Recovered files can be saved either info file type folders</li> <li>Recovered files can be saved either info file type folders</li> </ul>  | 2017-09-04<br>2017-09-04<br>2017-09-04<br>2017-09-04<br>2017-09-04<br>1.2 MB 2015-06-09<br>87.0 KB 2016-08-01<br>3.1 MB 2013-06-26<br>2.2 MB 2013-06-26<br>872.7 KB 2013-06-26<br>89.3 KB 2016-08-05<br>89.2 KB 2016-08-05<br>89.2 KB 2016-08-09<br>2017-09-04<br>2017-09-04<br>2017-09-04 |
|  | number of files to recover<br>and their total size       (Documents, Multimedia, etc),<br>or to a real folder stucture         Recover 308 files<br>17.0 GB       to file type folders<br>to folder structure | Haven't found<br>your files?   |

File recovery options

Select the way R-Undelete saves the files: either into the file type folders or to the real folder structure.

| File       Home       Share       View       Manage       Image       I |                     | Picture Tools   | D:\Recovered_File  | s\Graphics, Picture\JP   | EG Image   | - 0            | ×   |
|---|---------------------|---|--|--|--|----------------|-----|
| <ul> <li>Archive</li> <li>Document</li> <li>Document Spre</li> <li>Graphics, Pictul</li> <li>JPEG Image</li> <li>PNG Image</li> <li>MUtimedia</li> <li>MP4 File</li> <li>Multimedia Aut</li> <li>Multimedia Aut</li> <li>Multimedia Aut</li> <li>Multimedia Aut</li> <li>Multimedia Aut</li> <li>Multimedia Vid</li> <li>Flash Video</li> <li>MAG_7609</li> <li>IMG_7610</li> <li>IMG_7610</li> <li>IMG_7611</li> <li>IMG_7612</li> <li>IMG_7613</li> <li>IMG_7613</li> <li>IMG_7614</li> <li>IMG_7615</li> <li>IMG_7616</li> <li>IMG_7617</li> <li>IMG_7618</li> </ul>   | File Home Share     | View Manage   |  |  |  |                | ~ 🕐 |
| <ul> <li>Document</li> <li>Document Spre</li> <li>Graphics, Pictui</li> <li>JPEG Image</li> <li>PNG Image</li> <li>Multimedia</li> <li>MP4 File</li> <li>IMG_7604</li> <li>IMG_7605</li> <li>IMG_7606</li> <li>IMG_7607</li> <li>IMG_7608</li> <li>IMG_7608</li> <li>IMG_7608</li> <li>IMG_7609</li> <li>IMG_7610</li> <li>IMG_7611</li> <li>IMG_7612</li> <li>IMG_7613</li> <li>IMG_7613</li> <li>IMG_7614</li> <li>IMG_7615</li> <li>IMG_7616</li> <li>IMG_7617</li> <li>IMG_7617</li> <li>IMG_7618</li> </ul>  | ← → × ↑ 📙 « Data (I | D:) > Recovered_Files   | > Graphics, Picture  | > JPEG Image   | マ ひ Search   | JPEG Image     | P   |
| <ul> <li>Document Spre</li> <li>Graphics, Pictur</li> <li>JPEG Image</li> <li>PNG Image</li> <li>PNG Image</li> <li>Multimedia</li> <li>MP4 File</li> <li>IMG_7604</li> <li>IMG_7605</li> <li>IMG_7606</li> <li>IMG_7607</li> <li>IMG_7608</li> <li>IMG_7608</li> <li>IMG_7608</li> <li>IMG_7609</li> <li>IMG_7610</li> <li>IMG_7611</li> <li>IMG_7612</li> <li>IMG_7613</li> <li>IMG_7614</li> <li>IMG_7615</li> <li>IMG_7616</li> <li>IMG_7617</li> <li>IMG_7618</li> </ul>   | > 🔤 Archive 🔥       |   |  | ~  |  |                | ^   |
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| <ul> <li>Multimedia</li> <li>MP4 File</li> <li>IMG_7604</li> <li>IMG_7605</li> <li>IMG_7606</li> <li>IMG_7607</li> <li>IMG_7608</li> <li>IMG_7608</li> <li>Multimedia Au</li> <li>Multimedia Vid</li> <li>Flash Video</li> <li>IMG_7609</li> <li>IMG_7610</li> <li>IMG_7611</li> <li>IMG_7612</li> <li>IMG_7613</li> <li>IMG_7613</li> <li>IMG_7614</li> <li>IMG_7615</li> <li>IMG_7616</li> <li>IMG_7617</li> <li>IMG_7618</li> </ul>  | JPEG Image          |   | and the second s |  |  | 1 mars         |     |
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| <ul> <li>Multimedia Aut</li> <li>Multimedia Vid</li> <li>Multimedia Vid</li> <li>Flash Video</li> <li>Matroska Vide</li> <li>MPEG Transpo</li> <li>QuickTime Vit</li> <li>Windows AVI'</li> <li>Mog.7614</li> <li>Mog.7615</li> <li>Mog.7616</li> <li>Mog.7617</li> <li>Mog.7617</li> <li>Mog.7617</li> <li>Mog.7618</li> </ul>   | 🗸 🔤 Multimedia      |   | Constant of the second   |  |  |                |     |
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| Flash Video       IMG_7609       IMG_7610       IMG_7611       IMG_7612       IMG_7613         MPEG Transpo       QuickTime Vin       IMG_7614       IMG_7615       IMG_7616       IMG_7617       IMG_7618           Other files       IMG_7614       IMG_7615       IMG_7616       IMG_7617       IMG_7618   | > 🔤 Multimedia Au   |   | <u> </u>   | and the second   | a da to h  | Bearing        |     |
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| > Other files V IMG_7614 IMG_7615 IMG_7616 IMG_7617 IMG_7618 V  |                     |   | - <b>2</b>   |  |  |                |     |
|   |                     | IMG 7614  | IMG 7615   | IMG 7616   | IMG 7617   | IMG 7618       |     |
| 111 items BEE 📰   |                     | 1010_7014   | IMG_7015   | 1010_7010  | IMI0_7017  |                | =   |
| Recovery to the file type folders   |                     | Reco  | very to the file   | e type folders   |  |                |     |



When all the necessary preparations are made, click the Recover button to start file recovery.

Wait for R-Undelete to recover the files and see the results.

| UNDELETE  |                              |       |          |     |            | - 🗆 X          |
|---|------------------------------|-------|----------|-----|------------|----------------|
| RUNDELETE   | Disks                        | Files | Recovery |     | Lifetime 🕡 | <b>()</b>      |
| 0%  | 20%                          | 40%   | 60%      | 80% | 100%       | Stop           |
| 308 files were succ   | cessfully restored           |       |          |     |            |                |
| <ul> <li>✓ Successfully rev</li> <li>✓ Elapsed: 5m 4</li> </ul> | ecovered: 308 files.<br>19s. |       |          |     |            |                |
| Save log  |                              |       |          |     |            | <b>جر</b> Exit |

File recovery results

A file recovery log can be saved by clicking the Save log button.

When the recovery is over, the folder with recovered files will be automatically opened.

Now the recovery session is over. Go to the Disks panel to start another session or click the Exit button to close the program.

#### III Features

#### 3.1 File Sorting

Within the tabs files can be sorted by their names, paths, sizes, or dates, and shown in a single file list with details or as a folder tree structure, or tiles.

R-Undelete gives its users various means to find files for recovery. These means can be combined to make file search in R-Undelete versatile.

#### Global file sorting:

These settings are applied to all found files on the disk regardless of which tab is selected.

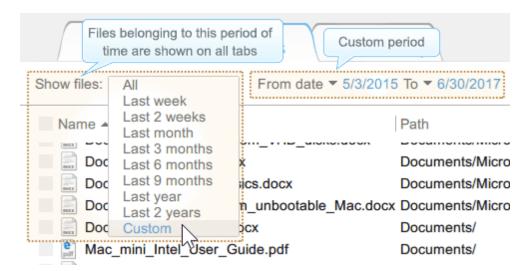
| R-UNDELETE | Time mask for Show All or only         |                                |                       |
|------------|--|--------------------------------|-----------------------|
|            | the files File Deleted files           | Lifetime<br>update             | 0 👀 🚺                 |
|            |  | es found on disk Test_Disk(E:) |                       |
| CMN        | Vame A Path                            | Size                           | Date                  |
| All        | V 🌺 DSC00412.png Photos/PNG/           | 3.4 MB                         | 2016-08-09            |
|            | V 🌺 DSC00413.png Photos/PNG/           | 3.7 MB                         | 2016-08-09            |
|            | V 🌺 DSCN0108.png Photos/PNG/           | 6.8 MB                         | 2016-08-09            |
| Documents  | V 🌺 DSCN0109.png Photos/PNG/           | 5.2 MB                         | 2016-08-09            |
| Beller     | V 🌺 DSCN0113.png Photos/PNG/           | 5.4 MB                         | 2016-08-09            |
| Pictures   | V 🌺 DSCN0116.png Photos/PNG/           | 5.9 MB                         | 2016-08-09            |
| - Inclused | V 🌺 DSCN0117.png Photos/PNG/           | 5.7 MB                         | 2016-08-09            |
|            | V 🌺 DSCN0121.png Photos/PNG/           | 9.7 MB                         | 2016-08-09            |
| Audio      | V 🌺 DSCN0124.png Photos/PNG/           | 1.9 MB                         | 2016-08-09            |
|            | V 🔆 DSCN0125.png Photos/PNG/           | 5.2 MB                         | 2016-08-09            |
|            | V 🌺 DSCN0129.png Photos/PNG/           | 4.8 MB                         | 2016-08-09            |
| Videos     | V Enniono.mp3 Music/Ennio Morricone/   | 3.4 MB                         | 2001-08-17            |
| 1          | V Ennioai.mp3 Music/Ennio Morricone/   | 4.1 MB                         | 2001-08-17            |
| Custom     | V Enniong.mp3 Music/Ennio Morricone/   | 4.0 MB                         | 2001-08-17            |
| custom     | Ennione.mp3 Music/Ennio Morricone/     | 2.4 MB                         | File search button    |
|            | Music/Ennio Morricone/                 | 2.3 MB                         | 2                     |
|            | O Details O Tree                       |                                | $\langle \mathcal{O}$ |
|            | Recover 308 files to file type folders | Haven't fo                     | Deen scan             |
|            | 17.0 GB 💿 to folder structure          | your f                         | iles?                 |

**Global filtering tools** 

• Only deleted files are shown by default. Click this button to see all files.

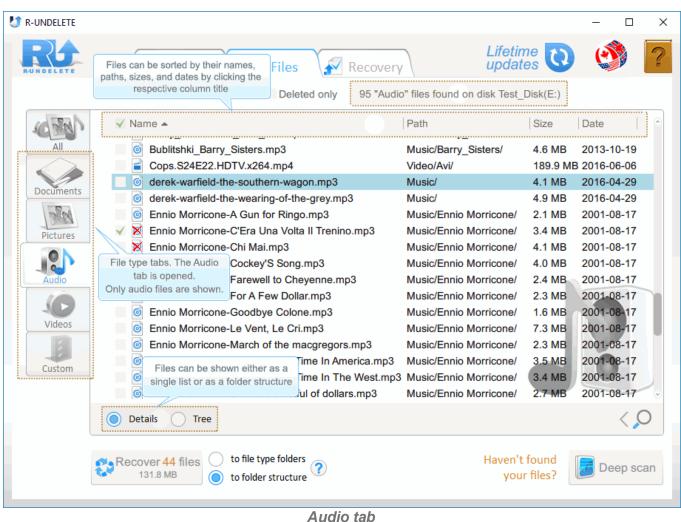


• Files can be also rearranged to see files within a specified time period.



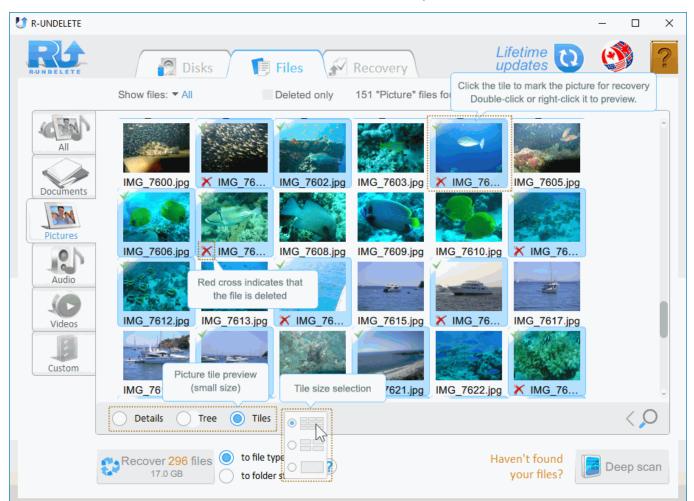
#### Files sorting by specific file types

For users convenience, files are already presorted by most common file types and placed to the corresponding tabs.



Within the tabs files can be shown in a single file list with details or as a folder tree structure, and as tiles (for the Pictures tab only). Then files can be rearranged by their names, paths, sizes, and dates.

When the Pictures tab is selected, R-Undelete can show picture files as tiles.

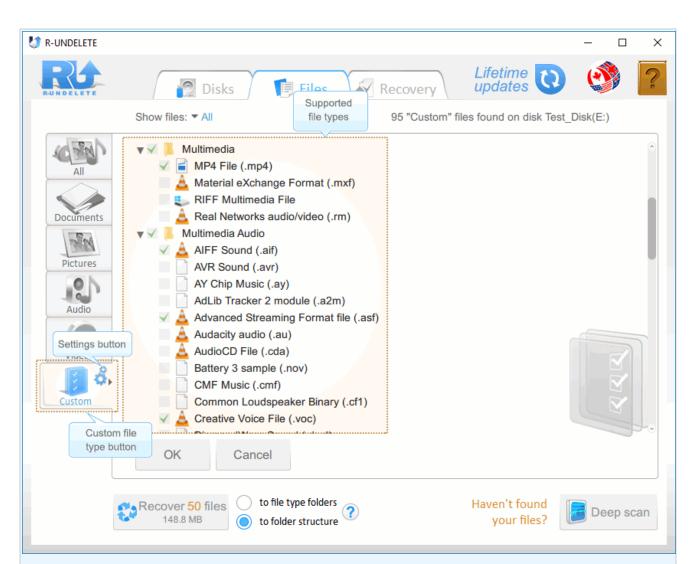


Pictures tab - Tiles view

The extra tab "Custom" allows the user to setup this tab to show specified file types only.

#### Custom tab setup

1. Click the Custom file type tab and then click the Setting buttons.



2. Select the required file types and click the OK button.

Only the selected file types will be shown.

| R-UNDELETE   | Types Disks  | Files   | Recovery   | Lifetime<br>updates          |         | ×  |
|--|--|---|--|------------------------------|---------|----|
| All<br>Documents<br>Documents<br>Pictures<br>Audio<br>Videos | <ul> <li>derek-warfield-the-w</li> <li>Ennio Morricone-A (</li> <li>Ennio Morricone-C'E</li> <li>Ennio Morricone-Co</li> <li>Ennio Morricone-Co</li> <li>Ennio Morricone-Fai</li> <li>Ennio Morricone-Foi</li> <li>Ennio Morricone-Go</li> <li>Ennio Morricone-Le</li> <li>Ennio Morricone-Le</li> <li>Ennio Morricone-On</li> <li>Ennio Morricone-On</li> <li>Ennio Morricone-Ov</li> <li>Hava_Nagila-Barry_</li> </ul> | Era Una Volta II Trenino<br>i Mai.mp3<br>ckey'S Song.mp3<br>rewell to Cheyenne.mp<br>r A Few Dollar.mp3<br>rodbye Colone.mp3<br>Vent, Le Cri.mp3<br>arch of the macgregors<br>arce Upon A Time In Am-<br>ice Upon A Time In The<br>reture a fistful of dollar | 3<br>p.mp3<br>3<br>amp3<br>perica.mp3<br>p West.mp3<br>s.mp3 | es found on disk Te          |         |    |
| 1  |  | file type folders <b>?</b><br>folder structure  |  | Haven't found<br>your files? | Deep so | an |

Individual files can be searched for 14 by clicking the Search button.

#### 3.2 File Search

To search for individual file(s) use the Search button, specify the file name or file mask, 4 and click the Start button.

|           |                    |                      |         |                            | Lifetime 🔃                           |         | 1  |
|-----------|--------------------|----------------------|---------|----------------------------|--------------------------------------|---------|----|
| UNDELETE  | Show files:  All   | Files                | Recove  | ery \<br>s found on disk 1 |                                      |         |    |
|           | Show hies. • All   |                      |         |                            | Iest_Disk(E.)                        |         |    |
|           | Vame 🔺             | Path                 | Size    | Date                       |                                      |         |    |
| All       | V 🌺 DSCN0116.png   | Photos/PNG/          | 5.9 MB  | 2016-08-09                 |                                      |         |    |
|           | V 🐝 DSCN0117.png   | Photos/PNG/          | 5.7 MB  | 2016-08-09                 |                                      |         |    |
|           | V 🌺 DSCN0121.png   | Photos/PNG/          | 9.7 MB  | 2016-08-09                 |                                      |         |    |
| Documents | V 🌺 DSCN0124.png   | Photos/PNG/          | 1.9 MB  | 2016-08-09                 |                                      |         |    |
| 10 200    | V 🐝 DSCN0125.png   | Photos/PNG/          | 5.2 MB  | 2016-08-09                 |                                      |         |    |
| Pictures  | V 🔆 DSCN0129.png   | Photos/PNG/          | 4.8 MB  | 2016-08-09                 |                                      |         |    |
| Fictures  | 🛛 🌺 DSCN0131.png   | Photos/PNG/          | 5.7 MB  | 2016-08-09                 |                                      |         |    |
|           | 🛛 🌺 DSCN0132.png   | Photos/PNG/          | 2.3 MB  | 2016-08-09                 |                                      |         |    |
| Audio     | 🛛 🌺 DSCN0133.png   | Photos/PNG/          | 8.8 MB  | 2016-08-09                 |                                      |         |    |
|           | 🛛 🌺 DSCN0135.png   | Photos/PNG/          | 5.3 MB  | 2016-08-09                 |                                      |         |    |
|           | 🛛 🌺 DSCN0136.png   | Photos/PNG/          | 6.2 MB  | 2016-08-09                 | -                                    |         |    |
| Videos    | 🛛 🏪 DSCN0138.png   | Photos/PNG/          | 3.1 MB  | 2016-08-09                 | 10 40                                | 2 and 1 |    |
| 5         | 🛛   🏙 IMG_0301.png | Photos/PNG/          | 13.7 MB | 2016-08-09                 |                                      | 100     |    |
| Custom    | 🛛 🏪 P1000075.png   | Photos/PNG/          | 11.1 MB | 2016                       | as analy hy them and                 | 1 and a | ۳  |
| Custom    | 🛛 🏪 P1000076.png   | Photos/PNG/          | 8.8 MB  | 2016                       | search button and ask to search for. |         |    |
|           | 🛛 🏪 P1000077.png   | Photos/PNG/          | 10.7 MB | 2016                       |                                      |         |    |
|           | Details Tree       |                      |         |                            | O > ∗.png                            | Start   |    |
|           | Recover 308 files  | to file type folders |         |                            | Haven't found                        |         |    |
| -         | 17.0 GB            | to folder structure  | ?)      |                            | your files?                          | Deep sc | an |

Search for files

Only the matched files will be shown.

File search is done on the files on the current tab. Select the All tab to search among all files.

File mask wildcards:

\* : matches all characters,

? : matches one character.

File mask examples:

\*.png matches all files with the png extension.

myfile??.doc matches files with any two last characters, like myfile01.doc or myfilena.doc.

#### 3.3 File Viewer

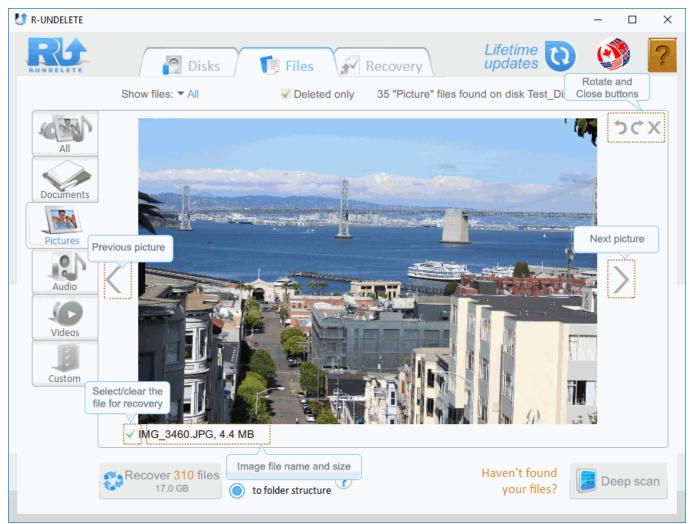
The built-in file viewer allows the user to view both existing and deleted files to estimate chances for successful file recovery or to find a necessary file to recover. All common file types are supported: documents, pictures, audio and video files 20.

To view a file, double-click or right-click the file.

Depending on its type, R-Undelete will show or play file's content differently.

#### File viewer for pictures

Pictures are shown within the main program's window.

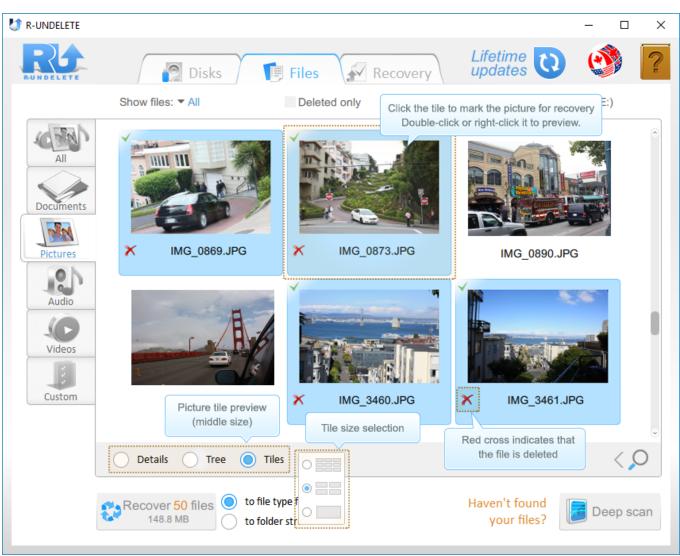


File view - Pictures

The picture can be rotated, if necessary. Use the arrows on the upper right corner. The picture can also be zoomed in/out by resizing the program's window.

Right-click the file to return to the previous view on the tab.

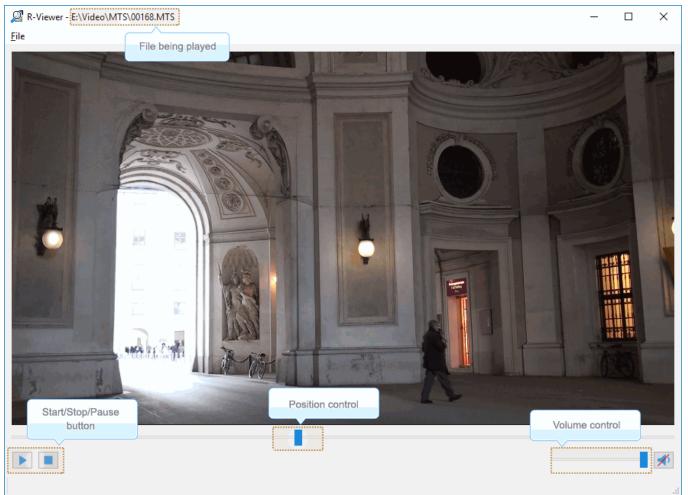
R-Undelete can also show picture files as tiles.



File viewer - Picture tiles

File viewer for Video, and Audio files

R-Undelete plays video and audio files in a separate viewer window. They can be shown (including embedded pictures) even without their respective applications installed.



File viewer - video/audio files

File viewer for Microsoft Ppen Pibre Office Documents

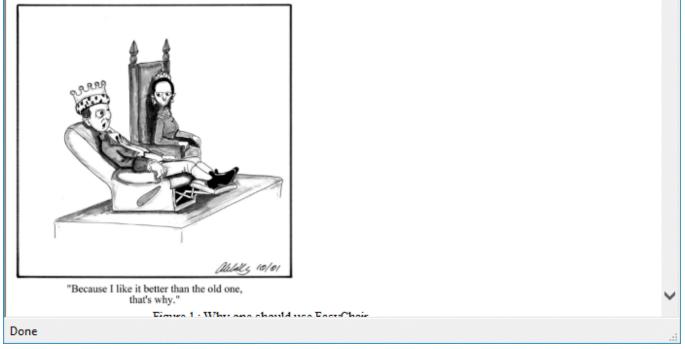
R-Undelete shows those documents in a separate viewer window. They can be shown (including embedded pictures) even without their respective applications installed.

Documents can be zoomed in/out for better viewing.

| P-Viewer - E:\Documents\eas   | ychair.docx  | _   |                         | ×         |
|---|--|---|-------------------------|-----------|
| <u>F</u> ile <u>E</u> dit   |  |   |                         |           |
| QQ  | File being viewed  |   |                         |           |
| File       Edit       File being viewed         The text       Zoom in/out button       update command. The style used for citations in this template is APA. You are free to use any oth         This is an example of the use of citations and references:       Not much is written yet about EasyChair. Apart from the Wikipedia article that comes and goes and contains a sketchy and questionable material (Wikipedia), there is an abstract of a keynote talk on EasyChair presented at the 2014 Automated Software Engineering Conference (Voronkov, Keynote talk: EasyChair, 2014) and a guide for writing documents for EasyChair authors (Voronkov & Hoder, Templates)         The references themselves are placed at the end of this document.         Adding Figures and Tables         In Microsoft Word, pictures can be inserted into the document by going to Insert->Picture->From File on the menu and selecting the desired file. To simplify working with the image, it is recommended that you insert the picture into a text box. In order to make it into a figure and add a caption, select the image by clicking on it and then go to Insert->Caption |  |   |                         |           |
|   | update command. The style used for citations in this templa  | te is APA. You ar                           | e free to ι             | ase       |
| anyour  | of citations and references:   |   |                         |           |
| ······································  |  |   |                         |           |
| sketchy and questionable m<br>2014 Automated Software<br>writing documents for Easy(  | aterial (Wikipedia), there is an abstract of a keynote talk o<br>Engineering Conference (Voronkov, Keynote talk: EasyCl<br>Chair authors (Voronkov & Hoder, Templates) | on EasyChair pres                           | ented at i              | the       |
| Adding Figures  | and Tables   |   |                         |           |
| and selecting the desired file. To<br>box. In order to make it into a fig   | o simplify working with the image, it is recommended that yo   | ou insert the pictur<br>I then go to Insert | e into a t<br>->Captior | text<br>n |

(or Insert->Reference->Caption... in earlier versions of Microsoft Word). From here, you can select the position of the caption (this should be set to below the image) and edit the text within it. Make sure that "Figure" is selected in the "Label" drop-down list and click "OK" to generate it. Captions are numbered automatically in sequential order. Figure 1 is an example of a captioned image.

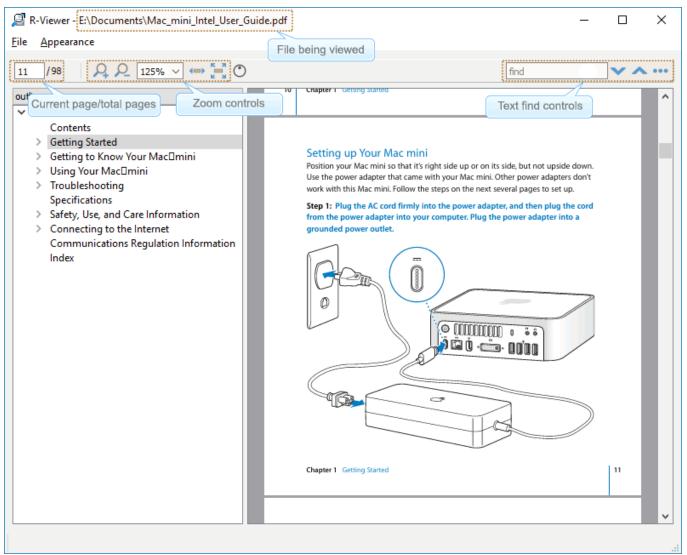
If you have a table in your document, captions can be created in the same way, just select "Table" from the "Label" drop-down list instead. Table 1 shows an example of a table of data that was conveniently available.



#### File viewer for Adobe Acrobat pdf files

R-Undelete shows those documents in a separate viewer window even without Adobe Acrobat installed.

The viewer allows the users to jump to a required page, zoom the document, and search for a required text.



File viewer - Adobe Acrobat pdf documents

The documents can be shown in different layouts and rotated. Click the View menu and select the required options.

Supported file types:

#### Documents

MS Office and Open//Libre Office files, even without the programs installed:

- Word??Writer documents: docx
- Excel?Calc spreadsheets: xlsx
- PowerPoint presentation: pptx

Office 97-2003, without the program installed

- Word documents: doc
- Excel spreadsheets xls
- PowerPoint presentation ppt

Adobe Acrobat document: pdf

#### V Multimedia Files

Video formats: AIFF, ASF, AVI, BFI, CAF, FLV, GIF, GXF, HLS, QuickTime, 3GP, MP4, Matroska, Maxis XA, MPEG-DASH, MPEG program stream, MPEG transport stream (including AVCHD), MXF, Material eXchange Format, SMPTE, MSN Webcam stream, NUT, Ogg, OMA, RL2, TXD, WTV.

Audio formats: 8SVX, AAC, AAC+, AC-3, ADPCM, AMR-NB, AMR-WB, Amazing Studio PAF Audio, Apple lossless audio, QuickTime, ATRAC, CELT, DCA (DTS Coherent Acoustics), DPCM, DSD (Direct Stream Digitial), DSP Group TrueSpeech, DST (Direct Stream Transfer), DV audio, FLAC (Free Lossless Audio Codec), G.723.1, G.729, GSM, IAC (Indeo Audio Coder), iLBC (Internet Low Bitrate Codec), IMC (Intel Music Coder), Interplay ACM, MACE (Macintosh Audio Compression/?Expansion), MACE (Macintosh Audio Compression/?Expansion), MLP (Meridian Lossless Packing), Monkey's Audio, MP1 (MPEG audio layer 1), MP2 (MPEG audio layer 2), MP3 (MPEG audio layer 3), MPEG-4 Audio Lossless Coding (ALS), Musepack SV7?SV8, Nellymoser Asao, AVC (Audio for Video Codec), PCM A-law?mu-law, QCEL/?PureVoice, QDesign Music Codec, RealAudio, Vorbis, Voxware MetaSound, WavPack, Westwood Audio, Windows Media Audio, Xbox Media Audio

#### ✓ Graphic files

3DS Max thumbnail (max), AAA logo (bpr), ACE texture (ace), ADEX (img, rle), AIM Grey Scale (ima, im), AIPD image (aipd), ARF (arf), AT&T Group 4 (att), AT&T multigen (icn), AVHRR Image (sst), AVT RAW (raw), AWD (awd), Ability Photopaint Image (apx), Access (g4, acc), Aces200 (ace), Acorn Sprite (acorn), AdTech perfectfax (adt), Adobe Illustrator (ai), Adobe PhotoParade(images) (php), Adobe Photoshop (psd), Advanced Art Studio (ocp, art, pic), AirNav (anv), Album bébé (frm), Alias Image File (pix, als, alias), Alpha Microsystems BMP (bmp), Amapi (2d), Amica Paint (ami, [b]), Amiga IFF (iff, blk), Amiga icon (info), Amstrad Cpc Screen (cpc), Analyze (avw), Analyze-7 (img), Andrew Toolkit raster object (atk), Apollo HDRU (hdru, hdr, gn), ArcInfo Binary (hdr), Art Director (art), Artisan (art), Artist 64 (a64), Artrage (ptg), Artweaver Document (awd), Astronomical Research Network (arn), Atari grafik (pcp), Aurora (sim), Auto F/X (afx), AutoCAD DWG (dwg, dwt), AutoCAD DXF (dxf), Autocad CAD-Camera (img), Autodesk Animator (fli, flc), Autodesk QuickCAD thumbnail (cad), Autodesk SKETCH thumbnail (skf), Autodesk SketchUp component (skp, skb), Autologic (gm, gm2,

gm4), Award Bios Logo (epa), Axialis Screensaver(images) (ssp), B3D(images) (b3d), BFLI (bfl, bfli, fli, flp, afl), BIAS FringeProcessor (msk, img, raw, flt), BLP textures (blp), BMF (bmf), BSB/KAP (kap), BYU SIR (sir), Bert's Coloring (bmg, ibg), Bfx Bitware (bfx), Bio-Rad confocal (pic), Blazing Paddles (pi), Bob Raytracer (bob), Brender (pix), Brooktrout 301 (brk, 301, brt), Brother Fax (uni), Buttonz & Tilez texture (til), CALS Raster (cal, cals, gp4, mil), CDU Paint (cdu), CGM (cgm), CImage (dsi), CMU Window Manager (cmu), CP8 256 Gray Scale (cp8), CSV (csv), Calamus (cpi, crg), Camera RAW (raw), Canon EOS-1D Mark II RAW (cr2), Canon Navigator Fax (can), Canon PowerShot (crw), Cartes Michelin (big), Casio QV-10/100 Camera (cam), Casio RAW (bay, raw), Chinon ES-1000 digital camera (cmt), Cisco IP Phone (cip), Cloe Ray-Tracer (clo, cloe), ColoRIX (rix, sci, scx, sc?), CompW (wlm), CompuServe GIF (gif, giff), Computer Eyes, Digital Vision (ce), ComputerEyes Raw (ce1, ce2), Contax RAW (bay, raw), Core IDC (idc), Corel Draw Bitmap(preview) (cdr), Corel Draw Pattern(preview) (pat), Corel Flow(preview) (bmf), Corel Metafile Exchange(preview) (cmx), Corel PhotoPaint 6.0 (cpt), CoverDesigner(images) (ncd), CoverDesigner Template(images) (nct), Crayola (art), Creative PC-CAM RAW (bay, raw), DBW Render (), DIV Game Studio Map (map), DIV Game Studio Multi Map (fpg), DKB Ray-Tracer (dis), DNG (dng), DPX (dpx), Dali Raw (sd0, sd1, sd2), Datacopy (img), Degas & Degas Elite (pi1, pc1, pi2, pc2, pi3, pc3, pi4, pi5, pi6), Deluxe Paint, Electronic Arts (lbm, ilbm), Dicom (dcm, acr, dic, dicom, dc3), Digital F/X (tdim), Digital Research(GEM Paint) (img, gem), Direct Draw Surface (dds), Discorp CMP Image (cmp), DjVu (djvu, djv, iw4), DolphinEd (dol), Doodle Atari (doo), Doodle C64 (dd), Doodle C64 (Compressed) (jj), Dr Halo (cut), Draz Paint (drz), EA Sports FSH (fsh), EPS Interchange Format (epi, ept), ERIchan (Entis Rasterized Image) (eri), ESM Software Pix (pix), Ecchi (ecc), Eclipse (tile), Edmics (c4), Egg Paint (trp), Electric Image (ei, eidi), Embroidery (bmc), Encapsulated Postscript (ps, eps), Encapsulated Postscript (Preview) (eps), Enhance Simplex (esm), Enhanced Compressed Wavelet (ecw), Epson RAW (erf), Eroiica (eif), Everex Everfax (efx, ef3), Explore(TDI) & Maya (iff, tdi), FIF(Iterated System) (fif), FIT (fit), Face Painter (fpt), Fast Piecewiseconstant (pwc), Fax Group 3 (g3, fax), Fax man (fmf), Faxable PCX (fcx), Faxable TIFF (ftf), Fenix Map (map), Fenix Multi Map (fpg), FileMagic (mag), Flash Image (fi), FlashCam Frame (ncy), FlashPix Format (fpx), Flexible Image Transport System (fts, fits, fit), Foculus RAW (bay, raw), Fontasy Grafik (bsg), Fremont Fax96 (f96), Fugawi Map (fx3), Fuji S2 RAW (raf), Fun Painter II (fp2, fun), Fun Photor (fpr), Fuzzy bitmap (fbm, cbm), GRS16 (g16), Gamma Fax (gmf), GeoPaint (geo), Gfa Raytrace (sul), GigaPaint Hi-res (gih), GigaPaint Multi (gig), Gimp Bitmap (xcf), Gimp Brush (gbr), Gimp Icon (ico), Gimp Pattern (pat), GoDot (4bt, 4bit, clp), GunPaint (gun, ifl), HD Photo (wdp, hdp), HDRI (hdr, hdri), HF (hf), HP-48/49 GROB (gro, grb), HP-49 OpenFire (gro2, gro4), HPGL-2 (hp, hpg, hgl, plt, hpgl, hpgl2, gl2, prn, prt, spl), HRU (hru), HSI Raw (raw), Half-Life Model (mdl), Hasselblad RAW (3fr), Hayes JTFax (jtf), Hemera Photo Image (hpi), Hemera Thumbs (hta), Heretic II MipMap (m8), Hi-Eddi (hed), Hires C64 (hir, hbm), Homeworld Texture (lif), IBM Kips (kps), IBM Printer Page Segment (pse), IM5(Visilog) (im5), IMNET Image (imt), IOCA (ica, ioca, mod), IPLab (ipl), IPod thumb (ithmb), ISS (iss), IcoFX (ifx), Icon Library (icl), Imacon/Hasselblad RAW (fff), Image Capture Board (icb), Image Magick file (mif, miff), Image Speeder (ish), Image System(Hires) (ish), Image System(Multicolor) (ism), Image Systems RLC2 Graphic (rlc), ImageLab (b&w, b w), ImagePro Sequence (seq), Imaging Fax (g3n), Imaging Technology (img), Img Software Set (img), Inshape (iim), InterPaint(Hires) (iph), InterPaint(Multicolor) (ipt), Intergraph Format (itg,

cit, rle), Interleaf (iimg), Iris CT (ct), Iris Graphics (iris), J Wavelet Image Codec (wic), JBIG (jbg, bie, jbig), JBIG-2 (jb2), JFIF based file (jb2), JPEG /JFIF (jpg, jpeg, jif, jfif, J, jpe), JPEG 8BIM header(Mac) (jpg, jpeg, jif, jfif, J, jpe), JPEG XR (jxr), JPEG-2000 Code Stream (jpc), JPEG-2000 JP2 File Format (jp2, j2k, jpx, jpf), JPEG-LS (jls), Jeff's Image Format (jif), Jigsaw (jig), Jovian VI (vi), Jpeg Network Graphics (jng), JustButtons animated bitmap (btn), KONTRON (img), Khoros Visualization Image file (vif, viff, xv), KinuPix Skin (thb), Kiss Cel (cel), Koala Paint (koa, kla), Koala Paint (Compressed) (gg), Kodak Cineon (cin), Kodak DC120 Digital Camera (kdc), Kodak DC25 Camera (k25), Kodak Photo CD (pcd), Kodak Pro Digital RAW (dcr), Kofax Group 4 (kfx), Kolor Raw Format (kro), Konica Camera File (kqp), LSS16 (lss, 16), LView Pro (lvp), LaserData (lda), Leaf RAW (mos), Leica RAW (bay, raw), Light Work Image (lwi), LucasFilm Format (lff), Lumena CEL (cel), LuraDocument Format (ldf), LuraDocument.jpm Format (jpm), LuraWave Format (lwf), LuraWave JPEG-2000 Code Stream (jpc), LuraWave JPEG-2000 Format (jp2, j2k, jpx, jpf), MAKIchan Graphics (mag), MGI Photosuite Project (images) (pzp), MGR bitmap (mgr), MRC (Medical Research Council) (mrc), MTV Ray-Tracer (mtv), Mac Paint (mac, mpnt, macp, pntg, pnt, paint), Mac icon (icns), Macintosh Quickdraw/Pict (pic, pict, pict2, pct), Mac OSX Resource (rsc, rsrc), Maggi Hairstyles & Cosmetics (fff), Male MRI (pd, t1, t2), Male Normal CT (fre), Mamiya RAW (mef), Marks Russel File (mrf), Mavica (411), Maw-Ware Textures (mtx), Mayura Draw (pdx), MegaPaint (bld), Megalux Frame (frm), Micro Dynamics MARS (pbt), Micro Illustrator Uncompressed (mil), Micrografx Picture Publisher 4.0 (pp4), Micrografx Picture Publisher 5.0 (pp5), Micron RAW (bay, raw), Microsoft Image Composer (mic), Microsoft Paint (msp), Microtek Eyestar (img), Mindjongg Format (ipg), Minolta DiMAGE RAW (mrw), Mobile FAX (rfa), MonkeyCard (pdb), MonkeyLogo (pdb), MonkeyPhoto (mph), MrSid (sid), Msx 2 Screen (sc2), Multiple Network Graphics (mng), NCR Image (ncr), NIST ihdr (pct), National Imagery Transmission F. (ntf, nitf), NeoBook Cartoon (car), Neochrome(ST & TT) (neo), Neopaint Mask (npm), Neopaint Stamp (stw), NewsRoom (nsr, ph, bn), Nifti (img), Nikon RAW (nef), Nokia Group Graphics (ngg), Nokia Logo File (nlm), Nokia OTA bitmap (otb), Nokia Operator Logo (nol), OAZ Fax (oaz, xfx), OS/2 Bitmap (bmp, bga), Olicom Fax (ofx), Olympus RAW (orf), Open Image Library Format (oil), OpenEXR (exr), Optigraphics (ctf), Optigraphics Tiled (ttf), Optocat (abs), Oric Hires (hir), Oric TAP (tap), Os/2 Warp (bga), PABX background (pix), PAX (pax), PC Paint/Pictor Page (pic, clp), PCO (b16), PM (pm), Page Control Language (pcl), Paint Magic (pmg), PaintShopPro Browser Cache File (jbf), PaintShopPro Brush (pspbrush), PaintShopPro Brush (jbr), PaintShopPro Frame (pfr, pspframe), PaintShopPro Image (psp, pspimage), PaintShopPro Mask (pspmask), PaintShopPro Mask (msk), PaintShopPro Pattern (pat), PaintShopPro Picture Tube (tub, psptube), PaintShopPro Texture (tex), Palm Pilot (pdb), Panasonic DMC-LC1 RAW (srf), Panasonic LX3 RAW (rw2), Panasonic RAW (bay, raw), Pegs (pxs, pxa), Pentax \*ist D (pef), Pfs Art Publisher (art), Photo Deluxe (pdd, pdb), Photo Filtre Studio (pfi), PhotoFantasy Image (fsy), PhotoFrame (frm), PhotoStudio File (psf), PhotoStudio Stamp (stm), Photomatrix (cat), Pic2 (p2), Picasso 64 (p64), Picture Gear Pocket (prc), Picture It! (mix), Pixar picture file (pic, pxr, picio, pixar), Pixel Power Collage (ib7, i17, i18, if9), Pixia (pxa), Pixibox (pxb), Planetary Data System (pds, img), Playback Bitmap Sequence (bms), Pocket PC Bitmap (2bp), Pocket PC Themes(images) (tsk), Polychrome Recursive Format (prf), Portable Bitmap (pbm, rpbm, ppma), Portable Document Format (pdf), Portable Greyscale (pgm, rpgm), Portable Image (pnm, rpnm, pbm, rpbm, pgm, rpgm, ppm, rppm), Portable Network Graphics (png, apng), Portable Pixmap (ppm, rppm), Portfolio

Graphics (pgf), Portfolio Graphics Compressed (pgc), Portrait (cvp), Poser Bump (bum), Postscript (ps, ps1, ps2, ps3, eps, prn), PowerCard maker (crd), PowerPoint(images) (pps), PowerPoint Presentation(images) (ppt), Print Master (pm), Print Shop (psa, psb), Printfox/Pagefox (bs, pg, gb), Prism (cpa), Prisms (pri), Psion Series 3 Bitmap (pic), Psion Series 5 Bitmap (mbm), Punk Productions Picture (ppp), Puzzle (pzl), Q0 (q0, rgb), Qdv(Random Dot Software) (qdv), Qrt Ray-Tracer (qrt), Quake Texture (wal), Quantel VPB (vpb), QuickTime Image Format (qtif, qti), RAW DVR (raw), RIPTerm Image (icn), Radiance (rad, img, pic), Rainbow Painter (rp), Raw (raw, gry, grey), Rawzor (rwz), Rayshade (pic), Red Storm File Format (rsb), Ricoh Digital Camera (j6i), Ricoh Fax (001, ric), Ricoh IS30 (pig), Rm2K XYZ (xyz), Rollei RAW (rdc, ia), RoverShot RAW (bay, raw), RunPaint(Multicolor) (rpm), Saracen Paint (sar), SBIG CCD camera ST-4 (st4), SBIG CCD camera ST-X (stx, st4, st5, st6, st7, st8), SciFax (sci), SciTex Continuous Tone (sct, ct, ch), Seattle Film Works (sfw), Seattle Film Works multi-image (pwp, sfw), SecretPhotos puzzle (xp0), Sega SJ-1 DIGIO (sj1), Sharp GPB (img), Siemens Mobile (bmx), SIF MICHEL-Soft (sif), Sigma RAW (x3f), Silicon Graphics RGB (rgb, rgba, bw, iris, sgi, int, inta), Sinar RAW (cs1, sti), Skantek (skn), Slow Scan Television (hrz), SmartDraw 6 template (sdt), SmartFax (1), SmoothMove Pan Viewer (pan), Softimage (pic, si), Solitaire Image Recorder (sir), Sony DSC-F1 Cyber-shot (pmp), Sony DSC-F828 RAW (srf), Sony PS2 TIM (tm2), Sony Playstation TIM (tim), Sony RAW (sr2, arw), Spectrum 512 (spu), Spectrum 512(Compressed) (spc), Spectrum 512(Smooshed) (sps), SPOT (dat), SriSun (ssi), Stad (pic, pac, seq), Star Office Gallery (sdg), Starbase (img), Stardent AVS X (x, avs, mbfs, mbfavs), Starlight Xpress SX (RAW), Stereo Image (jps), ST Micro RAW (bay, raw), Structured Fax Format (sff), Sun Icon/Cursor (icon, cursor, ico, pr), Sun Rasterfile (ras, rast, sun, sr, scr, rs), Sun TAAC file (iff, vff, suniff, taac), Syberia texture (syj), Synthetic Universe (syn, synu), SVG (svg), TG4 (tg4), TI Bitmap (92i, 73i, 82i, 83i, 85i, 86i, 89i), TIFF Revision 6 (tif, tim, tiff), TMSat image (imi), TRS 80 (hr), TealPaint (pdb), Teli Fax (mh), Thumbnail (tnl), TilePic (tjp), Tiny (tny, tn1, tn2, tn3), TopDesign Thumbnail (b3d, b2d), Total Annihilation (gaf), Truevision Targa (tga, targa, pix, bpx, ivb), Ulead Pattern (pst), Ulead PhotoImpact (upi), Ulead Texture(images) (pe4), Usenix FaceServer (fac, face), Utah raster image (rle, urt), VIPS Image (v), VITec (vit), VRML2 (wrl), Venta Fax (vfx), Verity (vif), Vicar (vic, vicar, img), Vidcom 64 (vid), Video Display Adapter (vda), Vista (vst), Vivid Ray-Tracer (img), Vort (pix), Vue d'esprit (vob), WAD(Half life) (wad), WSQ (wsq), WaveL (iwc), Wavefront Raster file (rla, rlb, rpf), WebShots(images) (wb1, wbc, wbp, wbz), Weekly Puzzle (jig), WebP (webp, wep), Whypic (ypc), WinFAX (fxs, fxo, wfx, fxr, fxd, fxm), WinMIPS (pic), Windows & Aldus Metafile (wmf), Windows Animated Cursor (ani), Windows Bitmap (bmp, rle, vga, rl4, rl8, sys), Windows Clipboard (clp), Windows Comp. Enhanced Metafile (emz), Windows Compressed Metafile (wmz), Windows Cursor (cur), Windows DIB (dib), Windows Enhanced Metafile (emf), Windows Icon (ico), Winzle Puzzle (wzl), Wireless Bitmap(level 0) (wbmp, wbm, wap), Word Perfect Graphics(images) (wpg), Worldport Fax (wfx), X Windows System dump (xwd, x11), X11 Bitmap (xbm, bm), X11 Pixmap (xpm, pm), XV Visual Schnauzer (p7), Xara(images) (xar), Xerox DIFF (xif), Ximage (xim), Xionics SMP (smp), YUV 16Bits (yuv, qtl, uyvy), YUV 16Bits Interleaved (yuv, qtl, uyvy), YUV 4:1:1 (yuv, qtl), YUV 4:2:2 (yuv, qtl), YUV 4:4:4 (yuv, gtl), ZX Spectrum Hobetta (\$s, \$c, !s), ZX Spectrum Snapshot(sna), ZX Spectrum standard (screen scr), ZZ Rough (rgh), Zeiss BIVAS (dta), Zeiss LSM (lsm), Zoner Callisto Metafile(zmf), Zoner Zebra Metafile (zbr), Zsoft Multi-

page Paintbrush (dcx), Zsoft Publisher's Paintbrush (pcx, pcc, dcx), byLight
(bif)

#### 3.4 Life Time Update

Life Time Update guarantees that R-Undelete will always stay up-to-date with all new features and bugfixes. For the paid R-Undelete version, Life Time Update is an everlasting investment for file undelete protection.

R-Undelete shows the update status automatically on the Lifetime updates button.



When updates become available, R-Undelete will notify that an update is available.



Click the button, and R-Undelete will start downloading the update files. You may stop that by clicking the Stop Download button.



The update will then be installed. R-Undelete may request you to restart the program to complete the update.



Once the update is over, the Lifetime updates button will return to its initial appearance until the next updates become available.

#### 3.5 Interface Languages

You may change the interface language of R-Undelete. Click the Language button and select the required one.



Languages supported: English, French, Spanish, German, Russian, Portuguese, Traditional and Simplified Chinese, and Japanese.

### IV Advanced Options

#### 4.1 Deep Scan

Deep Scan should be used when lost files have not been found during Quick Scan. During this procedure, R-Undelete deeply analyzes all data on the disk including parsing information about files and searching for files using their file signatures 44.

While Deep Scan starts, additionally found files are added to the corresponding tabs automatically. All file search settings and marking will be cleared.

Deep Scan is also greatly improves estimations for chances of successful file recovery [43].

To start Deep Scan click the Deep Scan button on the Files tab.

Deep Scan progress appears at bottom of the the R-Undelete window.



Deep Scan in Progress

Depending on your hardware, scan time may vary, even within the same scan process, and may be quite lengthy for large disks. Deep scan may be paused then resumed it by clicking the Resume scan button.





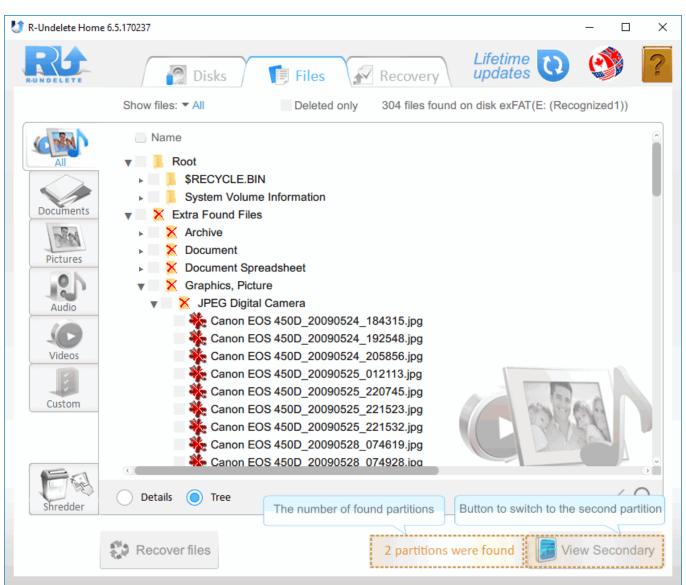


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R-Undelete stores the scan information for a scanned storage device or its disk(s) and loads it automatically once the storage device is connected again.

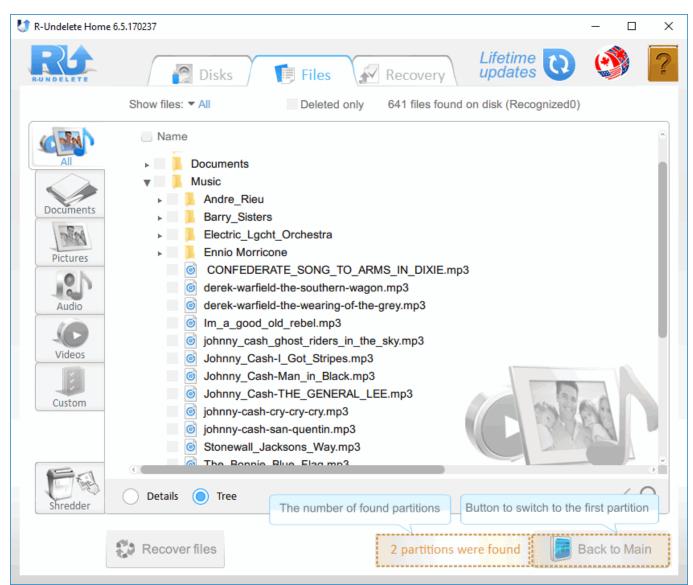
It also warns the user that the scan information is obsolete if it's seven or more days old and deletes it after 30 days.

If R-Undelete finds a previous partition 42 with a different file system, it shows a special message:



Deep Scan - two partitions

You may switch to the second partition and recover files from it:



Deep Scan - second partition

#### 4.2 Disk Images

Images 50 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 or its S.M.A.R.T. state is poor, an image of this hard drive should be immediately created. All data search and recovery can be done from this image.

To create an image,

1. Right-click a disk and select Create Image on the shortcut menu. Highlight the required field.



2. Select a place to store the image file and click the Save button. R-Undelete will start creating the image showing the progress.



To load an image,

\* Click the Open image button and select the file with the image. The image will appear. You may recover files from that image as if it was a real device.



#### 4.3 S.M.A.R.T. Monitoring

The hardware conditions of a drive can be checked by viewing its S.M.A.R.T. 50 data. To see it, right-click the drive and select S.M.A.R.T. on the shortcut menu.

|            |       |                                 |         |       |           |                     |     | - 0                       | × |
|------------|-------|---------------------------------|---------|-------|-----------|---------------------|-----|---------------------------|---|
|            | 0     | Disks 📑 Files                   |         | Reco  | very      | Lifetime<br>updates | 0   | ٢                         | ? |
| 931.5GB    |       | S.M.A.R.T Status: HEALT         | ТНҮ     |       |           |                     |     |                           |   |
| 2          | Syst  | ID Attribute Name               | Current | Worst | Threshold | Raw Values          |     |                           |   |
| TOSHIBA    | 91.60 | 01 Read Error Rate              | 100     | 100   | 16        | 000000000000        |     |                           |   |
| 37.3дв     |       | 02 Throughput Performance       | 141     | 141   | 54        | 0000000004A         |     |                           |   |
|            |       | 03 Spin-Up Time                 | 123     | 123   | 24        | 000300B800BB        |     |                           |   |
|            | Test  | 04 Start/Stop Count             | 100     | 100   | 0         | 000000003D4         |     |                           |   |
|            | 37.3G | 05 Reallocated Sectors Count    | 100     | 100   | 5         | 000000000000        |     |                           |   |
|            |       | 07 Seek Error Rate              | 100     | 100   | 67        | 000000000000        |     |                           |   |
| Open Image |       | 08 Seek Time Performance        | 100     | 100   | 20        | 000000000000        |     |                           |   |
|            |       | 09 Power-On Hours               | 100     | 100   | 0         | 00000000494         |     |                           |   |
|            |       | 0A Spin Retry Count             | 100     | 100   | 60        | 00000000000         |     |                           |   |
|            |       | 0C Power Cycle Count            | 100     | 100   | 0         | 000000003CF         |     |                           |   |
|            |       | C0 Power-off Retract Count      | 100     | 100   | 0         | 000000003D4         |     |                           |   |
|            |       | C1 Load/Unload Cycle Count      | 100     | 100   | 0         | 000000003D4         |     |                           |   |
|            |       | C2 Temperature                  | 162     | 162   | 0         | 002D00150025        |     |                           |   |
|            |       | C4 Reallocation Event Count     | 100     | 100   | 0         | 00000000000         |     | 1                         | 0 |
|            |       | C5 Current Pending Sector Count | 100     | 100   | 0         | 000000000000        |     |                           |   |
|            |       | C6 Uncorrectable Sector Count   | 100     | 100   | 0         | 00000000000         | 12- |                           |   |
|            |       | C7 UltraDMA CRC Error Count     | 200     | 200   | 0         | 000000000000        |     | $\mathcal{D}/\mathcal{D}$ |   |
|            |       |                                 |         |       |           | 0                   |     |                           |   |

Disks panel with the S.M.A.R.T. data of a healthy disk

When R-Undelete determines hardware problems with a hard drive, it shows the exclamation mark on the drive icon. Check the S.M.A.R.T. data and decide what to do with the hard drive.

The yellow exclamation mark signals hardware problems:

| R-Undelete Home |              |                                 |         |       |           |                     |     | -   |   | × |
|-----------------|--------------|---------------------------------|---------|-------|-----------|---------------------|-----|-----|---|---|
|                 |              | Disks 📑 Files                   |         | Rec   | overy     | Lifetime<br>updates | 0   | (A) |   | ? |
| 931.5GB         |              |                                 |         | -     |           |                     |     |     |   |   |
|                 |              | S.M.A.R.T Status: CAUTI         | ON      |       |           |                     |     |     |   |   |
|                 | Sys<br>291.6 | ID Attribute Name               | Current | Worst | Threshold | Raw Values          |     |     |   |   |
| 37.3gb          | 201.0        | 01 Read Error Rate              | 100     | 100   | 51        | 00000000008         |     |     |   |   |
|                 |              | 03 Spin-Up Time                 | 78      | 1     | 0         | 00000001040         |     |     |   |   |
|                 |              | 04 Start/Stop Count             | 100     | 100   | 0         | 00000000194         |     |     |   |   |
|                 | Unalloc      | 05 Reallocated Sectors Count    | 253     | 253   | 10        | 000000000000        |     |     |   |   |
| AMSUNG          | 3            | 07 Seek Error Rate              | 253     | 253   | 51        | 000000000000        |     |     |   |   |
| Open Image      | -            | 08 Seek Time Performance        | 253     | 253   | 0         | 000000000000        |     |     |   |   |
|                 |              | 09 Power-On Hours               | 100     | 100   | 0         | 00000023C48         |     |     |   |   |
|                 |              | 0A Spin Retry Count             | 253     | 253   | 49        | 000000000000        |     |     |   |   |
|                 |              | 0C Power Cycle Count            | 100     | 100   | 0         | 00000000111         |     |     |   |   |
|                 |              | C2 Temperature                  | 178     | 133   | 0         | 00000000014         |     |     |   |   |
|                 |              | C3 Hardware ECC recovered       | 100     | 100   | 0         | 00000756FAF2        |     |     |   |   |
|                 |              | C4 Reallocation Event Count     | 98      | 98    | 0         | 00000000006         |     |     |   |   |
|                 |              | C5 Current Pending Sector Count | 253     | 253   | 10        | 000000000000        |     |     |   |   |
|                 |              | C6 Uncorrectable Sector Count   | 98      | 98    | 10        | 00000000006         |     | 2   |   | 0 |
|                 |              | C7 UltraDMA CRC Error Count     | 100     | 100   | 51        | 000000000000        |     | 1   |   |   |
|                 |              | C8 Write Error Rate             | 100     | 100   | 51        | 000000000000        | 18- | 5   | _ |   |
|                 |              | C9 Soft Read Error Rate         | 100     | 100   | 51        | 00000000003         |     | S)  | 1 |   |
|                 | L            |                                 |         |       |           |                     |     | °.  |   |   |
|                 |              |                                 |         |       |           |                     |     |     |   |   |

Disks panel with the S.M.A.R.T. data of a disk with small hardware problems

This sign indicates that some small problems with the disk are possible in the future, caution is required when working with the hard drive, and these parameters should be checked regularly.

Disk imaging<sup>[29]</sup> is recommended. Then files may be recovered later from that image.

The red exclamation mark signals that the hard drive is in critical condition:

| Construction         Disks         Files         Recovery         Lifetime too         Cool         Cool           931.5cs         System(C):<br>291.6GB(NTFS)         System(C):<br>291.6GB(NTFS)         SMA.R.T Status: CRITCAL         Image         Image <td< th=""><th>R-Undelete Home</th><th></th><th></th><th></th><th>_</th><th>- 0</th><th>&gt;</th></td<> | R-Undelete Home       |                                 |              |             | _                   | - 0 | > |
|--|-----------------------|---------------------------------|--------------|-------------|---------------------|-----|---|
| System(C)       System(C)         76.4G8       Carrent Rade       85       72       25       00000DFFC795         03 Spin-Up Time       73       70       0       0000000000         04 Start/Stop Count       100       100       20       0000000000         05 Reallocated Sectors Count       100       100       0       0000000000         07 Seek Error Rate       84       80       30       0000000000         07 Seek Error Rate       100       100       100       0       0000000000         08 Spin-Up Time       100       100       0       00000000000       0         09 Power-On Hours       100       100       0       000000000012         04 Spin Retry Count       100       100       0       000000000012         05 Spin Retry Count       100       100       0       000000000012         04 Ardware ECC recovered       84       77       0       000000000019         05 Hardware ECC recovered       84       77       0       0000000000019         05 Hardware ECC recovered       84       77       0       000000000019         05 Hardware ECC recovered       84       77       0       000000000000 <td>RUNDELETE 🕅 Disk</td> <td>Files 📈 Re</td> <td>covery</td> <td></td> <td>Lifetime<br/>updates</td> <td>3</td> <td>?</td>   | RUNDELETE 🕅 Disk      | Files 📈 Re                      | covery       |             | Lifetime<br>updates | 3   | ? |
| Z91.6GB(NTFS)       D       Attribute Name       Current Worst       Threshold       Raw Values         76.4GB       01       Read Error Rate       85       72       25       000000FFC795         03       Spin-Up Time       73       70       0       00000000000         04       Start/Stop Count       100       100       20       00000000000         04       Start/Stop Count       100       100       36       00000000000         07       Seek Error Rate       84       60       30       000013BCFF72         09       Power-On Hours       100       100       183       00000000012D         0A       Spin Retry Count       100       100       20       00000000012D         0A       Spin Retry Count       100       100       20       00000000012D         0A       Spin Retry Count       100       100       20       000000000012D         0C       Power-Orycle Count       100       100       0       000000000012D         0C       Power Cycle Count       100       100       0       000000000012D         0C       Power Cycle Count       100       100       0       000000000012D   | 931.5св               |                                 | Þ            |             |                     |     |   |
| ID         Attribute Name         Current         Worst         Threshold         Raw Values           76.4GB         01         Read Error Rate         85         72         25         00000DFFC795           03         Spin-Up Time         73         70         0         0000000000           04         Start/Stop Count         100         100         20         0000000000           05         Reallocated Sectors Count         100         100         36         0000000000           07         Seek Error Rate         84         60         30         0000000000           08         Power-On Hours         100         100         100         0000000000           02         Power-On Hours         100         100         100         0000000000           04         Spin Retry Count         100         100         100         0000000000           02         Power-On Hours         100         100         100         0000000000           04         Spin Retry Count         100         100         00000000000         00000000000           02         Power-Or Hours         100         100         000000000000         000000000000           05   |                       | A S.M.A.R.T Status: CRITI       | CAL          |             |                     |     |   |
| 0.4GB       03 Spin-Up Time       73       70       0       00000000000         04 Start/Stop Count       100       100       20       00000000000         05 Reallocated Sectors Count       100       100       36       00000000000         07 Seek Error Rate       84       80       30       000000000012D         09 Power-On Hours       100       100       193       00000000000         0C Power Or Hours       100       100       20       00000000000         0C Power Or Hours       100       100       20       00000000000         0C Power Orgele Count       100       100       20       00000000000         0C Power Orgele Count       100       100       20       00000000000         0C Power Orgele Count       100       100       0       00000000000         0C S Current Pending Sector Count       100       100       0       00000000000         C5 Current Pending Sector Count       100       0       000000000000       000000000000         C6 Uncorrectable Sector Count       100       0       000000000000       000000000000000000000000000000000000   | TOSHIBA 291.6GB(NTFS) | ID Attribute Name               | Current Wors | t Threshold | Raw Values          |     |   |
| 03       Spin-Up Time       73       70       0       0000000000         04       Start/Stop Count       100       100       20       0000000000         05       Reallocated Sectors Count       100       100       36       0000000000         07       Seek Error Rate       84       60       30       0000000000         07       Seek Error Rate       100       100       100       0000000000         08       Spin-Retry Count       100       100       100       00000000000         04       Spin Retry Count       100       100       20       00000000000         06       Power-On Hours       100       100       100       00000000000         06       Power Cycle Count       100       100       20       00000000000         06       Power Cycle Count       100       100       0       00000000000         03       Hardware ECC recovered       84       77       0       00000000000         05       Current Pending Sector Count       100       100       0       00000000000         05       Uncorrectable Sector Count       100       100       000000000000       000000000000         05  | 76.4GB                | 01 Read Error Rate              | 85 72        | 25          | 00000DFFC795        |     |   |
| ST380021A       05 Reallocated Sectors Count       100       36       0000000000         Open Image       07 Seek Error Rate       84       60       30       000013BCFF72         09 Power-On Hours       100       100       0       00000000012D         0A Spin Retry Count       100       100       193       000000000054         0C Power Cycle Count       100       100       20       00000000054         C2 Temperature       25       50       0       00000000000         C3 Hardware ECC recovered       84       77       0       00000000000         C6 Uncorrectable Sector Count       100       100       0       00000000000         C6 Uncorrectable Sector Count       100       0       00000000000       00000000000         C7 UltraDMA CRC Error Count       200       0       00000000000       00000000000         C8 Write Error Rate       100       253       0       00000000000       0  | 6)                    | 03 Spin-Up Time                 | 73 70        | 0           | 000000000000        |     |   |
| Open Image         07 Seek Error Rate         84         60         30         000013BCFF72           09 Power-On Hours         100         100         0         0000000012D           0A Spin Retry Count         100         100         193         00000000000           0C Power Cycle Count         100         100         20         00000000004           C2 Temperature         25         50         0         000000000019           C3 Hardware ECC recovered         84         77         0         0000000000           C6 Uncorrectable Sector Count         100         100         0         00000000000           C6 Uncorrectable Sector Count         100         100         0         00000000000           C7 UltraDMA CRC Error Rate         100         200         0         00000000000  |                       | 04 Start/Stop Count             | 100 100      | 20          | 00000000005         |     |   |
| Open Image         07 Seek Error Rate         84         60         30         000013BCFF72           09 Power-On Hours         100         100         0         0000000012D           OA Spin Retry Count         100         100         193         00000000000           0C Power Cycle Count         100         100         20         00000000054           C2 Temperature         25         50         0         0000000000           C3 Hardware ECC recovered         84         77         0         0000000000           C5 Current Pending Sector Count         100         100         0         00000000000           C6 Uncorrectable Sector Count         100         100         0         00000000000           C7 UltraDMA CRC Error Count         200         0         00000000000         0           C8 Write Error Rate         100         253         0         00000000000         0   | ST380021A             | 05 Reallocated Sectors Count    | 100 100      | 36          | 000000000000        |     |   |
| 09 Power-On Hours       100       100       0       0000000012D         0A Spin Retry Count       100       100       193       00000000000         0C Power Cycle Count       100       100       20       000000000054         C2 Temperature       25       50       0       00000000019         C3 Hardware ECC recovered       84       77       0       0000000000         C5 Current Pending Sector Count       100       100       0       00000000000         C6 Uncorrectable Sector Count       100       100       0       00000000000         C7 UltraDMA CRC Error Count       200       200       0       00000000000         C8 Write Error Rate       100       253       0       00000000000   |                       | 07 Seek Error Rate              | 84 60        | 30          | 000013BCFF72        |     |   |
| 0C Power Cycle Count       100       100       20       00000000054         C2 Temperature       25       50       0       00000000019         C3 Hardware ECC recovered       84       77       0       00000000000         C5 Current Pending Sector Count       100       100       0       00000000000         C6 Uncorrectable Sector Count       100       100       0       00000000000         C7 UltraDMA CRC Error Count       200       200       0       00000000000         C8 Write Error Rate       100       253       0       00000000000   | Open Image            | 09 Power-On Hours               | 100 100      | 0           | 0000000012D         |     |   |
| C2 Temperature       25       50       0       00000000019         C3 Hardware ECC recovered       84       77       0       00000A3A47A0         C5 Current Pending Sector Count       100       100       0       00000000000         C6 Uncorrectable Sector Count       100       100       0       00000000000         C7 UltraDMA CRC Error Count       200       200       0       00000000000         C8 Write Error Rate       100       253       0       00000000000  |                       | 0A Spin Retry Count             | 100 100      | 193         | 000000000000        |     |   |
| C3 Hardware ECC recovered       84       77       0       00000A3A47A0         C5 Current Pending Sector Count       100       100       0       0000000000         C6 Uncorrectable Sector Count       100       100       0       00000000000         C7 UltraDMA CRC Error Count       200       200       0       00000000000         C8 Write Error Rate       100       253       0       00000000000  |                       | 0C Power Cycle Count            | 100 100      | 20          | 00000000054         |     |   |
| C5 Current Pending Sector Count10010000000000000C6 Uncorrectable Sector Count100100000000000000C7 UltraDMA CRC Error Count200200000000000000C8 Write Error Rate100253000000000000  |                       | C2 Temperature                  | 25 50        | 0           | 00000000019         |     |   |
| C6         Uncorrectable Sector Count         100         100         0         00000000000           C7         UltraDMA CRC Error Count         200         200         0         00000000000           C8         Write Error Rate         100         253         0         00000000000  |                       | C3 Hardware ECC recovered       | 84 77        | 0           | 00000A3A47A0        |     |   |
| C7 UltraDMA CRC Error Count         200         200         0         00000000000           C8 Write Error Rate         100         253         0         00000000000  |                       | C5 Current Pending Sector Count | 100 100      | 0           | 000000000000        |     |   |
| C8 Write Error Rate 100 253 0 0000000000   |                       | C6 Uncorrectable Sector Count   | 100 100      | 0           | 000000000000        |     |   |
|  |                       | C7 UltraDMA CRC Error Count     | 200 200      | 0           | 000000000000        | M   | 0 |
| CA Data Address Mark Error 100 253 0 0000000000  |                       | C8 Write Error Rate             | 100 253      | 0           | 000000000000        |     |   |
|  |                       | CA Data Address Mark Error      | 100 253      | 0           | 000000000000        |     |   |
|  |                       |                                 |              |             |                     |     |   |

Disks panel with the S.M.A.R.T. data of a disk with heavy hardware problems

This sign indicates that the hard drive conditions are critical and chances of hardware failure are high. The best recommendation for this case is to stop working with the hard drive and bring it to professional data recovery specialists. Work with the disk is possible, but at your own risk. Disk imaging 29 is very strongly recommended. Then files may be recovered later from that image.

#### 4.4 Shredder

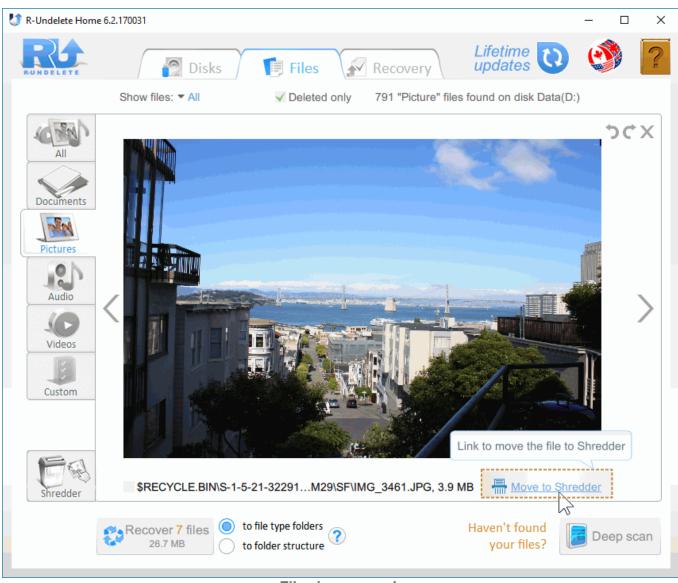
You may shred deleted files to render their content completely unrecoverable. During this procedure, the content of these files will be zeroed out and any attempt to recover them will retrieve files that cannot be opened.

• Select the deleted files you want to shred, right-click them, then select Move to Shredder on the shortcut menu.

| R-Undelete Home | 6.2.170031                 |   |                |                              | - 🗆            |
|-----------------|----------------------------|---|----------------|------------------------------|----------------|
|                 | Disks                      | Files                                       | Recove         | ery Lifetime Updates         | ) 🔮 [          |
|                 | Show files:  All           | ✓ Deleted                                   | only 5439 file | es found on disk Data(D:)    |                |
|                 | Name                       |   | Size           | Date                         |                |
| All             |                            | G_0539.JPG                                  | 4.1 MB         | 2009-05-28                   |                |
|                 |                            | G_0541.JPG                                  | 3.7 MB         | 2009-05-28                   |                |
|                 |                            | G_0542.J                                    | 0.0 MD         | 2009-05-28                   |                |
| Documents       |                            | G 0543.J Previe                             | w              |                              | for recovery   |
| Baller          |                            | G_0545.J Move                               | to Shredder    | 2009-06-zu                   | Tiol recovery  |
| Pictures        |                            | G_0547.JPG                                  | 3.2 MB         | 2009-06-20                   |                |
| Tietares        |                            | G_0550.JPG                                  | 3.9 MB         | 2009-05-28                   |                |
|                 |                            | G 0551.JPG                                  | 3.4 MB         | 2009-05-28                   |                |
| Audio           | IMC                        | G_0869.JPG                                  | 3.5 MB         | 2009-05-30                   |                |
|                 | 🔲 💑 ІМС                    | G_0873.JPG                                  | 5.6 MB         | 2009-05-30                   |                |
|                 | 🔲 🌺 ІМС                    | G_0890.JPG                                  | 5.4 MB         | 2009-05-30                   |                |
| Videos          | 🔲 🌺 ІМС                    | G_1739.JPG                                  | 4.1 MB         | 2009-06-03                   |                |
| 3               | 🔳 🌺 ІМС                    | G_3460.JPG                                  | 4.4 MB         | 2009-06-06                   |                |
| Custom          | 🗸 🐝 IMC                    | G_3461.JPG                                  | 3.9 MB         | 2                            |                |
|                 | 🚽 🌺 ІМС                    | G_3476.JPG                                  | 3.9 MB         | 2 Files selected for movi    | ng to Shredder |
|                 |                            | G_3478.JPG                                  | 4.7 MB         | 2009-06-06                   |                |
|                 |                            | G_3479.JPG                                  | 4.3 MB         | 2009-06-06                   |                |
|                 | 🗸 🌺 IMC                    | G_3480.JPG                                  | 4.3 MB         | 2009-06-06                   |                |
| Shredder        | O Details O Tree           |   |                |                              | < ,0           |
| 1               | Recover 6 files<br>22.7 MB | to file type folders<br>to folder structure | ?              | Haven't found<br>your files? | Deep scan      |
|                 |                            | <b>F</b> *1                                 | panel.         |                              |                |

Use the mouse cursor and arrow/?Shift?Control keys to select the files. Please note that the selected files rather than the marked files will be moved to Shredder.

You may use the link on the File viewer to move the file being viewed to Shredder.



File viewer panel.

• Switch to the Shredder tab, view the files on it, and click the Shred button.

| R-Undelete Home 6.2 | 2.170031   |                            |                       |                |             | —       |                               |
|---------------------|--|----------------------------|-----------------------|----------------|-------------|---------|-------------------------------|
|                     | Disks  | Files                      | Recovery              | Lifeti<br>upda | ime 🕡       | ٢       | ?                             |
|                     | Show files: ▼ All  | 13 "Tra                    | ash" files found on d | isk Data(D:)   |             |         |                               |
| (AND)               | Name - Path  |                            |                       | Size           | Date        |         |                               |
| All                 | ntrianglight with the second s | vered_Files\Gra            | phics, Picture\JPEG   | Image\ 4.1 MB  | 2009-05-28  |         |                               |
|                     | NG_0541.JPG Reco   | vered_Files\Gra            | phics, Picture\JPEG   | Image\ 3.7 MB  | 2009-05-28  |         |                               |
|                     | KING_0542.JPG Reco   | vered_Files\Gra            | phics, Picture\JPEG   | Image\ 3.8 MB  | 2009-05-28  |         |                               |
| Documents           | MG_0543.JPG Reco   | _                          | -                     | -              |             |         |                               |
| 1200                | MG_0545.JPG Reco   | _                          | -                     | -              |             |         |                               |
| Pictures            | MG_0869.JPG Reco   | -                          |                       |                |             |         |                               |
| ON                  | MG_0873.JPG Reco   | -                          |                       | •              |             |         |                               |
|                     | MG_0890.JPG Reco   | -                          |                       | -              |             |         |                               |
| Audio               | IMG_1739.JPG Reco IMG_3460.JPG Reco  | -                          | •                     | -              |             |         |                               |
|                     | IMG_3478.JPG Reco  | _                          |                       | -              |             |         |                               |
| Videos              | MG_3479.JPG Reco   |                            |                       | -              |             |         |                               |
|                     | IMG_3481.JPG Reco  |                            |                       |                |             |         |                               |
| Custom              |  |                            |                       |                |             |         |                               |
| Shredder            | The Shred button s   | howing the num             | ber of files to shred | ]              |             | <       | $\langle \mathcal{O} \rangle$ |
|                     | Shred 13 files Wher anym   | n file is shredde<br>iore. | d its content is de   | leted for good | and can not | be reco | vered                         |
|                     | 57   |                            |                       |                |             |         |                               |

Shredder tab.

You may move the files from the Shredder tab back to their original places. Right-click the files and select Remove from Shredder on the shortcut menu.

R-Undelete shows shredded files with a special icon.

| RO        | Disks            | Files       | Recov        | rery Lifetin<br>upda | me 🔃 🔮 📔  |
|-----------|------------------|-------------|--------------|----------------------|-----------|
|           | Show files:  All | ✓ Deleted   | only 5439 fi | les found on disk Da | ata(D:)   |
|           | Name             |             | Size         | Date                 |           |
| All       | ye 💑 🦄           | NSOCD I.JPG | 990.U ND     | 2009-04-29           |           |
|           |                  | NFAZZA.jpg  | 1.7 MB       | Shredded files       |           |
|           | 🛛 🌺 \$R          | ZVB2H5.JPG  | 3.7 MB       | 2003-00-20           |           |
| Documents | 🐁 IM             | G_0539.JPG  | 4.1 MB       | 2009-05-28           |           |
|           | 🐁 IM             | G_0541.JPG  | 3.7 MB       | 2009-05-28           |           |
| 1 Section | 🐁 IM             | G_0542.JPG  | 3.8 MB       | 2009-05-28           |           |
| Pictures  | 🐻 IM             | G_0543.JPG  | 3.4 MB       | 2009-05-28           |           |
| ON        | 🐁 IM             | G_0545.JPG  | 3.8 MB       | 2009-06-20           |           |
|           | M 👬              | G_0547.JPG  | 3.2 MB       | 2009-06-20           |           |
| Audio     | 🛛 🌺 IM           | G_0550.JPG  | 3.9 MB       | 2009-05-28           |           |
|           | 🛛 🌺 IM           | G_0551.JPG  | 3.4 MB       | 2009-05-28           |           |
| Videos    | 🐁 IM             | G_0869.JPG  | 3.5 MB       | 2009-05-30           |           |
| Videos    | 🐁 IM             | G_0873.JPG  | 5.6 MB       | 2009-05-30           |           |
|           | 🐁 IM             | G_0890.JPG  | 5.4 MB       | 2009-05-30           |           |
| Custom    | 🐁 IM             | G_1739.JPG  | 4.1 MB       | 2009-06-03           | Les Beach |
|           | 🐁 IM             | G_3460.JPG  | 4.4 MB       | 2009-06-06           |           |
|           | 🍀 IM             | G_3461.JPG  | 3.9 MB       | 2009-06-06           | 1 Kaland  |
|           | 📲 👬 IM           | G_3476.JPG  | 3.9 MB       | 2009-06-06           |           |
|           |                  |             | 4.7 MB       | 2009-06-06           |           |
| Shredder  | O Details 🔵 Tree |             |              |                      | < ,0      |
|           | ~                |             |              | Haven't              | found     |

Files panel with shredded files.

Please note that shredded files cannot be marked for recovery.

When the disk is reopened, the shredded files will be shown as normal ones, but their content will remain zeroed out.

|           |                   | ~            |               | Lifetii             | ne 🔃 🔮 🚺             |
|-----------|-------------------|--------------|---------------|---------------------|----------------------|
| UNDELETE  | Disks 🖉           | 🧾 Files      | Recov         | ery <b>upda</b> i   | tes 💕 💕 📗            |
|           | Show files: ▼ All | ✓ Deleted    | only 5433 fil | es found on disk Da | ta(D:)               |
|           | Name              |              | Size          | Date                |                      |
| All       |                   | INSOCD I.JPG | 990.U ND      | 2009-04-29          |                      |
|           |                   | RNFAZZA.jpg  | 1.7 MB        | hredded files 9     |                      |
|           |                   | RZVB2H5.JPG  | 3.7 MB        | 2000 00 28          |                      |
| Documents | N IN              | IG_0539.JPG  | 4.1 MB        | 2009-05-28          |                      |
| E.        | 🛛 🌺 IN            | IG_0541.JPG  | 3.7 MB        | 2009-05-28          |                      |
| is all    | 📲 👬 🕷             | IG_0542.JPG  | 3.8 MB        | 2009-05-28          |                      |
| Pictures  | 😽 IN              | IG_0543.JPG  | 3.4 MB        | 2009-05-28          |                      |
| ON        | 👬 IN              | IG_0545.JPG  | 3.8 MB        | 2009-06-20          |                      |
|           | 🐳 IM              | IG_0547.JPG  | 3.2 MB        | 2009-06-20          |                      |
| Audio     |                   | IG_0550.JPG  | 3.9 MB        | 2009-05-28          |                      |
|           |                   | IG_0551.JPG  | 3.4 MB        | 2009-05-28          |                      |
| Videos    | 😽 IN              | IG_0869.JPG  | 3.5 MB        | 2009-05-30          |                      |
| videos    | 😽 IN              | IG_0873.JPG  | 5.6 MB        | 2009-05-30          |                      |
| 13        | IN 🎇 IN           | IG_0890.JPG  | 5.4 MB        | 2009-05-30          |                      |
| Custom    | 🛛 🌺 IN            | IG_1739.JPG  | 4.1 MB        | 2009-06-03          | and the first of the |
|           | 👬 IN              | IG_3460.JPG  | 4.4 MB        | 2009-06-06          | DECEM                |
|           |                   | IG_3461.JPG  | 3.9 MB        | 2009-06-06          | 1 LAND               |
|           | 🛛 🌺 IN            | IG_3476.JPG  | 3.9 MB        | 2009-06-06          |                      |
|           | 🔹 🐝 IN            | IG 3478.JPG  | 4.7 MB        | 2009-06-06          |                      |
| Shredder  | O Details O Tree  |              |               |                     | < O                  |
|           |                   |              |               | Haven't             | found                |
|           | Recover files     |              |               |                     | r files?             |

Files panel with shredded files.

#### 4.5 Upgrade

There are two license types for R-Undelete:

#### R-Undelete Home

R-Undelete Home is free for home users. It recovers files from FAT/2exFAT storage devices, like external USB hard drives and sticks, and digital photo and video camera memory cards. In addition to Quick Scan<sup>[43]</sup>, R-Undelete Home uses the Deep Scan<sup>[26]</sup> procedure to find files using their file signatures<sup>[44]</sup>, which makes R-Undelete Home is an ideal solution for recovery lost digital photos, movies, and music.

This free version also allows its users to evaluate how the software recovers lost files from the NTFS and ReFS file systems, for which it is fully functional to save recovered files smaller than 256KB. Regardless of this limitation, all recovered files can be viewed in the build-in

viewer to estimate recovery chances before you upgrade the Home version for recovery from NTFS disks.

#### R-Undelete

R-Undelete has no limitations and recovers lost files from NTFS, NTFS5 (created or updated by Win2000/XP/2003/2/ista/2008/2012/2016/2/Win7/2/Win8/2/Win10) and ReFS/2/ReFS2+ (Resilient File System, Windows 2012/2016 Server) disks as well as recovers them from FAT (FAT12, FAT16, FAT32, exFAT) disks. Moreover, it can recover files from any storage volumes visible to the host OS. Those can be software and hardware RAIDs, Windows Storage Spaces, and alike.

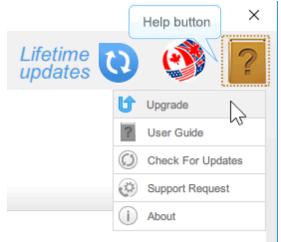
#### Upgrading to R-Studio

If for any reason you want to switch the license to our professional data recovery tool R-STUDIO, R-Undelete can be upgraded to R-STUDIO for the initial price difference.

#### Upgrading to R-Undelete

This procedure can be done on-the-fly even during file recovery operations. The program doesn't have to be restarted.

1. Click the Help button and select Upgrade on the shortcut menu



or select About on the shortcut menu and then click the Upgrade button on the About dialog box.



2. Enter the license key and click the OK button The license key can be bought online on the R-TT, Inc site.

| 🔰 Upgrade R-Undelete Home | ×  |
|---------------------------|--|
|                           | recovers files from FAT and exFAT file systems.<br>Elicense to extend support for NTFS and ReFS.                                 |
| Name:                     | Alex Bailey  |
|                           | Registration key:  |
|                           | Dge2Ke8Aljp+hQMYS+/wpyesjE4A0oby/<br>A76leUTGiCnJf/UDUBJRgVxL3dG77iFC1/WB/<br>e5APCn4ftN7alQtM<br>+v9NpJRC0ZkQ6WjiA8boRygC0G4Q== |
|                           |  |
| Buy license online        | OK Cancel  |

Copy and paste the key, do not try to type it in manually.

3. Read the License Agreement and click the Agree button

#### 🔰 Upgrade R-Undelete Home $\times$ 🚺 License Agreement $\times$ ems. eFS. R-UNDELETE Copyright(c) 2002-2017 R-tools Technology Inc. All rights reserved. END-USER LICENSE AGREEMENT IMPORTANT-READ CAREFULLY: This End-User License Agreement ("EULA") is a legal agreement between you (either an individual or a single entity) later referred to as "LICENSEE" and R-tools Technology Inc. later referred to as "R-TT" for the software product R-Undelete later referred to as "SOFTWARE" and for support and maintenance ÁΕ services later referred to as "SUPPORT SERVICES". By installing, copying, or otherwise using the SOFTWARE, you agree to be bound by the terms of this EULA. If you do not agree to the terms of this EULA, do not purchase, download, install or use the SOFTWARE Agree Cancel Buy license omme Cance

The lock on the dialog box will turn into green:

| 🔮 Upgrade R-Undelete Home | ×  |
|---------------------------|--|
|                           | ne recovers files from FAT and exFAT file systems.<br>TE license to extend support for NTFS and ReFS.                            |
| Nan                       | ne: Alex Bailey Registration key:  |
|                           | Dge2Ke8Aljp+hQMYS+/wpyesjE4A0oby/<br>A76leUTGiCnJf/UDUBJRgVxL3dG77iFC1/WB/<br>e5APCn4ftN7alQtM<br>+v9NpJRC0ZkQ6WjiA8boRygC0G4Q== |
| Buy license online        | OK Cancel  |

And the About dialog will change its appearance.



Now R-Undelete can deliver all its power in file recovery.

#### V Definitions

#### Hard drive

A hard drive (often abbreviated as HD, or HDD) is a storage device that permanently stores and retrieves data on a computer. It consists of a spinning magnetic disk to which data is written using a read? write magnetic head on a mechanical arm called an actuator, all inside of an air-sealed casing.

#### Partition and (logical) disk

A partition is an area on a physical storage device separated from other device segments. For the operating system and computer users, although the separation is pure logical, it appears as an independent storage device with a separate file system. There are several reasons for such partitioning. For example, Windows 10 creates several service partitions, apart from the system partition (disk C:), like boot and recovery partitions that it uses to ensure system stability and recoverability. Another reason to separate the system and user data partitions is if the system has to be re-installed, the user data will remain untouched.

To be accessible for the computer user, a partition must have an assigned letter. In this case such a partition is called a logical disk and is referred to by its letter.

SSD and NVME storage devices

#### SSD Device Icons

238.5дв

M4-CT256M.

SSD storage devices.

128gb NVME disk

NVME storage devices: SSD devices connected to the computer through a special interface.

A solid-state drive (SSD) is a storage device that stores data on nonvolatile solid-state flash memory and has no moving parts, unlike hard drives or optical disks. They are much faster than traditional hard drives and more shock-resistant, but their life span is shorter and storage space is more expensive. NVME devices are SSD devices connected to the computer through a special interface.

#### Peculiarities of file recovery from SSD and NVME storage devices

All considerations below are applicable for files deleted from or without Recycle Bin. If you must recover files after a system crash, it will not differ much from file recovery from conventional hard drives.

SSD devices have some specific obstacles for file recovery, especially for files deleted from or without the Recycle Bin. Periodically, Windows issues a special command TRIM that informs the SSD device that some files have been deleted and their storage space is needed no more. Upon receiving this command, the device frees its internal space where the deleted files have resided. When the OS accesses that space, the device simply returns zeros even without reading the actual data. Moreover, Microsoft uses a so called DZAT procedure (deterministic zeroes after TRIM) that fully and permanently cleans that space by overwriting it with zeros. It is impossible to recover files after this procedure.

The main question is when that will happen. Depending on many circumstances, it may take from several seconds to several days. Within this time period, the file data will remain stored on the SSD device, and R-Undelete can recover them.

Usually, Windows executes the TRIM command during shutdown and startup. That is why the main advice for the case of deleted files is to power your computer off by long-pressing the Power button of your computer. Do not shut down it. Then remove the SSD disk from the computer and connect it to another one. Use that second computer for file recovery.

#### Quick Scan

A disk operation in which R-Undelete quickly analyzes information about files stored on the disk, including search for deleted files. Then it lists all found files in its Files panel.

#### Recovery chances

R-Undelete estimates chances for successful file recovery while listing the files. Those estimations may not be quite accurate immediately upon file listing, but Deep Scan <sup>26</sup> greatly improves those estimations.

#### **V**Recovery chances

| • | Undefined     |
|---|---------------|
| • | Good          |
| • | Above average |
| • | Average       |
| • | Below average |
| • | Bad           |

#### File mask

A file mask is a pattern of characters and wildcards used to match folder and file names.

File signatures and raw file search

A file signature (sometimes is called as a file magic number) is a data pattern within the file that is unique to certain file types. It can be used to identify the format of the file and recover its content even when the disk file system contains no information about such a file. This method of file recovery is called "raw file search" or search for known file types and used to recover deleted files from damaged, deleted, or re-formatted disks, as well as from partitions with unrecognized file systems. R-Undelete uses raw file search when performing Deep Scan 26.

#### ✓ List of known file types

| Document                                |  |   |
|---|--|---|
| AbiWord Document: .abw                  | Adobe PDF document: .pdf                   | Final Draft Document: .fdr                        |
| FrameMaker<br>Document: .fm             | Garmin MapSource<br>data: .mps             | GNU Info Document: .info                          |
| HTML Document: .html                    | Lotus AMI Pro<br>Document: .sam            | Lotus Organizer<br>Report: .rep                   |
| Lotus Word Pro<br>Document: .lwp        | Microsoft Money Data: .mny                 | Microsoft Office Open XML<br>Document *           |
| Microsoft OneNote section file: .one    | Microsoft Pocket Streets<br>Map File: .mps | Microsoft PowerPoint 2007<br>XML Document*: .pptx |
| Microsoft PowerPoint<br>Document*: .ppt | Microsoft Reader<br>eBook: .lit            | Microsoft Reader eBook<br>annotations: .ebo       |

| Microsoft Word 2007 XM                          | Microsoft Word                             | Microsoft Word2                              |
|---|--|--|
| Microsoft Word 2007 XML<br>Document*: .docx     | Microsoft Word<br>Document*: .doc          | Document: .doc                               |
| Microsoft WordPad                               |  |  |
| Document: .wri                                  | OLE Storage                                | OpenDocument Document                        |
| PostScript document:*.ps                        | QuickBooks Backup File:<br>*.gbb           | QuickBooks Primary Data<br>File: *.gbw       |
| Quicken Data: *.gdf                             | Rich Text Document: .rtf                   | TEX Document: .tex                           |
| Text Document: .txt                             | TurboTax return file:.tax                  | Unicode Document: .txt                       |
| Word for Macintosh<br>Document: .mcw            | WordPerfect<br>Document: .doc              | XML Document: .xml                           |
| Document: Spreadsheet                           | 1  |  |
| Lotus Spreadsheet: .wks                         | Lotus3 Spreadsheet: .wk3                   | Microsoft Excel 2007 XML<br>Document*: .xlsx |
| Microsoft Excel Document*: .xls                 | Microsoft Excel2<br>Spreadsheet: .xls      | Microsoft Excel3/4<br>Spreadsheet: .xls      |
| Quattro Pro<br>Spreadsheet: .wq1                |  |  |
| Document: Database                              |  |  |
| Data Interchange Format file: .dif              | dBase III Database: .dbf                   | Microsoft Access 2007<br>Database: .accdb    |
| Microsoft Access 2007                           | Microsoft Access                           | Microsoft Linker                             |
| XML Document: .accdt                            | Database: .mdb                             | Database: .1k                                |
| Microsoft Program<br>Database: .pdb             | Microsoft SQL<br>Database: .mdf            | Microsoft SQL Log: .ldf                      |
| MySQL Database: .myi                            | Omnis Studio<br>Database: .df1             | Omnis Studio Library: .lbs                   |
| Internet-related files                          |  |  |
| Compiled HTML file: .chm                        | Internet shortcut: .url                    | Microsoft OutLook Personal<br>Folder: .pst   |
| Microsoft Outlook/Inbox<br>offline folder: .ost | Mozilla Firefox browser<br>extension: .xpi | Mozilla Mail Summary file: .msf              |
| Outlook Express                                 | The Bat! Address                           | The Bat! Message                             |
| Messages: .dbx                                  | book: .abd                                 | Base: .tbb                                   |
| The Bat! Message                                | Windows Address                            | XML document                                 |
| Index: .tbi                                     | Book: .wab                                 | (Unicode): .xml                              |
| Font  |  |  |
| Adobe PostScript<br>Font: .pfb                  | Adobe Printer Font: .pfm                   | BDF Unix font                                |
| BGI font: .chr                                  | CPI DOS font: .cpi                         | MyTest Font: .mtf                            |
| TrueType Font: .ttf                             | Windows System<br>Font: .fon               |  |

| Graphics/Picture                       |   |  |
|--|---|--|
| 3D XML file: .3dxml                    | 3DStudio Mesh: .3ds                           | Adobe InDesign File: .indd   |
| Adobe Photoshop                        | Agfa/?Matrix Scodl                            | Alias Wavefront Raster   |
| Image: .psd                            | Image: .scd                                   | Image: .rla  |
| ArcView Shape: .shp                    | AutoCAD Binary                                | AutoCAD Drawing: .dwg  |
|  | Image: .dxf                                   |  |
| AutoCAD Image: .dxf                    | Autodesc Animator                             | Autodesc Animator Pro  |
|  | Image: .pic                                   | color map: .col  |
| Autodesc Animator Pro                  | Autologic Image: .gm                          | AVHRR Satellite  |
| Image: .pic                            |   | Image: .sst  |
| Bentley MicroStation CAD               | BMF Image: .bmf                               | Canon RAW graphics   |
| Drawing: .dgn                          |   | file: .crw   |
| Canon RAW graphics                     | Canon RAW graphics                            | ColoRIX Image: .rix  |
| file*: .cr2                            | file: .crw                                    |  |
| CompuServe GIF                         | ComputerEyes Raw                              | Continous Edge Graphic   |
| Image: .gif                            | Image: .ce1                                   | Image: .ceg  |
| Corel Texture Image: .tex              | CorelDraw CMX                                 | CorelDraw Image: .cdr  |
|  | Image: .cmx                                   |  |
| Cubicomp Picture Maker                 | Dr. Halo palette: .pal                        | Enhanced MetaFile  |
| Image                                  |   | Image: .emf  |
| Epson Stylus Image: .prn               | Erdas LAN/2GIS                                | Fractal Image Format: .fif   |
|  | Image: .lan                                   |  |
| Freehand (MX)                          | GEM Raster Image: .img                        | GEM VDI Image: .gdi  |
| Database: .fh10                        | Onershine Werkehen for                        |  |
| GOES Satellite Image: .goe             | Graphics Workshop for Windows Thumbnail: .thn | Gridded Binary Image: .grb   |
| Hitaabi Baatar Imaga: A                |   | HD Command Language  |
| Hitachi Raster Image: .hrf             | Hotspot Image: .shg                           | HP Command Language  |
| HP Raster Image: .rtl                  | HSI JPEG Image: .hsi                          | IBM Picture Maker Image:   |
| The Master Intage It I                 | TIOLOT LO IMAGE IIST                          | *.pic  |
| iPhoto Image: .attr                    | Jovian Logic Image: .vi                       | JPEG 2000: .jp2  |
| JPEG Digital                           | JPEG Image: .jpg                              | Kodak PhotoCD  |
| Camera*: .jpg                          | Ji LO Image Jpg                               | Image: .pcd  |
| LBM/IFF Image: .lbm                    | Lightwave Object: .1wo                        | Lotus PIC Image: .pic  |
| Macintosh Paint                        | Macintosh PICT                                | Microsoft Paint Image: .msp  |
| Image: .mac                            | Image: .pct                                   | miorocorr ant magemsp  |
| Minolta RAW image: .mrw                | Nikon RAW image*: .nef                        | Olympus RAW image: .orf  |
| PaintShop Pro Image: .psp              | PaperPort Image: .max                         | PBM Image: .pbm  |
| PGM Image: .pgm                        | Pictor PC Paint                               | PIX Image: .pix  |
| Pym                                    | Image: .pic                                   | The may of the second s |
| PM Image: .pm                          | PNG Image: .png                               | PPM Image: .ppm  |
| · ···································· | · · · · · · · · · · · · · · · · · · ·         |  |

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| Print Shop Image: .pds                  | QuarkXpress<br>Database: .gxp                        | QuarkXPress file: .gxd              |
|---|--|-------------------------------------|
| Quick Link II fax<br>Image: .qfx        | QuickDraw 3D<br>Metafile: .3dmf                      | RenderMan Image: .rib               |
| SGI Image: .sgi                         | Sigma RAW image: .x3f                                | Sketch Image: .sk                   |
| SmartDraw file: .sdr                    | SmartDraw template: .sdt                             | Sony RAW image: .arw                |
| STAD Image: .pac                        | Sun Raster Image: .sun                               | SymbianOS Image: .mbm               |
| Tagged Image Format<br>File: .tif       | TI Image: .92i                                       | TrueVision Image: .tga              |
| Utah Raster Toolkit<br>Image: .rle      | VITec Image: .vit                                    | Windows Animated<br>cursor: .ani    |
| Windows Bitmap<br>Image: .bmp           | Windows cursor: .cur                                 | Windows Fax Cover<br>Image: .cpe    |
| Windows icon: .ico                      | Windows MetaFile<br>Image: .wmf                      | WordPerfect Graphics<br>Image: .wpg |
| X PixMap Image: .xpm                    | X Window Dump<br>Image: .xwd                         | Xara Drawing: .xar                  |
| ZSoft PCX Image: .pcx                   |  |                                     |
| Multimedia: Audio Files                 |  |                                     |
| Advanced Streaming<br>Format file: .asf | AIFF Sound: .aif                                     | Amusic tracker: .amd                |
| aPac Audio: .apc                        | AudioCD file: .cda                                   | AVR Sound: .avr                     |
| CMF Music: .cmf                         | Creative Voice File: .voc                            | DiamondWare Sound: .dwd             |
| Digital Speech File: .dss               | Digital Voice File: .dvf                             | EA ASF/MUS Audio: .asf              |
| Extended M3U playlist: .m3u             | FLAC Audio   | La Lossless Audio: .la              |
| Liquid Audio: .la1                      | MIDI Instrument<br>definition: .idf                  | MIDI Music: .mid                    |
| MIDI stream: .mds                       | Monkeys Audio: .ape                                  | MPEG Layer I Audio: .mpg            |
| MPEG Layer II<br>Audio*: .mp2           | MPEG Layer III<br>Audio*: .mp3                       | MUS Music: .mus                     |
| Musepack Audio: .mpc                    | Next/Sun Sound: .au                                  | Ogg Vorbis Audio: .ogg              |
| OptimFROG Audio: .ofr                   | RIFF MIDI Music: .rmi                                | RK Audio Sound: .rka                |
| Sierra AUD Sound: .aud                  | Sony OpenMG Audio: .oma                              | Super NES Audio: .spc               |
| TTA Audio: .tta                         | VQF Sound: .vqf                                      | WavPack Audio: .wv                  |
| Westwood AUD<br>Sound: .aud             | Windows Audio<br>Compression Manager<br>driver: .acm | Windows Media<br>Audio: .wma        |
| Windows WAVE<br>Sound: .wav             | X-MIDI Music: .xmi                                   | ZyXEL Sound: .zyx                   |
| Multimedia: Video Files                 |  |                                     |
|   |  |                                     |

| 3GPP multimedia audio?<br>/video: .3gp | 3GPP2 multimedia audio?<br>/video: .3g2 | 4X Movie Video: .4xm                     |  |  |
|--|---|--|--|--|
| Adobe Filmstrip<br>Animation: .fsf     | AMV Video: .amv                         | ANIM Animation: .cel                     |  |  |
| Autodesk Animator: .fli                | BCS Video: .bcs                         | BINK Video: .bik                         |  |  |
| DeluxePaint<br>Animation: .anm         | Director Video: .dcr                    | DriveCam Video: .dce                     |  |  |
| DVM Video: .dvm                        | Eyemail Video: .eye                     | Flash Video: .flv                        |  |  |
| Google Video: .gvi                     | Intel DVI Video: .dvi                   | Intel Indeo Video File: .ivf             |  |  |
| Interplay MVE Video: .mve              | Lotus ScreenCam<br>Video: .scm          | LZA Animation: .lza                      |  |  |
| MPEG Video: .mpg                       | Nancy Codec Video: .noa                 | NEOchrome<br>Animation: .ani             |  |  |
| Nullsoft Video: .nsv                   | NuppelVideo (MythTV)<br>Video: .nuv     | QuickTime Video: .mov                    |  |  |
| QV-10 Video: .cam                      | RPL Video: .rpl                         | Sega FILM?CPK<br>Video: .cpk             |  |  |
| SGI movie format: .mv                  | Shockwave Video: .swf                   | Smacker Video: .smk                      |  |  |
| SMJPEG Video: .mjpg                    | Sony Movie Player<br>Video: .mqv        | VideoCD MPEG: .dat                       |  |  |
| VideoCD Video: .vcd                    | Vivo streaming Video: .viv              | VOB video files: .vob                    |  |  |
| VP6 encoded Video: .vp6                | Windows AVI Video: .avi                 | Windows Media<br>Video: .wmv             |  |  |
| Multimedia Files                       |   |  |  |  |
| Material Exchange<br>File: .mxf        | MP4 file: .mp4                          | Real Networks audio?<br>/video: .rm      |  |  |
| RIFF Multimedia File                   |   |  |  |  |
| Archive Files                          |   |  |  |  |
| 7-Zip archive: .7z                     | ACE archive: .ace                       | AIN archive: .ain                        |  |  |
| ARJ archive: .arj                      | ARX archive: .arx                       | Aladdin Systems StuffIt<br>archive: .sit |  |  |
| BAG archive: .bag                      | BIX archive: .bix                       | BOA archive: .b58                        |  |  |
| BZip2 archive: .bz2                    | BlackHole archive: .bh                  | Blink archive: .bli                      |  |  |
| CPIO archive: .cpio                    | CRUSH archive                           | ChArc archive: .chz                      |  |  |
| Compress archive: . z                  | FOXSQZ archive: .sqz                    | GZip archive: .gz                        |  |  |
| HA archive *: .ha                      | HAP archive: .hap                       | HPACK archive: .hpk                      |  |  |
| Hyper archive: .hyp                    | InstallShield Cabinet<br>archive: .cab  | InstallShield Data<br>archive: .z        |  |  |
| InstallShield archive                  | JAM archive: .jam                       | JAR archive: .jar                        |  |  |
| JRC archive: .jrc                      |   |  |  |  |

| Microsoft Compress 6<br>archivearchiveQFC archive: .gfcQuantalRAR archive: .rarRPM atSAR archive: .sarSBC atSQZ archive: .sqzSZip atTAR archive: .tarUFA atUltraCompressor 2<br>archive: .uc2UltraCatWRAptor archive: .wraWinlmYBS archive: .gzApple<br>ArchiveZZip archive: .gzApple<br>ArchiveR-Drive Image<br>Archive: .arcR-Drive<br>ArchiveDOS Style Executable: .exeELF EtELF Module (UNIX)Java EtBorland Delphi 6<br>Library: .dcuBorlan<br>compilDelphi 7 Compiled<br>Unit: .dcuLibrary<br>MicrosoftMicrosoft ClassWizard<br>file: .clwMicrosoft  | O archive: .pll<br>m archive *: .ark<br>rchive: .rpm<br>rchive: .sbc<br>rchive<br>rchive: .ufa<br>ypt 2 archive: .ue2<br>o archive: .imp<br>chive: .zip<br>Safari Web<br>e: .webarchive<br>e Image V1 | Microsoft Compress 5<br>archive<br>Pack archive<br>Quark archive<br>ReSOF archive: .sof<br>SCO archive *<br>StuffIt archive: .sit<br>UHArc archive: .sit<br>UHArc archive: .uha<br>WIN-Freeze archive*: .ice<br>YAC archive: .yc<br>ZOO archive: .yc<br>ZOO archive: .goo<br>Microsoft Internet Explorer<br>Web Archive: .mht<br>WinImage Archive: .imz |  |  |  |
|---|---|---|--|--|--|
| archiveQFC archive: .gfcQuantulQFC archive: .gfcQuantulRAR archive: .rarRPM aSAR archive: .sarSBC aSQZ archive: .sgzSZip aTAR archive: .tarUFA aUltraCompressor 2<br>archive: .uc2UltraCaWRAptor archive: .wraWinlmYBS archive: .ybsZIP ardZZip archive: .zz<br>Archive: .arcApple<br>ArchiveR-Drive Image<br>Archive: .arcR-Driv<br>ArchiveDOS Style Executable: .exeELF EELF Module (UNIX)<br>Unidows OCX File: .ocxJava EBorland Delphi 6<br>Library: .dcuBorlan<br>compilDelphi 7 Compiled<br>Unit: .dcuLibrary<br>Microsoft ClassWizard<br>file: .clw  | m archive *: .ark<br>rchive: .rpm<br>rchive: .sbc<br>rchive<br>rchive: .ufa<br>ypt 2 archive: .ue2<br>o archive: .imp<br>chive: .zip<br>Safari Web<br>e: .webarchive<br>e Image V1<br>e: .arc         | Quark archive<br>ReSOF archive: .sof<br>SCO archive *<br>StuffIt archive: .sit<br>UHArc archive: .uha<br>WIN-Freeze archive*: .ice<br>YAC archive: .yc<br>ZOO archive: .yc<br>ZOO archive: .goo<br>Microsoft Internet Explorer<br>Web Archive: .mht<br>WinImage Archive: .imz   |  |  |  |
| RAR archive: .rarRPM aSAR archive: .sarSBC aSQZ archive: .sqzSZip aTAR archive: .tarUFA aUltraCompressor 2<br>archive: .uc2UltraCaWRAptor archive: .wraWinImYBS archive: .ybsZIP ardZZip archive: .zzApple<br>ArchiveR-Drive Image<br>Archive: .arcR-Drive<br>ArchiveDOS Style Executable: .exeELF EELF Module (UNIX)Java EBorland Delphi 6<br>Library: .dcuBorlan<br>compiled<br>Unit: .dcuMicrosoft ClassWizard<br>file: .clwMicrosoft  | rchive: .rpm<br>rchive: .sbc<br>rchive<br>rchive: .ufa<br>ypt 2 archive: .ue2<br>o archive: .imp<br>chive: .zip<br>Safari Web<br>e: .webarchive<br>e Image V1<br>e: .arc<br>wecutable (UNIX)          | ReSOF archive: .sof<br>SCO archive *<br>StuffIt archive: .sit<br>UHArc archive: .uha<br>WIN-Freeze archive*: .ice<br>YAC archive: .yc<br>ZOO archive: .yc<br>ZOO archive: .go<br>Microsoft Internet Explorer<br>Web Archive: .mht<br>WinImage Archive: .imz   |  |  |  |
| SAR archive: .sarSBC aSQZ archive: .sqzSZip aTAR archive: .tarUFA aUltraCompressor 2<br>archive: .uc2UltraCaWRAptor archive: .wraWinImYBS archive: .ybsZIP ardZZip archive: .zzApple<br>ArchiveR-Drive Image<br>Archive: .arcR-Drive<br>ArchiveDOS Style Executable: .exeELF EELF Module (UNIX)Java EBOFF executableWin32Windows OCX File: .ocxVin32Windows OCX File: .ocxDomDevelopment filesBorland<br>compilBorland Delphi 6<br>Library: .dcuBorlan<br>compilDelphi 7 Compiled<br>Unit: .dcuLibrary<br>Microsoft ClassWizard<br>file: .clw   | rchive: .sbc<br>rchive<br>rchive: .ufa<br>ypt 2 archive: .ue2<br>p archive: .imp<br>chive: .zip<br>Safari Web<br>e: .webarchive<br>e Image V1<br>e: .arc<br>wecutable (UNIX)                          | SCO archive *<br>StuffIt archive: .sit<br>UHArc archive: .uha<br>WIN-Freeze archive*: .ice<br>YAC archive: .yc<br>ZOO archive: .zoo<br>Microsoft Internet Explorer<br>Web Archive: .mht<br>WinImage Archive: .imz<br>ELF Library (UNIX)   |  |  |  |
| SQZ archive: .sqzSZip aTAR archive: .tarUFA aUltraCompressor 2<br>archive: .uc2UltraCaWRAptor archive: .wraWinImYBS archive: .ybsZIP ardZZip archive: .zzApple<br>ArchiveR-Drive Image<br>Archive: .arcR-Drive<br>ArchiveDOS Style Executable: .exeELF EELF Module (UNIX)Java ERDOFF executableWin32Windows OCX File: .ocxWin32Windows OCX File: .ocxCompilDevelopment filesBorland<br>compilDelphi 7 Compiled<br>Unit: .dcuLibrary<br>Microsoft ClassWizard<br>file: .clw  | chive<br>chive: .ufa<br>ypt 2 archive: .ue2<br>p archive: .imp<br>chive: .zip<br>Safari Web<br>c: .webarchive<br>c Image V1<br>c: .arc<br>wecutable (UNIX)  | StuffIt archive: .sit<br>UHArc archive: .uha<br>WIN-Freeze archive*: .ice<br>YAC archive: .yc<br>ZOO archive: .zoo<br>Microsoft Internet Explorer<br>Web Archive: .mht<br>WinImage Archive: .imz  |  |  |  |
| TAR archive: .tarUFA aUltraCompressor 2<br>archive: .uc2UltraCaWRAptor archive: .wraWinImYBS archive: .ybsZIP ardZZip archive: .zzApple<br>ArchiveR-Drive Image<br>Archive: .arcR-Drive<br>ArchiveDOS Style Executable: .exeELF EELF Module (UNIX)Java ERDOFF executableWin32Windows OCX File: .ocxVin32Development filesBorland<br>compilDelphi 7 Compiled<br>Unit: .dcuLibrary<br>Microsoft ClassWizard<br>file: .clw   | chive: .ufa<br>ypt 2 archive: .ue2<br>o archive: .imp<br>chive: .zip<br>Safari Web<br>e: .webarchive<br>e Image V1<br>e: .arc<br>wecutable (UNIX)   | UHArc archive: .uha<br>WIN-Freeze archive*: .ice<br>YAC archive: .yc<br>ZOO archive: .zoo<br>Microsoft Internet Explorer<br>Web Archive: .mht<br>WinImage Archive: .imz   |  |  |  |
| UltraCompressor 2<br>archive: .uc2UltraCit<br>archive: .uc2WRAptor archive: .wraWinlm<br>YBS archive: .ybsZIP ard<br>ZIP ard<br>ArchiveZZip archive: .zzApple<br>ArchiveArchive<br>ArchiveR-Drive Image<br>Archive: .arcR-Drive<br>ArchiveDOS Style Executable: .exeELF E<br>ELF Module (UNIX)RDOFF executableWin32Windows OCX File: .ocxWin32Windows OCX File: .ocxEorland<br>compilDevelopment filesBorland<br>compilDelphi 7 Compiled<br>Unit: .dcuLibrary<br>Microsoft ClassWizard<br>file: .clw  | ypt 2 archive: .ue2<br>o archive: .imp<br>chive: .zip<br>Safari Web<br>e: .webarchive<br>e Image V1<br>e: .arc<br>wecutable (UNIX)  | WIN-Freeze archive*: .ice<br>YAC archive: .yc<br>ZOO archive: .zoo<br>Microsoft Internet Explorer<br>Web Archive: .mht<br>WinImage Archive: .imz  |  |  |  |
| archive: .uc2WinImWRAptor archive: .wraWinImYBS archive: .ybsZIP ardZZip archive: .zzApple<br>ArchiveR-Drive Image<br>Archive: .arcR-Drive<br>ArchiveDOS Style Executable: .exeELF EELF Module (UNIX)Java ERDOFF executableWin32Windows OCX File: .ocxVin32Development filesBorland<br>compilBorland Delphi 6<br>Library: .dcuBorlan<br>compilDelphi 7 Compiled<br>Unit: .dcuLibrary<br>Microsoft ClassWizard<br>file: .clw   | o archive: .imp<br>chive: .zip<br>Safari Web<br>c: .webarchive<br>c Image V1<br>c: .arc<br>wecutable (UNIX)   | YAC archive: .yc<br>ZOO archive: .zoo<br>Microsoft Internet Explorer<br>Web Archive: .mht<br>WinImage Archive: .imz   |  |  |  |
| YBS archive: .ybsZIP archiveZZip archive: .zzApple<br>ArchiveR-Drive Image<br>Archive: .arcR-Drive<br>ArchiveArchive: .arcR-Drive<br>ArchiveExecutable//Library/DLLELF E<br>ELF Module (UNIX)DOS Style Executable: .exeELF E<br>ELF Module (UNIX)RDOFF executableWin32Windows OCX File: .ocxWin32Windows OCX File: .ocxE<br>CompileDevelopment filesBorland<br>compilDelphi 7 Compiled<br>Unit: .dcuLibrary<br>Microsoft ClassWizard<br>file: .clw  | chive: .zip<br>Safari Web<br>: .webarchive<br>e Image V1<br>: .arc<br>(ecutable (UNIX)  | ZOO archive: .zoo<br>Microsoft Internet Explorer<br>Web Archive: .mht<br>WinImage Archive: .imz<br>ELF Library (UNIX)   |  |  |  |
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| Development filesBorland Delphi 6BorlanLibrary: .dcucompilDelphi 7 CompiledLibraryUnit: .dcuMicrosoft ClassWizardfile: .clwMicrosoft  | DLL*: .dll  | Win32 Executable*: .exe   |  |  |  |
| Borland Delphi 6<br>Library: .dcuBorlan<br>compilDelphi 7 Compiled<br>Unit: .dcuLibrary<br>Library<br>Microsoft ClassWizard<br>file: .clwMicrosoft<br>Microsoft   |   |   |  |  |  |
| Borland Delphi 6<br>Library: .dcuBorlan<br>compilDelphi 7 Compiled<br>Unit: .dcuLibrary<br>Library<br>Microsoft ClassWizard<br>file: .clw   | Development files   |   |  |  |  |
| Delphi 7 Compiled<br>Unit: .dcuLibraryMicrosoft ClassWizard<br>file: .clwMicrosoft  | d Turbo Pascal<br>ed Unit: .tpu   | COM Type Library: .tlb  |  |  |  |
| file: .clw  | .lib  | Microsoft .NET XML<br>Resource template: .resx  |  |  |  |
|   | oft Linker database   | Microsoft Precompiled<br>header: .pch   |  |  |  |
|   | oft Visual Studio<br>Ise: .dsp  | Microsoft Visual Studio<br>Solution: .sln   |  |  |  |
|   | oft Visual C++  | Microsoft Visual Studio<br>workspace: .dsw  |  |  |  |
| OMF Object library: .lib Visual   |   | Windows Compiled  |  |  |  |
| Windows Compiled<br>resource (32bit): .res  | Basic Database: .vbp  | resource (16bit)*: .res   |  |  |  |
| Other file types  |   |   |  |  |  |

| ABBYY Lingvo<br>dictionary: .lsd  | File Crypt file: .rzx     | Kaspersky Anti-virus data<br>base: .avc |
|-----------------------------------|---------------------------|---|
| NOD32 Antivirus Update file: .nup | OziExplorer Map data:.map | RegEdit file: .reg                      |
| RegEdit file<br>(UNICODE): .reg   | Windows Backup File: .bkf | Windows Clipboard file: .clp            |
| Windows Color<br>Profile: .icm    | Windows Minidump          | Windows National locale: .nls           |
| Windows Password file: .pwl       | Windows Policy file: .pol | Windows Registry file: .dat             |
| Windows Registry<br>hive: .hiv    | Windows shortcut: .lnk    | WinHelp: .hlp                           |
| WinHelp Contents: .cnt            |                           |   |

Note: Using scan for Known File Types, R-Undelete can successfully recover only unfragmented files.

#### Disk Image

An image is a file containing an exact, byte by byte, copy of a hard drive or a disk. When created, images can be connected to R-Undelete and 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 or its S.M.A.R.T. state is poor, an image of this hard drive should be immediately created. All data search and recovery can be done from this image.

The Disk Images [29] help page explains how to create and work with images.

#### Smart technology

S.M.A.R.T. (Self-Monitoring, Analysis and Reporting Technology) is a technology widely used in hard drives and solid-state devices that monitors their reliability conditions to predict possible hardware failures.

#### VI Contact and Support

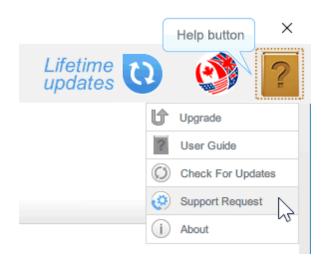
To obtain the latest version of R-Undelete, go to:

Product Site: http://www.R-Undelete.com Sales Department: sales@r-tt.com

R-Undelete Technical Support Team is available 24 hours a day, seven days a week, and has an average response time less than 4 hours.

Tech. Support: support@r-tt.com

Click the Help button and select Support Request on the shortcut menu



Or send manually your support request to: http://www.r-tt.com/SupportRequest.shtml

File Recovery FAQ: http://www.r-tt.com/File\_Recovery\_FAQ.shtml R-TT Forum: http://forum.r-tt.com

#### VII System Requirements

An Intel-compatible platform running Windows 10 /8.1/8 /7 /Vista /XP /2000 Windows Server 2019 /2016 /2012 /2008 /2003

At least 256 MB of RAM, a mouse, and enough disk space for recovered files, image files, etc.

The administrative privileges are required to install and run R-Undelete.

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