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I  R-Drive Image

R-Drive Image is unique and powerful drive image software. It creates drive image files on-the-fly, that is, without stopping Windows. Such images may be stored anywhere including various removable media. It compresses image data with variable compression level to save free space. It also restores such images on the disks on-the-fly, except system partitions. R-Drive Image creates special startup disk (a startup CD/DVD disc, or USB removable storage device) to restore system partitions. It mounts images as virtual disks to copy only certain files from the images. It also directly copies an entire disk to another - no time spent for file structure scanning.

System integrators and computer assemblers can use R-Drive Image OEM kit to create system recovery disks to include them with their fully assembled computer systems.

Note: The current version has a limited support for dynamic disks or other non-MBR/GPT partition layouts. See Support for Various Disk Partition Schemes and File Systems for details.

The R-Drive Image Features topic tells more about R-Drive Image.

The System Requirements topic tells more about R-Drive Image system requirements.

The R-Drive Image Registration topic explains how to register your copy of R-Drive Image.

The Disk Actions chapter explains disk actions such as:
- Create an Image of a partition, logical disk, or entire hard drive
- Create an Image from Files
- Restore Data from an Image
- Copy Disk to Disk to make an exact copy of one disk on another
- Manage partition and logical disks
- Mount an Image as a Virtual Logical Disk (read-only)
- Unmount Virtual Logical Disks
- Check an Image File to check an existing image file

The RAIDs, and Various Disk and Volume Managers chapter explains how to perform disk actions with various compound volumes such as:
- Windows Software RAIDs, Spanned, and Other Volumes
- Windows Storage Spaces
- Mac RAIDs
- Linux Logical Volume Manager Volumes

The Startup Version chapter explains how to perform disk actions using the R-Drive Image Startup Version such as:
- Create Startup Disk
- Restoring Data to a System or Other Locked Disk
- Create an Image Using the Startup Disks
- Disk to Disk Copy Using the Startup Disks

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The **Scheduled Actions, Command Line Operations, and Scripting** chapter explains how to start disk actions automatically at scheduled times/events and create scripts that can be performed from a command line.

- **Scheduler and Unattended Actions**
- **Scripting and Command Line Operations**
- **Rotation schemes** (backup sets)

The **Technical Information** chapter gives technical information on

- **Logging**
- **Creating consistent point-in-time backups**
- **Support for Various Disk Partition Schemes and File Systems**
- **Supported CD and DVD Recorders**
- **List of Hardware Devices Supported in the Startup Mode**

The **R-Drive Image OEM kit** chapter explains how computer system integrators can create system recovery disks for their systems

- **Create a Master Image**
- **Create Startup Media**

Follow this link to obtain **R-Drive Image Contact Information and Technical Support**

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Mac OS X, OS X, and macOS are registered trademarks of Apple Inc.

### 1.1 R-Drive Image Features

**R-Drive Image** is unique and powerful drive image software. It creates disk *images*: files that contain exact, byte-by-byte, copies of hard drives, partitions, or logical disks. Such images may be stored in any location: other hard disks or various removable media, such as CD-R(W) and DVD discs, USB external disks, and network drives. At any time, data from such images may be restored on their original disks or on any other partitions or even on drive's free space. Images may contain data from the partitions, logical disks, and entire hard drives, or only individual files.

**Note:** The current version has a limited support for dynamic disks or other non-MBR/GPT partition layouts. See **Support for Various Disk Partition Schemes and File Systems** for details.

Using **R-Drive Image**, you can completely restore your system immediately after heavy data loss caused by an operating system crash, virus attack, or hardware failure. You can also use **R-Drive Image** for mass system deployment: if you need to setup many identical computers, you can setup manually only one system, than, using **R-Drive Image**, you can make an image of the system, and deploy it on all other computers, saving your time and cost.

You can copy a hard drive, partition, or logical disk directly to another one. Such copying is much faster than traditional file by file copying, as no time spent for file structure scanning.

If you need to restore only certain files from an image, you can mount that image as a read-only virtual disk and copy those files directly from the image using Windows Explorer or any other file utility.
R-Drive Image includes a partition manager that can delete, wipe, create, and re-sized partitions and logical disks.

If you are a system integrator, consultant, or computer assembler, you can use R-Drive Image OEM kit to create system recovery disks to include them with your fully assembled computer systems.

R-Drive Image features:
- A simple wizard interface – no in-depth computer management skills are required.
- Commands in the shortcut menu to perform some disk actions, like restoring data from an image file and mounting an image as a virtual disk directly from Windows explorer.
- Image files are created on-the-fly, no need to stop and restart Windows. All other disk writes are stored in a cache until the image is created.
- Images can be created for storage devices with removable media.
- Images can be burned on CD/DVD recorders directly from the program.
- Image data can be compressed to save free space.
- Image files can be stored on removable media. Support for USB 2.0 and 3.0 devices in the startup mode.
- Images can be split into several files to fit the type of the storage medium.
- Image can be created incrementally and differentially.
- Image files can be password-protected and contain comments.
- Images can contain data from the entire disk or useful information only, that is, only those disk parts that contain data from existing files.
- Partition manager that allows you to delete, wipe, create, and re-sized partitions and logical disks.
- Support for two image format types: .rdr (R-Drive Image’s proprietary internal format) or VMDK, a popular virtual machine disk format (only in Corporate, Technician, and Commercial versions).
- Support for RAID, stripes, and various disk and volume managers, such as Windows Storage Spaces, Apple RAID, Apple CoreStorage/File Vault/Fusion Drives, and Linux LVM.
- Data from an image are restored on-the-fly, except on a system partition. Data to the system partition can be restored either by restarting R-Drive Image in its startup mode directly from Windows, or by using specially created startup disks.
- Special startup disks (a startup CD/DVD disc or USB removable storage device) can be created to restore data to a system partition. Such disks can be used to perform basic disk imaging operations on Mac computers with some restrictions.
- Data from an image can be restored on a free (unpartitioned) space on any place on a hard drive. The size of the restored partition can be changed.
- Data from an image can be restored on other existing partitions. R-Drive Image deletes such partitions and restores data on that free space.
- An entire disk can be directly copied on another one.
- An image can be mounted as a read-only virtual drive and its content can be viewed and copied.
- An image can be checked for its integrity.
- Support for S.M.A.R.T. warnings.
- A built-in scheduler automatically starts disk actions at scheduled times/events.
Scripts can be created for frequent or unattended actions. Scripts are executed from a command line and can be included in any command file.

Support for rotation schemes (backup sets). A rotation scheme is a set of files (usually a file for a full image of an object and a number of its incremental/differential backups) which R-Drive Image treats as one unit. Rotation schemes (backup sets) are used to flexibly control the parameters of complex backup tasks such as a total size allocated for the image files, number of image files to keep, and time for which the data will be kept. Available are simple and custom rotation schemes. Custom rotation schemes are available in the Corporate, Technician, and Commercial versions.

R-Drive Image OEM System Recovery Media creation: special startup disk(s) that may be used to restore a computer system after a complete failure when it requires a complete fresh setup (system recovery disks).

Note: You need to purchase an OEM registration key to activate this feature.

The Disk Actions chapter explains basic disk actions.
The Startup Version chapter explains how to perform disk actions using the R-Drive Image Startup Version.
The Technical Information chapter gives technical information on Supported CD and DVD Recorders and List of Hardware Devices Supported in the Startup Mode and another useful technical information.

Follow this link to obtain R-Drive Image Contact Information and Technical Support

1.2 System Requirements

- An Intel-compatible platform.
- The administrative privileges are required to install and run R-Drive Image.

Operating systems on which various versions can run:


1.3 Contact Information and Technical Support

To obtain the latest version of R-Drive Image, go to:
Product Site: http://www.drive-image.com/
Sales Department: sales@r-tt.com

The R-Drive Image Technical Support Team is available 24 hours a day, seven days a week, and has an average e-mail response time less than 4 hours.
Tech. Support: support@r-tt.com
You may send a support request form from http://www.r-tt.com/Support_request.html

Drive Imaging & Backup FAQ: http://www.r-tt.com/Drive_Imaging_Backup_FAQ.shtml
R-tt Forum: http://forum.r-tt.com

The Disk Actions chapter explains basic disk actions.
The **Startup Version** chapter explains how to perform disk actions using the **R-Drive Image Startup Version**.

The **Technical Information** chapter gives technical information on **Supported CD and DVD Recorders** and **List of Hardware Devices Supported in the Startup Mode** and another useful technical information.

### 1.4 R-Drive Image Registration

The trial period of **R-Drive Image** will start after its fresh install. The **Action Selection** panel will show its remaining time.

You need to obtain a registration key to activate the **R-Drive Image** trial version. You may obtain this key online at the **R-TT web site** or on the **R-Drive Image Please register R-Drive Image** message.

The registration keys are sent to customer e-mail boxes immediately after purchase.

With the purchase of a new **R-TT** software product, you receive one year of support services that includes technical support, customer support and all upgrades and new releases for your product during that term. When your 1-year support service expires, you will need to renew that support at a discounted price to continue receiving support services. The renewal support purchase will extend your support by 1-year from the date of its expiration.

More details are on the **Buy On Line** page (http://www.r-tt.com/BuyOnLine.shtml) at the **R-TT web site**.

**To obtain a registration key directly from R-Drive Image,**

1. Click the **About** button

   ![About button](image)

   and select **Register** on the shortcut menu.
2 Click the Buy license online button on the **Please register R-Drive Image** message

![Please register R-Drive Image](image)

and follow the instructions.

**To register with a registration key,**

1 Click the **About** button and select **Register** on the shortcut menu.

2 Enter the registration key on the **Please register R-Drive Image** message and click the **OK** button.
   The registration information will appear.

![Registration Information](image)

The **Disk Actions** chapter explains basic disk actions.
The **Startup Version** chapter explains how to perform disk actions using the **R-Drive Image Startup Version**.
The **Technical Information** chapter gives technical information on **Supported CD and DVD Recorders** and **List of Hardware Devices Supported in the Startup Mode** and another useful technical information.
Follow this link to obtain R-Drive Image Contact Information and Technical Support
II Disk Actions

This chapter explains how to perform disk actions. Each action starts from the Action Selection panel.

Keyboard Navigation

You may use the keyboard to navigate through and select items and objects on the panels. If there are several objects that can be selected, a dashed frame will appear around the object that is in the current focus.

<table>
<thead>
<tr>
<th>Space</th>
<th>Select/Deselect.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keyboard arrows</td>
<td>Right / Left / Up / Down</td>
</tr>
<tr>
<td>Alt+S / Alt+D</td>
<td>Switch between the Source / Destination panels.</td>
</tr>
<tr>
<td>Tab/Shift-Tab</td>
<td>Forward / Backward</td>
</tr>
</tbody>
</table>

Changing the program language

You may select the language of R-Drive Image panels. To do so, click the Help button and select the required language on the Language menu.

To start a required action, select

- Create an Image of a partition, logical disk, or entire hard drive
- Create an Image from Files
- Restore Data from an Image
- Copy Disk to Disk to make an exact copy of one disk on another
- Manage partition and logical disks
- Mount an Image as a Virtual Logical Disk (read-only)
- Unmount Virtual Logical Disks
- Check an Image File to check an existing image file
The **RAIDs, and Various Disk and Volume Managers** chapter explains how to perform disk actions with various compound volumes such as:

- **Windows Software RAIDs, Spanned, and Other Volumes**
- **Windows Storage Spaces**
- **Mac RAIDs**
- **Linux Logical Volume Manager Volumes**

The **Startup Version** chapter explains how to perform disk actions using the **R-Drive Image Startup Version** such as:

- **Create Startup Disk**
- **Restoring Data to a System or Other Locked Disk**
- **Support for Various Disk Partition Schemes and File Systems**
- **Disk to Disk Copy Using the Startup Disks**

The **Scheduled Actions, Command Line Operations, and Scripting** chapter explains how to start disk actions automatically at scheduled times/events and create scripts that can be performed from a command line.

- **Scheduler and Unattended Actions**
- **Scripting and Command Line Operations**
- **Rotation schemes (backup sets)**

The **Technical Information** chapter gives technical information on

- **Creating consistent point-in-time backups**
- **Support for Various non-MBR/GPT Partition Layouts**
- **Supported CD and DVD Recorders**
- **List of Hardware Devices Supported in the Startup Mode**

The **R-Drive Image OEM kit** chapter explains how computer system integrators can create system recovery disks for their systems

- **Create a Master Image**
- **Create Startup Media**

Follow this link to obtain **R-Drive Image Contact Information and Technical Support**

### 2.1 Create an Image

**Note:** You may read about **Support for Various Disk Partition Schemes and File Systems** to learn more about possible options for your specific case.

You may create images of entire objects or backup only selected files during this action. Images from files can also be created by selecting **Create an Image from Files** on the **Action Selection** panel.
Creating images of entire objects

To create an image:

1. Click Create image on the Action Selection panel
   
   R-Drive Image will start analyzing the computer disk configuration, the Progress... message showing the progress.

   ![R-Drive Image Progress Analysis](image)

   Then the Select disk(s) to create image panel will show the configuration.

   More information...

2. S.M.A.R.T. warning for a hard drive

   If a hard drive has S.M.A.R.T. warnings, a color mark will appear on its left-top corner. Dragging the cursor over the drive will show a tooltip explaining that warning.

   ![S.M.A.R.T. Warning](image)

   Warnings will also appear in confirming e-mails for scheduled actions.

   * ===================[S.M.A.R.T.]===================
   ! SAMSUNG HM320HJ 2AK10001(298GB #2): Health Status: BAD
   [01] Read Error Rate
   ! ===================[S.M.A.R.T.]===================

   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.

2. Select the objects you want to backup on the Select disk(s) to create image panel and click the Next button
**Keyboard Navigation**

You may use the keyboard to navigate through and select items and objects on the panels. If there are several objects that can be selected, a dashed frame will appear around the object that is in the current focus.

- **Space**: Select/Deselect.
- **Keyboard arrows**: Right / Left / Up / Down
- **Alt+S / Alt+D**: Switch between the Source / Destination panels.
- **Tab/Shift-Tab**: Forward / Backward

**More information…**

Selected Objects

You may select all objects on a hard drive by clicking the hard drive icon. It will show the marked hard drive.

Use the Refresh button if your computer disk configuration has been changed (when you connect a USB disk, for example).

You may select the backup type for each partition. You may store in the image either the exact Sector by backup copy of the object, Backup useful information only, or Backup selected files. Right-click the object and select the required backup type on the shortcut menu.
3 Select the place on the Choose destination of new image panel to which the image files will be written, specify the file name, and click the Next button.

You may select any place including connected network drives, **supported CD and DVD Recorders**, or any other devices with removable storage.

You may also choose what image format will be created. (Only in the **Corporate**, **Technician**, and **Commercial** versions).

### Image file format

<table>
<thead>
<tr>
<th>Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>rdr</td>
<td>Default. A proprietary image format. Data in the image can be compressed and password protected, although it provides a relatively moderate protection against conventional unauthorized access. The image can be split into several files and include a short description.</td>
</tr>
<tr>
<td>vmdk</td>
<td>A common virtual disk format for virtual machine. Only the <strong>Corporate</strong>, <strong>Technician</strong>, and <strong>Commercial</strong> versions support this format.</td>
</tr>
</tbody>
</table>

### Imaging Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Differentially</td>
<td>Appended changes will be those between the saved full image and the current state. If there is no full image, it will be created instead. When restoring data, you will need the full image and ONLY the differential file created at the instant to which you want to restore data.</td>
</tr>
<tr>
<td>Incrementally</td>
<td>Appended changes will be those between the last saved changes and the current state. If there is no full image, it will be created instead. When restoring data, you will need the full image and ALL files (both incremental and differential ones) created to the instant to which you want to restore data.</td>
</tr>
</tbody>
</table>

**Minimum file sizes**: If you need to keep only the latest backup instant, you may use the Append changes differentially to the existing image option and delete all previous differential files. If you need to keep all instances, you may use the Append changes incrementally to the existing image option to keep overall file sizes smaller.
**Data safety:** If any of the differential file is damaged, data will be lost only for that backup instant. If any of the incremental file is damaged, data will be lost for all subsequent backup instances starting from the damaged file until the next full of differential backup.

| Full | All data in the image file will be replaced with the current one. |

Click the Options button to specify additional options and parameters, if necessary.

- **Image Options** panel

<table>
<thead>
<tr>
<th><strong>Image options</strong></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image compression ratio</td>
<td>You may compress the data in the image to save space. Please note that the smaller size you select the more time will be spent to create the image file and vice versa.</td>
</tr>
<tr>
<td>Volume size for multi-volume image</td>
<td>You may set this option to Automatic and let Windows decide how to split the image file. This mostly depends on the file system on the destination disk. You may also either explicitly specify the split size, or choose a preset for various devices with removable storage. Select Fixed size for that. For the RDR format, a new partial file of the image will be started when the previous file reaches the specified file size. For the VMDK format, a new partial file of the image will be started when the specified data volume of the source object has been processed.</td>
</tr>
<tr>
<td>Estimated size</td>
<td>Shows the estimated size of the image file. An actual image size depends on how much empty space is on the selected partition and what file types are there.</td>
</tr>
<tr>
<td>Password protection</td>
<td>You may protect your image file with a password. <strong>Note:</strong> This feature provides a relatively moderate protection against conventional unauthorized access.</td>
</tr>
<tr>
<td>Image description</td>
<td>You may attach a text description to the image for annotation. Maximum length of the description is 255 characters.</td>
</tr>
<tr>
<td>Validate image when completed</td>
<td>Select this option if you want R-Drive Image to check the newly created file image for its consistency. This may be useful for storing image files with critical data. Please note that this operation requires additional time.</td>
</tr>
<tr>
<td>Shutdown computer when completed</td>
<td>If this checkbox is selected, <strong>R-Drive Image</strong> will shut your computer down when completed the task.</td>
</tr>
</tbody>
</table>
• **Notifications Options** panel

**Notifications options**

**Execute on**
You may specify the applications of the *.com, *.exe, and *.pif types, and their parameters delimited by a space.

**Mail Notification**
If a personal firewall is installed on your computer, you should allow the `r-driveimagecl.exe` application to get access to the e-mail server.

**Test mail account**
Click this button to test whether you entered the correct mail settings.
- **Backup Options** panel

<table>
<thead>
<tr>
<th><strong>Backup Options</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Snapshot provider</strong></td>
<td>A snapshot provider is a service <strong>R-Drive Image</strong> uses to read the disk content while creating its image. <strong>R-Drive Image</strong> uses the snapshot providers in the order specified on the tab. If it fails to use the first one selected, it tries to use the second one, and so on.</td>
</tr>
<tr>
<td><strong>Windows Volume Snapshot Service</strong></td>
<td>If this check box is selected, <strong>R-Drive Image</strong> will try to use the Windows native snapshot provider. This snapshot provider is able to notify system applications that a snapshot is being taken. If this option is selected, <code>pagefile.sys</code> and <code>hibernate.sys</code> files are excluded from the image of the system disk.</td>
</tr>
<tr>
<td><strong>R-TT Volume Snapshot Service</strong></td>
<td>If this check box is selected, <strong>R-Drive Image</strong> will try to use R-TT snapshot provider. This snapshot provider is not able to notify system applications that a snapshot is being taken.</td>
</tr>
<tr>
<td><strong>Notify system applications</strong></td>
<td>If this check box is selected, the snapshot provider, if it supports this feature, notifies system applications that a snapshot is being taken.</td>
</tr>
<tr>
<td><strong>Limit I/O rate</strong></td>
<td>Specifies the rate limits for reading/writing data from/to disks</td>
</tr>
<tr>
<td><strong>Limit read</strong></td>
<td>The rate limit for reading from the source disk</td>
</tr>
<tr>
<td><strong>Limit write</strong></td>
<td>The rate limit for writing to the destination disk</td>
</tr>
<tr>
<td><strong>Process priority</strong></td>
<td>These options specify how much computer resources <strong>R-Drive Image</strong> will consume during a backup process.</td>
</tr>
</tbody>
</table>
**Backup Process Priority**
Specifies the priority of the backup process. Similar to that specified in Windows Task Manager.

**Use CPU cores**
Specifies how many processor cores **R-Drive Image** will use for the backup process.

**Ignore disk read errors (bad sectors)**
If this check box is selected, **R-Drive Image** will ignore possible read errors when it tries to read data from bad sectors. **R-Drive Image** works with disks with bad sectors in the following way:
It reads a certain part of disk (predefined by Windows) and
- If read errors are ignored, the entire part with bad sectors will be filled with zeros.
- If read errors are not ignored, **R-Drive Image** reads that part sector by sector and shows a warning message for every bad sector with two options: skip the sector or try to read it again. In this case only the bad sectors will be filled with zeros, but all that requires manual actions and extremely slows the imaging process.

Please note that **R-Drive Image** is developed for the work with normally functioning disks. If you need to image a malfunctioning disk, use **R-Studio**, a data recovery utility. It has more controls for imaging, and can create **R-Drive Image**-compatible images even in its demo mode, that is, without registering.

**Backup AUX applications**
**R-Drive Image** is able to make applications run before and after all backup operations. Please note that those application should return a 0 exit code. Leave these fields blank if in doubt.

<table>
<thead>
<tr>
<th>Before</th>
<th>An application <strong>R-Drive Image</strong> starts before the backup operations starts. If you need to start several application, you may use a command file. Example: &quot;cmd.exe /c example.bat&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>After</td>
<td>An application <strong>R-Drive Image</strong> starts after the backup operations completes. If you need to start several application, you may use a command file. Example: &quot;cmd.exe /c example.bat&quot;</td>
</tr>
</tbody>
</table>

**Snapshot AUX applications**
**R-Drive Image** is able to make applications run before and after taking the snapshot of one or several volumes. Please note that those application should return a 0 exit code. Leave these fields blank if in doubt.

<table>
<thead>
<tr>
<th>Before</th>
<th>An application <strong>R-Drive Image</strong> starts before it takes the snapshot of one or several volumes. If you need to start several application, you may use a command file. Example: &quot;cmd.exe /c example.bat&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>After</td>
<td>An application <strong>R-Drive Image</strong> starts after it takes the snapshot of one or several volumes. If you need to start several application, you may use a command file. Example: &quot;cmd.exe /c example.bat&quot;</td>
</tr>
</tbody>
</table>

See [Creating consistent point-in-time backups](#) for more details.
4 Verify that the information on the Processing panel is correct and click the Start button

You may also create a script for this action. Click the Script to Clipboard button and paste the script to any text-processing utility.

> R-Drive Image will start creating the image file(s)

The Progress bar will show the progress of the current operation and overall process. When the image is created, the Image created successfully. message will appear. You may cancel the current operation by clicking the Cancel button. The Operation canceled by user message will appear.
If there is not enough space on the destination place, the **Not enough space** message will appear. You may select another place for the rest of the image file or cancel the operation.

When the operation is over, you may see the results of the operation by clicking the **Open logs** button.

**Writing images on CD-R/RW discs and other devices with removable storage**

**CD-R/RW and DVD discs**

If you select a CD/DVD drive to write the image file, you will see the **Media Options** panel. You may create a system recovery disc(s) for your system if you select the **Include R-Drive Image bootable version** option on this panel. You may start your system up using such CD/DVD disc and recover the data using the **R-Drive Image startup version**.

Then select appropriate CD/DVD Media Options. Leave **Use ISO caching** selected unless you have problems with data recording on a disc.

When you click the **Start** button, **R-Drive Image** will open the CD-R/RW drive tray and the **Insert a blank CD-R/RW disc...** message will appear. Insert a blank CD-R/RW disc and click the **OK** button. Each time **R-Drive Image** fills the disc, the **Insert the next blank CD-R/RW disc...** message will appear. Insert the next blank CD-R/RW disc and click the **OK** button.

If you mistakenly insert a non-empty CD-R/RW disc, the **CD-R/RW disc is not empty...** message will appear. Change the disc to another empty CD-R/RW disc and click the **OK** button.

**Supported CD and DVD Recorders**.

**Disk/file structure for CD-R/RW discs and other devices with removable storage**
If you specify the filename.rdr file name for the image file, **R-Drive Image** will create the following disk/file structure:

<table>
<thead>
<tr>
<th>Disc</th>
<th>File name</th>
</tr>
</thead>
<tbody>
<tr>
<td>The first disk</td>
<td>filename1.rdr</td>
</tr>
<tr>
<td>The second disk</td>
<td>filename2.rdr</td>
</tr>
<tr>
<td>The third disk</td>
<td>filename3.rdr</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

It is recommended that you mark the disk accordingly. You will start restoring the data from the last disk. Go to the **Restore Data from an Image** topic for more details.

**Bad Sectors**

When **R-Drive Image** encounters a bad sector, the **IO Error** message will appear. You may either cancel the current action or fill the bad sectors with zeros.

**IO Error Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abort</td>
<td>Click this button to cancel the action</td>
</tr>
<tr>
<td>Retry</td>
<td>Click this button to try to read the bad sectors once again</td>
</tr>
<tr>
<td>Ignore</td>
<td>Click this button to skip this error and fill the bad sectors with zeros</td>
</tr>
<tr>
<td>Ignore All</td>
<td>Click this button to skip all errors and fill the bad sectors with zeros</td>
</tr>
</tbody>
</table>

Backup only selected files from the **Select disk(s) to create image panel**

1. **Click Create image** on the **Action Selection panel**.
   
   **R-Drive Image** will start analyzing the computer disk configuration, the **Progress...** message showing the progress.
Then the **Select disk(s) to create image** panel will show the configuration.

2. Right-click the objects files on which you want to backup on the **Select disk(s) to create image** panel and select Backup selected files only on the shortcut menu.

3. Select files on the **Files Selected** panel and select the files you want to backup and click the OK button.

You may search for individual files, use **filters**, or the **Batch mode** if you want to include all files of several patterns. Such patterns may include multiple file names, masks, and paths.
And click the Next button on the Select disk(s) to create image panel

4. Select the place on the Choose destination of new image panel to which the image files will be written, specify the file name, and click the Next button.

You may select any place including connected network drives, supported CD and DVD Recorders, or any other devices with removable storage.

Click the Options button to specify additional options and parameters, if necessary.

- Image Options
• **Notifications Options**
• **Backup Options**

See [Creating consistent point-in-time backups](#) for more details.

5 **Verify that the information on the Processing panel is correct and click the Start button**

You may also create a script for this action. Click the **Script to Clipboard** button and paste the script to any text-processing utility.

> **R-Drive Image** will start creating the image file(s)

The Progress bar will show the progress of the current operation and overall process. When the image is created, the **Image created successfully.** message will appear.

When the operation is over, you may see the results of the operation by clicking the **Open logs** button.

The **Disk Actions** chapter explains basic disk actions.

The **Startup Version** chapter explains how to perform disk actions using the **R-Drive Image Startup Version**.

The **Technical Information** chapter gives technical information on **Supported CD and DVD Recorders** and **List of Hardware Devices Supported in the Startup Mode** and another useful technical information.

Follow this link to obtain **R-Drive Image Contact Information and Technical Support**

### 2.2 Create an Image from Files

You may backup only selected files rather than the entire object. You can do that in the **Create Image** and **Create an Image from Files** (below) actions.

#### Create Image from selected files from the Action Selection panel

1 **Click Create image from files on the Action Selection panel**

   **R-Drive Image** will start analyzing the computer disk configuration, the **Progress...** message showing the progress.

2 **Select files you want to include in the image on the Choose files for new image panel and click the Next button**
You may search for individual files, use filters, or the Batch mode if you want to include all files of several patterns. Such patterns may include multiple file names, masks, and paths.

3 Select the place on the Choose destination of new image panel to which the image files will be written, specify the file name, and click the Next button.

You may select any place including connected network drives, supported CD and DVD Recorders, or any other devices with removable storage.

Click the Options button to specify additional options and parameters, if necessary.

- Image Options panel
### Image options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image compression ratio</td>
<td>You may compress the data in the image to save space. Please note that the smaller size you select the more time will be spent to create the image file and vice versa.</td>
</tr>
<tr>
<td>Volume size for multi-volume image</td>
<td>You may set this option to Automatic and let Windows decide how to split the image file. This mostly depends on the file system on the destination disk. You may also either explicitly specify the split size, or choose a preset for various devices with removable storage. Select Fixed size for that. For the RDR format, a new partial file of the image will be started when the previous file reaches the specified file size. For the VMDK format, a new partial file of the image will be started when the specified data volume of the source object has been processed.</td>
</tr>
<tr>
<td>Estimated size</td>
<td>Shows the estimated size of the image file. An actual image size depends on how much empty space is on the selected partition and what file types are there.</td>
</tr>
<tr>
<td>Password protection</td>
<td>You may protect your image file with a password. Note: This feature provides a relatively moderate protection against conventional unauthorized access.</td>
</tr>
<tr>
<td>Image description</td>
<td>You may attach a text description to the image for annotation. Maximum length of the description is 255 characters.</td>
</tr>
<tr>
<td>Validate image when completed</td>
<td>Select this option if your want R-Drive Image to check the newly created file image for its consistency. This may be useful for storing image files with critical data. Please note that this operation requires additional time.</td>
</tr>
<tr>
<td>Shutdown computer when completed</td>
<td>If this checkbox is selected, R-Drive Image will shut your computer down when completed the task.</td>
</tr>
</tbody>
</table>

### Notifications Options panel

#### Notifications options

- **Execute on**
  - You may specify the applications of the *.com, *.exe, and *.pif types, and their parameters delimited by a space.

- **Mail Notification**
  - If a personal firewall is installed on your computer, you should allow the r-driveimagecl.exe application to get access to the e-mail server.

- **Test mail account**
  - Click this button to test whether you entered the correct mail settings.

### Backup Options panel

#### Backup Options

- **Snapshot provider**
  - A snapshot provider is a service R-Drive Image uses to read the disk content while creating its image. R-Drive Image uses the snapshot providers in the order specified on the tab. If it fails to use the first one selected, it tries to use the second one, and so on.

- **Windows Volume**
  - If this check box is selected, R-Drive Image will try to use the Windows native
<table>
<thead>
<tr>
<th>Snapshot Service</th>
<th>snapshot provider. This snapshot provider is able to notify system applications that a snapshot is being taken. If this option is selected, pagefile.sys and hibernate.sys files are excluded from the image of the system disk.</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-TT Volume Snapshot Service</td>
<td>If this check box is selected, <strong>R-Drive Image</strong> will try to use R-TT snapshot provider. This snapshot provider is not able to notify system applications that a snapshot is being taken.</td>
</tr>
<tr>
<td>Notify system applications</td>
<td>If this check box is selected, the snapshot provider, if it supports this feature, notifies system applications that a snapshot is being taken.</td>
</tr>
<tr>
<td>Limit I/O rate</td>
<td>Specifies the rate limits for reading/writing data from/to disks</td>
</tr>
<tr>
<td>Limit read</td>
<td>The rate limit for reading from the source disk</td>
</tr>
<tr>
<td>Limit write</td>
<td>The rate limit for writing to the destination disk</td>
</tr>
<tr>
<td>Process priority</td>
<td>These options specify how much computer resources <strong>R-Drive Image</strong> will consume during a backup process.</td>
</tr>
<tr>
<td>Backup Process Priority</td>
<td>Specifies the priority of the backup process. Similar to that specified in Windows Task Manager.</td>
</tr>
<tr>
<td>Use CPU cores</td>
<td>Specifies how many processor cores <strong>R-Drive Image</strong> will use for the backup process.</td>
</tr>
<tr>
<td>Ignore disk read errors</td>
<td>If this check box is selected, <strong>R-Drive Image</strong> will ignore possible read errors when it tries to read data from bad sectors. <strong>R-Drive Image</strong> works with disks with bad sectors in the following way: It reads a certain part of disk (predefined by Windows) and • If read errors are ignored, the entire part with bad sectors will be filled with zeros. • If read errors are not ignored, <strong>R-Drive Image</strong> reads that part sector by sector and shows a warning message for every bad sector with two options: skip the sector or try to read it again. In this case only the bad sectors will be filled with zeros, but all that requires manual actions and extremely slows the imaging process. Please note that <strong>R-Drive Image</strong> is developed for the work with normally functioning disks. If you need to image a malfunctioning disk, use <strong>R-Studio</strong>, a data recovery utility. It has more controls for imaging, and can create <strong>R-Drive Image</strong>-compatible images even in its demo mode, that is, without registering.</td>
</tr>
<tr>
<td>Backup AUX applications</td>
<td><strong>R-Drive Image</strong> is able to make applications run before and after all backup operations. Please note that those application should return a 0 exit code. Leave these fields blank if in doubt.</td>
</tr>
<tr>
<td>Before</td>
<td>An application <strong>R-Drive Image</strong> starts before the backup operations starts. If you need to start several application, you may use a command file. Example: &quot;cmd.exe /c example.bat&quot;</td>
</tr>
<tr>
<td>After</td>
<td>An application <strong>R-Drive Image</strong> starts after the backup operations completes. If you need to start several application, you may use a command file. Example: &quot;cmd.exe /c example.bat&quot;</td>
</tr>
</tbody>
</table>
Snapshot AUX applications

<table>
<thead>
<tr>
<th>Before</th>
<th>An application R-Drive Image starts before it takes the snapshot of one or several volumes. If you need to start several application, you may use a command file. Example: &quot;cmd.exe /c example.bat&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>After</td>
<td>An application R-Drive Image starts after it takes the snapshot of one or several volumes. If you need to start several application, you may use a command file. Example: &quot;cmd.exe /c example.bat&quot;</td>
</tr>
</tbody>
</table>

See Creating consistent point-in-time backups for more details.

4 Verify that the information on the Processing panel is correct and click the Start button
   You may also create a script for this action. Click the Script to Clipboard button and paste the script to any text-processing utility.

   > R-Drive Image will start creating the image file(s)
      The Progress bar will show the progress of the current operation and overall process. When the image is created, the Image created successfully message will appear.
      When the operation is over, you may see the results of the operation by clicking the Open logs button.

2.3 Restore Data from an Image

   **Note:** You may read about Support for Various Disk Partition Schemes and File Systems to learn more about possible options for your specific case.

   **We recommend you stop all other programs before you start restoring data on a partition.**

   **Note:** Go to the Restoring Data to a System or Other Locked Disk topic if you want to learn how to restore data to system disks.

   You may restore data from images for entire disk objects or restore only selected files.

   **Restoring partitions and entire disks**

   **To restore data from an image to a disk/partition:**

   1 Click Restore from an Image on the Action Selection panel.
      R-Drive Image will start analyzing the computer disk configuration, the Progress... message showing the progress. Then R-Drive Image will show you the Image File Selection panel with the disks/folder structure.

   2 Select the file with the image on the Choose image file panel and click the Next button
When you click the file, you may view its content in the right panel.

**More information...**

<table>
<thead>
<tr>
<th>Objects in Image Files</th>
<th>Source: D:IMAGES/RDI.rdr</th>
<th>Data on the disk</th>
<th>Date/time: 03.23.2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image with one logical disk</td>
<td>E (NTFS-32)</td>
<td>Hard Drive</td>
<td>Disk Letter/Label</td>
</tr>
<tr>
<td></td>
<td>E: (NTFS-32)</td>
<td>Properties</td>
<td>DriveSize/File System</td>
</tr>
<tr>
<td></td>
<td>E: (NTFS-32)</td>
<td></td>
<td>Data on the disk</td>
</tr>
<tr>
<td></td>
<td>E: (NTFS-32)</td>
<td></td>
<td>Date/time: 03.23.2021</td>
</tr>
<tr>
<td></td>
<td>E: (NTFS-32)</td>
<td></td>
<td>Image date/time: 03.23.2021</td>
</tr>
<tr>
<td></td>
<td>E: (NTFS-32)</td>
<td></td>
<td>Image date/time: 03.23.2021</td>
</tr>
</tbody>
</table>

You may also restore data directly from Windows explorer by right-clicking the required image file with the .rdr extension and selecting **Restore Image** from the shortcut menu.

If you select an image with incremental or differential data backup, **select** the date and time of image creation and click the **Next** button.
If the image file is password-protected, the **Password prompt**... message will appear. Enter the password and click the **OK** button.

3. **Select the object in the image file** on the **Image Object Selection** panel, select a destination, and click the **Next** button.

Use the **Refresh** button if your computer disk configuration has been changed (when you connect a USB disk, for example).
**R-Drive Image may show only those disks that you want to see.**

To hide/show disks:

1. Click the Show/hide disks button

   **Hide/show disks**

   ![Disk Selection Screenshot](image)

2. Clear/select disks you want to hide/show

   **Hide/show disks**

   ![Disk Selection Screenshot](image)

   - **R-Drive Image will show only those disks that have been selected**

   **Hide/show disks**

   ![Disk Selection Screenshot](image)

   You may select all objects on a hard drive by clicking the hard drive icon. It will show the
marked hard drive.
You may select only one object at a time, and you need to specify the destination to proceed further.

>S.M.A.R.T. warning for a hard drive

If a hard drive has S.M.A.R.T. warnings, a color mark will appear on its left-top corner. Drugging the cursor over the drive will show a tooltip explaining that warning.

Warnings will also appear in confirming e-mails for scheduled actions.

*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.

>More information...

If the chosen destination is smaller than the selected image, R-Drive Image will show the Destination disk is too small message and you will need to select another destination.

If you select several partitions as the destination, R-Drive Image will show the You have selected several partitions... message. If you click the OK button, all those partitions will be deleted and data will be restored on that free space.

Note: Although R-Drive Image shows unallocated space instead of the deleted partitions, the partitions and their data will be actually deleted only when R-Drive Image starts restoring the data from the image.
5 Specify restore parameters on this panel and click the Next button
You may change create/copy/modify parameters on the Create partition, Copy partition, or Modify partition panel. Click the Create / Copy Options / Modify button, respectively.

<table>
<thead>
<tr>
<th>Create/Copy Partition Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partition layout</td>
</tr>
<tr>
<td>Partition type</td>
</tr>
<tr>
<td>File system</td>
</tr>
<tr>
<td>Allocation unit size</td>
</tr>
<tr>
<td>Volume label</td>
</tr>
<tr>
<td>Drive letter</td>
</tr>
<tr>
<td>Partition size</td>
</tr>
<tr>
<td>Free space before</td>
</tr>
<tr>
<td>Partition size</td>
</tr>
<tr>
<td>Free space after</td>
</tr>
<tr>
<td>![Green marks available space]</td>
</tr>
</tbody>
</table>
You may format a disk if necessary. Click the **Format** button and select the format parameters on the **Format partition** panel.

- **Format partition options**

<table>
<thead>
<tr>
<th>File system</th>
<th>You may select the file system for the partition to be formatted.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allocation unit size</td>
<td>It is the size of a disk block, that is, the minimum allocatable disk space.</td>
</tr>
<tr>
<td>Volume label</td>
<td>Label for this volume.</td>
</tr>
</tbody>
</table>

You may also delete or wipe selected disk object by clicking the **Delete** button. Click the **Clear HDD** or **Wipe** button if you want to delete all object on the hard drive or wipe its data. Go to the **Partition Manager** help page for more details.

- To restore data from an image of an entire hard drive to a hard drive:

  The **Restore/Copy Parameters** panel will be different with different sets of options:
### HDD Copy Method

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Raw disk copy</strong></td>
<td><strong>R-Drive Image</strong> writes sector-by-sector the data from the original drive or its image to the target one making an exact copy of the original disk regardless of its partitioning method. Can be used if other methods create a non-bootable disk due to incorrect detection of drive's geometry or non-standard loader. Drawback: partition sizes cannot be changed.</td>
</tr>
<tr>
<td><strong>Copy all partitions onto original places</strong></td>
<td><strong>R-Drive Image</strong> copies all partitions to their original places. If <strong>R-Drive Image</strong> detects the drive's geometry correctly, and there is no non-standard loader, it makes the same result as during Raw disk copy.</td>
</tr>
<tr>
<td><strong>Realign partitions</strong></td>
<td><strong>R-Drive Image</strong> will copy the partitions on the disk with a 512KB alignment. This is very useful for SSD and advanced-formatted disks. If there are empty (non-used) spaces between partitions, those spaces will be removed taking into account the alignment.</td>
</tr>
<tr>
<td><strong>Expand/Shrink partition to whole disk</strong></td>
<td>If there are empty (not-used) places between the partitions or they occupy less or more space than the target drive, <strong>R-Drive Image</strong> proportionally expands/shrinks them to occupy the entire target drive. Otherwise it is similar to Copy all partitions onto original places.</td>
</tr>
<tr>
<td><strong>Fixed active partition</strong></td>
<td><strong>R-Drive Image</strong> preserves the original offset/size of the active partition (in case the loader has links to it).</td>
</tr>
</tbody>
</table>

See [Support for Various Disk Partition Schemes and File Systems](#) for details.

When you restore data from an image of a system disk, a disk signature collision may occur. In this case, the **Disk Signature Collision** panel will appear. You may specify the way to resolve this collision on this panel.
Disk Signature Collision Resolving

| Same signature for both disk | **R-Drive Image** will create an identical copy of the source disk with the same signature. To avoid disk signature collision, you'll have to disconnect one of the disks and restart the computer, if necessary. Use this mode if you clone a system disk for another computer or only the target disk will be used in yours. |
| Different signature on the target disk. | **R-Drive Image** will write another disk signature to the target disk. Don’t use this mode if you clone a system disk, Windows won’t start from it. To get access to the target disk after cloning, you’ll have to restart the computer or re-connect it if it’s an external USB disk. |
| Change the disk signature on the source disk. | **R-Drive Image** will change the disk signature on the source disk. Use this mode if you want to start Windows from the target disk, but be warned: the computer won’t start from the source disk anymore. |

If you try to restore data to a system or other disk locked by the system or other application, the **Disk not locked** message will appear.
To continue restoring you may:

- If you restore data to your system disk, select Restart computer (recommended) to continue restoring the data in the R-Drive Image startup mode. Read carefully the Restoring Data to a System Disk topic before you proceed.

- If you restore data to a disk locked by other low-level disk software (including Windows internal services), stop this software and select Retry to lock the disk once again.

- You may also try to unlock the disk by selecting Force Windows to unlock the disk (not recommended). If Windows fails to unlock the disk, the Disk not locked message will appear again. You will need to stop the software locking the disk manually or select Restart computer (recommended) to continue restoring the data in the R-Drive Image startup mode.

Note: Use this option cautiously, because it may cause unpredictable results including system crash and data loss.

6 Verify that the information on the Processing panel is correct and click the Start button

You may also create a script for this action. Click the Script to Clipboard button and paste the script to any text-processing utility.

R-Drive Image will start restoring the data from the image file to the selected destination.

When the image is restored, the Image restored successfully message will appear.

If some other program (like a file manager) is accessing the partition on which the data is to be restored, the Cannot lock the disk message will appear. Close this program or make it stop accessing the partition.

If you restore data from an image of an entire hard drive to an entire hard drive, the system may not see the restored partitions until restarted. In this case R-Drive Image will show the Disk image restored successfully message. Click the Yes button to restart your system.
Restoring data from CD-R/RW drives or other devices with removable storage

For the image with the file name `filename.rdr`, R-Drive Image creates the following disk/file structure:

<table>
<thead>
<tr>
<th>Disk</th>
<th>File name</th>
</tr>
</thead>
<tbody>
<tr>
<td>The first disk</td>
<td><code>filename1.rdr</code></td>
</tr>
<tr>
<td>The second disk</td>
<td><code>filename2.rdr</code></td>
</tr>
<tr>
<td>The third disk</td>
<td><code>filename3.rdr</code></td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

You should start restoring the data from the last disk. Each time R-Drive Image requires a new disk, the Insert disk #... message will appear. Insert the necessary disk and click the OK button. Follow the device instructions on how to change its disks.

**Note:** At the beginning, R-Drive Image may require you to change the first/last disks several times.

Bad Sectors

When R-Drive Image encounters a bad sector, the IO Error message will appear. You may either cancel the current action or fill the bad sectors with zeros.

**IO Error Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abort</td>
<td>Click this button to cancel the action</td>
</tr>
<tr>
<td>Retry</td>
<td>Click this button to try to read the bad sectors once again</td>
</tr>
<tr>
<td>Ignore</td>
<td>Click this button to skip this error and fill the bad sectors with zeros</td>
</tr>
<tr>
<td>Ignore All</td>
<td>Click this button to skip all errors and fill the bad sectors with zeros</td>
</tr>
</tbody>
</table>
Restoring selected files and folders

(See Support for Various Disk Partition Schemes and File Systems for the list of supported file systems)

1. **Click Restore from an Image on the Action Selection panel**
   - R-Drive Image will start analyzing the computer disk configuration, the **Progress...** message showing the progress. Then R-Drive Image will show you the **Choose image file** panel with the disks/folder structure.

2. **Select the file with the image on the Choose image file panel and click the Next button**
   - When you click the file, you may view its content in the right panel.
   - If you select an image with incremental or differential data backup, select the date and time of image creation and click the **Next** button.
   - If the image file is password-protected, the **Password prompt...** message will appear. Enter the password and click the **OK** button.

3. **Select the object in the image file on the Image Object Selection pane where the files and folders reside, and click the Next button**
Mark folders and files to restore on the Select Files to Restore panel, specify the output folder, and click the OK button.

You may also specify Options that control processing of already existing files. You may search for individual files, use filters, or the Batch mode if you want to include all files of several patterns. Such patterns may include multiple file names, masks, and paths.

Click the Next button to continue file restore on the Image Object Selection panel.

Verify that the information on the Processing panel is correct and click the Start button. You may also create a script for this action. Click the Script to Clipboard button and paste the script to any text-processing utility.
> R-Drive Image will start restoring the files from the image file to the selected destination. If the files already exist in the specified folder, **The file exists** message will appear. Click the necessary button to resume the restore operation.

```
R-Drive Image

The file exists

Current file information
File name: C:\Users\Tester1\Documents\Recover\Documents\My Report 1.doc
New name: My Report 1_2.doc

Apply the answer to all files
Overwrite Rename Skip file
```

When the image is restored, the **Files restored successfully** message will appear.

```
R-Drive Image

Files restored successfully

Ok
```

The **Disk Actions** chapter explains basic disk actions.
The **Startup Version** chapter explains how to perform disk actions using the R-Drive Image Startup Version.
The **Technical Information** chapter gives technical information on **Supported CD and DVD Recorders** and **List of Hardware Devices Supported in the Startup Mode** and another useful technical information.

Follow this link to obtain **R-Drive Image Contact Information and Technical Support**

### 2.4 Copy a Disk to a Disk

**Attention: All previous data on the destination disk will be completely deleted**

To copy an entire disk or its part to another one:

1. Click **Copy Disk** on the **Action Selection** panel.

   R-Drive Image will start analyzing the computer disk configuration, the **Progress...** message showing the progress. Then the **Object Selection** panel will show the configuration.

```
More information...
```

```
Disk Configuration

Hard Drives

OPT 901.5GB
MBR 298GB
MBR 298GB

Partitions/Logical Drives/Unallocated Space

Selected Object
Rec 300MB
U 1 Syst 0 MB
C: 2000MB NTFS
D: 148 MB NTFS

Disk Letter/Size/Type/Space/FileSystem/Label
```

You may select all objects on a hard drive by clicking the hard drive icon. It will show the marked hard drive.
2 Select the disk object on the **Source:** on the **Object Selection** panel, select a destination, and click the **Next button**

You may select only one object at a time, and you need to specify the destination to proceed further.

Use the **Refresh** button if your computer disk configuration has been changed (when you connect a USB disk, for example).

**More information...**

If the destination is smaller than the selected object, **R-Drive Image** won't allow you to select this object and you will need to select another destination.

If you select several partitions as the destination, **R-Drive Image** will show the **You have selected several partitions...** message. If you click the **OK** button, all those partitions will be deleted and data will be restored on that free space.

**Note:** Although **R-Drive Image** shows unallocated space instead of the deleted partitions, the partitions and their data will be actually deleted only when **R-Drive Image** starts copying the data.
S.M.A.R.T. warning for a hard drive

If a hard drive has S.M.A.R.T. warnings, a color mark will appear on its left-top corner. Drugging the cursor over the drive will show a tooltip explaining that warning.

Warnings will also appear in confirming e-mails for scheduled actions.

* ===================[S.M.A.R.T.]===================
! SAMSUNG HM320HJ 2AK10001 (298GB #2): Health Status: BAD
[01] Read Error Rate
! ===================[S.M.A.R.T.]===================

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.

If you try to copy data to or from a system, or other disk locked by the system or other application, the Disk not locked message will appear.

To continue copying you may:
- If you copy data to or from your system disk, select Restart computer (recommended) to continue restoring the data in the R-Drive Image startup mode. Read carefully the Disk to Disk Copy Using the Startup Disks topic before you proceed.
- If you copy data to a disk locked by other low-level disk software (including Windows internal services), stop this software and select Retry to lock the disk once again.
- You may also try to unlock the disk by selecting Force Windows to unlock the disk (not recommended). If Windows fails to unlock the disk, the Disk not locked message will appear again. You will need to stop the software locking the disk manually or select Restart computer (recommended) to continue copying the data in the R-Drive Image startup mode.

Note: Use this option cautiously, because it may cause unpredictable results including system crash and data loss.

You may select all objects on a hard drive by clicking the hard drive icon. . It will show the marked hard drive.

3 Specify copy parameters on the Restore/Copy Parameters panel and click the Next button

- **Restore parameters**
  You may change create/copy/modify parameters on the Create partition, Copy partition, or Modify partition panel. Click the Create / Copy Options / Modify button, respectively.

**Create/Copy Partition Parameters**

<table>
<thead>
<tr>
<th>Partition layout</th>
<th>The type of partition layout. See Support for Various Disk Partition Schemes and File Systems for the list of supported partition types.</th>
</tr>
</thead>
</table>

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<table>
<thead>
<tr>
<th>Partition type</th>
<th>Primary (Active)/ Primary/Logical You may specify the type of the partition to be restored. Do not change this setting unless you have serious reasons to do so.</th>
</tr>
</thead>
<tbody>
<tr>
<td>File system</td>
<td>You may select the file system for the partition to be restored.</td>
</tr>
<tr>
<td>Allocation unit size</td>
<td>It is the size of a disk block, that is, the minimum allocatable disk space. (only on the Create partition panel.)</td>
</tr>
<tr>
<td>Volume label</td>
<td>Label of this volume. You can change it.</td>
</tr>
<tr>
<td>Drive letter</td>
<td>Select the letter that will be assigned to the partition. You may select &quot;Do not connect&quot; if you do not want to connect this partition to your system.</td>
</tr>
<tr>
<td>Partition size</td>
<td>Minimum/maximum size of the partition to be restored.</td>
</tr>
<tr>
<td>Free space before</td>
<td>You may specify the size of free space that will be left on the hard drive before the beginning of the partition.</td>
</tr>
<tr>
<td>Partition size</td>
<td>You may specify the size of the partition to be restored. Should be between the minimum and maximum partition size.</td>
</tr>
<tr>
<td>Free space after</td>
<td>You may specify the size of free space that will be left on the hard drive after the end of the partition.</td>
</tr>
<tr>
<td></td>
<td>You may visually adjust the location and size of the object to be restored. All other restore options will be adjusted accordingly. Also, when you adjust one or several restore options directly, these changes will be shown visually. Green marks available space. See Support for Various Disk Partition Schemes and File Systems for the list of supported file systems.</td>
</tr>
</tbody>
</table>

To copy data from an entire hard drive to another hard drive:

The Restore/Copy Parameters panel will be different with different sets of options:

HDD Copy Method

- **Raw disk copy**

  R-Drive Image writes sector-by-sector the data from the original drive or its image to the target one making an exact copy of the original disk regardless of its partitioning method. Can be used if other methods create a
non-bootable disk due to incorrect detection of drive's geometry or non-standard loader. Drawback: partition sizes cannot be changed.

| Copy all partitions onto original places | **R-Drive Image** copies all partitions to their original places. If **R-Drive Image** detects the drive's geometry correctly, and there is no non-standard loader, it makes the same result as during Raw disk copy. |
| Realign partitions | **R-Drive Image** will copy the partitions on the disk with a 512KB alignment. This is very useful for SSD and advanced-formatted disks. If there are empty (non-used) spaces between partitions, those spaces will be removed taking into account the alignment. |
| Expand/Shrink partition to whole disk | If there are empty (not-used) places between the partitions or they occupy less or more space than the target drive, **R-Drive Image** proportionally expands/shrinks them to occupy the entire target drive. Otherwise it is similar to Copy all partitions onto original places. |
| Fixed active partition | **R-Drive Image** preserves the original offset/size of the active partition (in case the loader has links to it). |

See [Support for Various Disk Partition Schemes and File Systems](#) for details.

When you copy a system disk, a disk signature collision may occur. In this case, the **Disk Signature Collision** panel will appear. You may specify the way to resolve this collision on this panel.

| Disk Signature Collision Resolving |
| Same signature for both disk | **R-Drive Image** will create an identical copy of the source disk with the same signature. To avoid disk signature collision, you'll have to disconnect one of the disks and restart the computer, if necessary. Use this mode if you clone a system disk for another computer or only the target disk will be used in yours. |
| Different signature on the target disk | **R-Drive Image** will write another disk signature to the target disk. Don’t use this mode if you clone a system disk, Windows won’t start from it. To get access to the target disk after cloning, you’ll have to restart the computer or... |
4. **Verify that the information on the Processing panel is correct and click the Start button**
You may also create a script for this action. Click the **Script to Clipboard** button and paste the script to any text-processing utility.

> **R-Drive Image** will start copying the data from the source to the selected destination place.
When the data is copied, the **Object copied successfully** message will appear.

If some other program (like a file manager) is accessing the partition on which the data is to be restored, the **Cannot lock the disk** message will appear. Close this program or make it stop accessing the partition.

If you copy an entire hard drive to another hard drive, two absolutely identical hard drive will appear in your system. That will confuse it and may cause unpredictable results. To prevent that, a **Disk copied successfully** message will appear. You may turn your system off to disconnect one of the disks, or restart it to disable one of the disk in the BIOS of your system. Under Windows 95/98/Millennium, the target disk will not appear until system restart even if you decide to click the **Cancel** button.

**Bad Sectors**

When **R-Drive Image** encounters a bad sector, the **IO Error** message will appear. You may either cancel the current action or fill the bad sectors with zeros.

**IO Error Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abort</td>
<td>Click this button to cancel the action</td>
</tr>
<tr>
<td>Retry</td>
<td>Click this button to try to read the bad sectors once again</td>
</tr>
<tr>
<td>Ignore</td>
<td>Click this button to skip this error and fill the bad sectors with zeros</td>
</tr>
<tr>
<td>Ignore All</td>
<td>Click this button to skip all errors and fill the bad sectors with zeros</td>
</tr>
</tbody>
</table>

The **Disk Actions** chapter explains basic disk actions.
The **Startup Version** chapter explains how to perform disk actions using the **R-Drive Image Startup Version**.
The **Technical Information** chapter gives technical information on **Supported CD and DVD Recorders** and **List of Hardware Devices Supported in the Startup Mode** and another useful technical information.
Follow this link to obtain **R-Drive Image Contact Information and Technical Support**.
2.5 Partition Manager

R-Drive Image has a built-in partition manager. It can perform the following disk operations:

**Entire hard drives:** An entire hard drive can be cleared or wiped

**Existing partitions:** An existing partition can be modified, formatted, deleted, or wiped

**Unallocated space:** A new partition can be created, or free space can be wiped

All commands can be invoked either by clicking the respective button on the panel, or by right-clicking the object and selecting the respective menu item.

**Entire hard drive**

To clear an entire hard drive:

1. **Click Partition Manager on the Action Selection panel.**
   - R-Drive Image will start analyzing the computer disk configuration, the *Progress...* message showing the progress.

2. **Select the hard drive and click the Clear HDD button on the Object Selection panel.**
3 Select another disk action on the Object Selection panel, if necessary.

If not, click the Next button.

4 Verify that the information on the Processing panel is correct and click the Start button.

R-Drive Image will remove all objects on the disk.

To wipe an entire hard drive:
Data wiping is necessary only for files stored on conventional hard drives. Data stored on SSD storage devices cannot be effectively wiped out due to the principles of operation of these devices.

1 Click Partition Manager on the Action Selection panel.

R-Drive Image will start analyzing the computer disk configuration, the Progress... message showing the progress.
2. Select the hard drive and click the Wipe button on the Object Selection panel.

3. Select the necessary wiping algorithm on the Wipe an object panel and click the OK button.

You may read more about wiping algorithms on the Disk Wiping Algorithms help page.

4. Select another disk action on the Object Selection panel, if necessary.
   If not, click the Next button.

5. Verify that the information on the Processing panel is correct and click the Start button.

   - R-Drive Image will remove all objects on the disk and wipe it.

Existing partition

To modify/format/delete/wipe an existing partition:

1. Click Partition Manager on the Action Selection panel.
   - R-Drive Image will start analyzing the computer disk configuration, the Progress... message showing the progress.

2. Select the partition and click the Modify/Format/Delete/Wipe button on the Object Selection panel and specify the required parameters:

<table>
<thead>
<tr>
<th>Modify panel</th>
<th>Modify parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Format panel</td>
<td>Format options</td>
</tr>
<tr>
<td>Delete button</td>
<td>Deletes partition</td>
</tr>
<tr>
<td>Wipe panel</td>
<td>Wipe algorithms</td>
</tr>
</tbody>
</table>

then click the OK button.
3 Verify that the information on the Processing panel is correct and click the Start button.

> R-Drive Image will perform the specified action.

**Unallocated space**

To create a new partition on an allocated space:

1. Click Partition Manager on the Action Selection panel.
   - R-Drive Image will start analyzing the computer disk configuration, the Progress... message showing the progress.
2. Select the unallocated space, click the Create button on the Object Selection panel, and specify the required parameters on the Create partition panel, then click the OK button.
3. Verify that the information on the Processing panel is correct and click the Start button.

> R-Drive Image will create a new partition.

To wipe an unallocated space:

1. Click Partition Manager on the Action Selection panel.
   - R-Drive Image will start analyzing the computer disk configuration, the Progress... message showing the progress.
2. Select the unallocated space, click the Wipe button on the Object Selection panel, and specify the wiping algorithms on the Wipe partition panel, then click the OK button.
3. Verify that the information on the Processing panel is correct and click the Start button.

> R-Drive Image will wipe the unallocated space.

### 2.6 Mount an Image as a Virtual Logical Disk

**Note:** You can mount images only as read-only disks. See [Support for Various Disk Partition Schemes and File Systems](#) for the list of supported file systems.

To mount an image as a Virtual Logical Disk:

1. Click Mount an Image as a Virtual Logical Disk on the Action Selection panel.
   - R-Drive Image will show you the Choose image to mount drive(s) from panel with the disks/folders structure.
2. Select the file with the image on the Choose image to mount drive(s) from panel and click the Next button.

When you click the file, you may view its content on the right pane.

More information...
You may select all objects on a hard drive by clicking the hard drive icon. It will show the marked hard drive.

You may also mount the disk from Windows explorer by right-clicking the required image file with the .rdr extension and selecting **Mount as Virtual Disk** from the shortcut menu.

If you select an image with incremental or differential data backup, select the date and time of image creation and click the **Next** button.

If the image file is password-protected, the **Password prompt...** message will appear. Enter the password and click the **OK** button.

3 **Select the object in the image file on the Choose image to mount panel, select a drive letter, and click the Next button**
You may select only one object at a time, and you need to specify its drive letter to proceed further.

More information...

4 Verify that the information on the Processing panel is correct and click the Start button
You may also create a script for this action. Click the Script to Clipboard button and paste the script to any text-processing utility

& R-Drive Image will start mounting the selected object as a virtual logical disk.
When the disk is mounted, the Virtual disk(s) mounted successfully message will appear.

Mounting images on devices with removable storage
You cannot mount a split image if its files are stored on separate removable disks. However you can mount such image if you copy all the files into one folder on a hard disk.
Note: While R-Drive Image is mounting an image, Windows itself may install additional software required to run the virtual logical disks correctly. In this case follow Windows on-screen instructions.

The Disk Actions chapter explains basic disk actions.
The Startup Version chapter explains how to perform disk actions using the R-Drive Image Startup Version.
The Technical Information chapter gives technical information on Supported CD and DVD Recorders and List of Hardware Devices Supported in the Startup Mode and another useful technical information.
Follow this link to obtain R-Drive Image Contact Information and Technical Support

2.7 Unmount Virtual Logical Disks

To unmount Virtual Logical Disks:

1 Click Unmount Virtual Logical Disks on the Action Selection panel.
R-Drive Image will show you the list of virtual disks on the Choose drive(s) to umount them panel.
2 Mark the disks on the **Choose drive(s) to umount them** panel and click the **Next** button

3 Verify that the information on the **Processing** panel is correct and click the **Start** button
You may also create a script for this action. Click the **Script to Clipboard** button and paste the script to any text-processing utility

> **R-Drive Image will start unmounting the selected virtual logical disks**
When the disks are unmounted, the **Virtual disk(s) unmounted successfully**. message will appear.

The **Disk Actions** chapter explains basic disk actions.
The **Startup Version** chapter explains how to perform disk actions using the **R-Drive Image Startup Version**.
The **Technical Information** chapter gives technical information on **Supported CD and DVD Recorders** and **List of Hardware Devices Supported in the Startup Mode** and another useful technical information.

Follow this link to obtain **R-Drive Image Contact Information and Technical Support**

### 2.8 Check an Image File

**To check an image file:**

1. **Click** Check an Image File on the Action Selection panel. **R-Drive Image** will show you the Choose image to check integrity panel with the disks/folder structure.

2. **Select** the file with the image on the Choose image to check integrity panel and click the Next button. When you click the file, you may view its content in the right pane.

**More information...**

#### Objects in Image Files

<table>
<thead>
<tr>
<th>Image Description</th>
<th>Partitions/Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image with one logical disk</td>
<td>Disk Letter/Label</td>
</tr>
<tr>
<td>Image with two logical disks on one hard drive</td>
<td>Disk Letter/Label</td>
</tr>
<tr>
<td>Image with two logical disks on two hard drives</td>
<td>Disk Letter/Label</td>
</tr>
</tbody>
</table>

If the image file is password-protected, the **Password prompt...** message will appear. Enter the password and click the **OK** button.

3. **Verify that the information on the Processing panel is correct and click the Start button**

   You may also create a **script** for this action. Click the **Script to Clipboard** button and paste the script to any text-processing utility.

   **R-Drive Image** will start checking the data in the image file.

   When the image is checked, the **Object checked successfully** message will appear if the image file is good. If it is corrupted, **R-Drive Image** will show the **Image corrupted** message.

![Message: Object checked successfully.]

![Message: Error: Image file is corrupted. Decompression failed. Check system memory for errors.]

The **Disk Actions** chapter explains basic disk actions.
The **Startup Version** chapter explains how to perform disk actions using the **R-Drive Image Startup Version**.

The **Technical Information** chapter gives technical information on **Supported CD and DVD Recorders** and **List of Hardware Devices Supported in the Startup Mode** and another useful technical information.

Follow this link to obtain **R-Drive Image Contact Information and Technical Support**
III Advanced File Filtering

3.1 Filters

Filters can be used if it's necessary to show only files of certain types. For example, the required types are *.jpg and *.docx. Then such files can be searched for and marked accordingly. Complex filters can be created using the Batch mode.

Note that filters do not mark files, they filter out all other file types making R-Drive Image show only files matching the filter(s). File marking affects only those files that are matching the applied filters.

A filter can be specified on the Search window. The example below shows how this filter affects files that R-Drive Image shows on the Select files... panel.

Filter specified

![Filter specified screenshot]

After this filter has been applied, R-Drive Image will show only *.jpg and *.docx files.

Filter applied

![Filter applied screenshot]

Note that folders that contain no *.jpg or *.docx files are show as empty.
Applied filters can be edited and saved to load them later.

**Filter being edited**

Folders and their files may be marked/unmarked manually changing folder's marks accordingly. There are four mark types for folders:

<table>
<thead>
<tr>
<th>Folder Content</th>
<th>Mark Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No files or folder matching the selection recursively have been marked in the folder.</td>
<td>![Folder with no marked files]</td>
</tr>
<tr>
<td>No files or folders matching the selection have been found, but they may appear in the future.</td>
<td>![Folder with no found files]</td>
</tr>
<tr>
<td>Some files match the selection and marked in this folder.</td>
<td>![Folder with partially marked files]</td>
</tr>
<tr>
<td>The folder and all its files and folders recursively match the selection and are marked in this folder.</td>
<td>![Folder with all marked files]</td>
</tr>
</tbody>
</table>

### 3.2 Batch Mode

Batch mode is a way to apply very complex sets of file filters for automated search for folders and files and marking them for backup or restore. Such sets can be saved for future use and loaded when necessary.
The simple way to specify such a set is to mark all necessary files and folders manually on the **Select Files to Restore** panel and click the **Batch mode** button. Depending whether files or folders are on a disk or in an image, their paths may look slightly different.

**Select Files to Restore panel (image)**

![Select Files to Restore panel](image-url)

- **28 files selected - 203.3MB**
  - **Output folder:** C:/Users/Tester1/Documents
  - **Batch mode**
  - **Options**
  - **OK**
  - **Cancel**

**Enter file filter specifications. Wildcards can be used**

- “Files to Delete”
- “Files to Recover/IMG_0002.JPG”
- “Files to Recover/test1.arc”
- “Files to Recover/test3.arc”
- “Files to Recover/wipe Test 3.doc”
- “Music/Carl Off Caminoburana”
- “Music/Mamou_Ghao”

**Save...**
**Load...**
**OK**
**Cancel**
Sets are stored in the plain text format, and can be composed or edited in the **Batch window** or in any text editor capable of exporting text in this format. Below are the rules that should be followed while writing filter sets.

Every filter set consists of strings each representing a single filter. They are executed in the top to bottom order. If, for example, files are to be marked according to the first string, but unmarked according to the seventh string, they will eventually be unmarked.

Filters can include file names, file paths, and wildcards, like * and ?. They can also have some keys that modify their impact on the search results. If a path in the filter has a space in it, it should be enclosed in quotation marks.

**Switches that modify file filters:**

```
-no
```

This filter unmarks the folders or files it's applied to. I.e., `C:\Photos\*.jpg` -no unmarks all jpg files in the `C:\Photos` folder.
<table>
<thead>
<tr>
<th>Switch</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-file</td>
<td>This filter is applied to files. May be shorten to <code>-fi</code>. <code>-no-file</code> negates the filter, making it applied not to files.</td>
</tr>
<tr>
<td>-dir</td>
<td>This filter is applied to folders. May be shorten to <code>-d</code>. <code>-no-dir</code> negates the filter, making it applied not to folders.</td>
</tr>
<tr>
<td>-case</td>
<td>This filter is case-sensitive. May be shorten to <code>-c</code>. <code>-no-case</code> makes the filter case-insensitive.</td>
</tr>
<tr>
<td>-local</td>
<td>This filter is applied to the current folder, not to its subfolders. May be shorten to <code>-l</code>. <code>-no-local</code> negates the filter making it applied to the folder and its subfolders.</td>
</tr>
<tr>
<td>-recursive</td>
<td>This filter is applied to the current folder and its subfolders. May be shorten to <code>-r</code>. <code>-no-recursive</code> negates the filter making it applied only to the folder.</td>
</tr>
<tr>
<td>-from:</td>
<td>The initial date from which files will be marked. It may be either in the form of exact date: <code>-from:20210101</code>, or relative to the current date: <code>-from:now-3week</code>. Has no effect on folders. May be shorten to <code>-fr</code>.</td>
</tr>
<tr>
<td>-to:</td>
<td>The final date to which files will be marked. It may be either in the form of exact date: <code>-to:20211201</code>, or relative to the current date: <code>-to:now-1week</code>. Has no effect on folders.</td>
</tr>
</tbody>
</table>

An exact date may be specified as a local time `YearMonthDayHour24MinSec`, or as a UTC time `YearMonthDayHour24MinSecU`.

Provided that there’s no switches in the filter (i.e., `-recursive`), a file path in the file filter ending with a path separator is applied to the files in the folder and its subfolders. If not, only to the files in the folder.

The file filter `D:\Files\` will be applied to the files in the `D:\Files\`.

The file filter `D:\Files` will be applied to the files in the `D:\Files` and in its subfolders.

Below is an example of filters recursively applied to files in the `D:\Files\Pictures` folder and its subfolders.

```
D:\Files\Pictures
D:\Files\Pictures\My_Photo -no
D:\Files\Pictures\My_Photo\Home???????.jpg
```

Line 1: All files will be marked in the `D:\Files\Pictures` folder and its subfolders will be marked.
Line 2. All files in the `D:\Files\Pictures\My_Photo` folder will be unmarked.
Line 3: Files named like `Home210312.jpg` in the folder `D:\Files\Pictures\My_Photo\` will be marked.

An importance notice about marking a folder.
If you mark all files in the folder but not the folder itself, its mark will be the following:

**The folder was not marked**

The batch will look like:
And the folder will be restored only if there are marked files/folders in it.
If you mark the folder, its mark will be the following:

The folder was marked

The batch will look like:

And the folder will always be restored regardless whether there are marked files/folders in it.

IV RAIDs, and Various Disk and Volume Managers

R-Drive Image supports various RAIDs, and Disk/Volume Managers.

- Hardware RAIDs
- Windows Software RAIDs, Spanned, and Other Volumes
- Windows Storage Spaces
- Apple RAIDs
- Apple CoreStorage/File Vault/Fusion Drive Volumes
- Linux mdadm RAIDs
- Linux Logical Volume Manager Volumes

The Disk Actions chapter explains disk actions such as:

- Create an Image of a partition, logical disk, or entire hard drive
• Create an Image from Files
• Restore Data from an Image
• Copy Disk to Disk to make an exact copy of one disk on another
• Manage partition and logical disks
• Mount an Image as a Virtual Logical Disk (read-only)
• Unmount Virtual Logical Disks
• Check an Image File to check an existing image file

The **Startup Version** chapter explains how to perform disk actions using the **R-Drive Image Startup Version** such as:

• Create Startup Disk
• Restoring Data to a System or Other Locked Disk
• Create an Image Using the Startup Disks
• Disk to Disk Copy Using the Startup Disks

The **Scheduled Actions, Command Line Operations, and Scripting** chapter explains how to start disk actions automatically at scheduled times/events and create scripts that can be performed from a command line.

• Scheduler and Unattended Actions
• Scripting and Command Line Operations
• Rotation schemes (backup sets)

The **Technical Information** chapter gives technical information on

• Logging
• Creating consistent point-in-time backups
• Support for Various Disk Partition Schemes and File Systems
• Supported CD and DVD Recorders
• List of Hardware Devices Supported in the Startup Mode

The **R-Drive Image OEM kit** chapter explains how computer system integrators can create system recovery disks for their systems

• Create a Master Image
• Create Startup Media

Follow this link to obtain **R-Drive Image Contact Information and Technical Support**
4.1 Hardware RAIDs

R-Drive Image supports hardware RAIDs created by RAID controllers.

**Hardware RAID**

Actually, R-Drive Image treats them as single hard disks.

**Hardware RAID**

*Data Restore from an Image of a Hardware RAID*

You may restore data from an image of a hardware RAID with the limitations described in the Support for Various Disk Partition Schemes and File Systems section.
4.2 Windows Software RAIDs, Mirrors, and Spanned Volumes

R-Drive Image supports Windows software RAIDs, mirrors, and spanned volumes. Such objects can be managed using the Disk Management item in Computer management.

Windows software RAID0
Windows software mirror

Windows software spanned volume

Windows Software RAIDs, Mirrors, and Spanned Volumes Imaging
R-Drive Image displays those objects similar to their representation in the Windows Disk Manager.
Windows software RAID0

Windows software mirror
Windows software spanned volume

When you select one parent of a Windows software RAID, mirror, or spanned volume, **R-Drive Image** selects the entire object.

**Data Restore from an Image of a Software RAID, Mirror, and Spanned Volume**

You may restore data from an image of a Windows software RAID, mirror, and spanned volume with the limitations described in the [Support for Various Disk Partition Schemes and File Systems](#) section.

**Windows software RAID0**
4.3 Windows Storage Spaces

R-Drive Image supports Windows Storage Spaces created by Windows 8/8.1 and Windows 10/Threshold 2/Anniversary/Fall Creators updates. Storage pools and spaces is a new storage technology, first introduced in Windows 8 and Windows Server 2012, that allows the user to combine various (not always similar) hard drives into a kind of a RAID or compound volume. First, the hard drives are combined into a storage pool, then several storage spaces with striping (similar to RAID0), mirroring (similar to RAID1), and parity (similar to RAID5) can be created in that storage pool. You may read more about storage pools and spaces in the Microsoft’s Storage Spaces: FAQ.
When drives from a storage pool are connected to a Windows computer, it automatically detects them and assembles storage spaces accordingly.

**Windows storage spaces**

![Windows storage spaces](image)

Storage pools and spaces can be managed using the **Storage Spaces** item in the **Control Panel**.

**Windows storage spaces**

![Windows storage spaces](image)

**R-Drive Image** can image Windows Storage Spaces and then restore data to them with some restrictions.

**Windows Storage Space Imaging**

**R-Drive Image** displays both Windows Storage Spaces and their parents on the **Partition Selection** panel.
When you select a certain Windows Storage Space, **R-Drive Image** also shows its respective parents.

**Data Restore from an Image of a Windows Storage Space**
You may restore data from an image of a Windows Storage Space with the limitations described in the Support for Various Disk Partition Schemes and File Systems section.

Please, note that **R-Drive Image** can restore data only to fixed-provisional Windows Storage Spaces if the Windows version doesn't support Windows Storage Spaces. The startup version of **R-Drive Image** can restore data only to fixed-provisional Windows Storage Spaces, too. You may read more about thin-provisioned or fixed Windows Storage Spaces in Microsoft's Storage Spaces Overview.
4.4 Apple RAIDs

R-Drive Image supports various software RAIDs that OS X can create from disks connected to a Mac computer: RAID1 (Mirror set), RAID0 (Stripe set), and Concatenated disk set.

**Apple RAID0 example**

![Apple RAID0 example](image)

**Apple RAIDs Imaging**

R-Drive Image displays both Apple RAIDs and their members on the Partition Selection panel.

**Apple RAID0**

You may select either the Apple RAID, or its members separately.

**Data Restore from an Image of an Apple RAID**

You may restore data from an image of an Apple RAID with the limitations described in the Support for Various Disk Partition Schemes and File Systems section.
4.5  Apple CoreStorage/File Vault/Fusion Drive Volumes

The macOS operating system has the following disk management systems:

- **File Vault**, is a disk encrypted utility;
- **Fusion Drive** is an Apple's hybrid drive technology;
- **CoreStorage** is a logical volume management system.

**R-Drive Image** supports all these technologies and can unlock their encrypted volumes (hard drives and images).

**Apple CoreStorage/File Vault Volume Imaging**

**R-Drive Image** displays both those volumes and their members on the **Partition Selection** panel.
Locked Apple CoreStorage

In the above case, the entire hard drive will be imaged. You may unlock encrypted volumes and image only them. Click the locked volume and enter the password in the **Unlock encrypted drive** dialog box.

Unlocked Apple CoreStorage

In this case the volume will be image without encryption
**Data Restore from an Image of CoreStorage/File Vault Volumes**

You may restore data from an image of an Apple CoreStorage/File Vault volume with the limitations described in the [Support for Various Disk Partition Schemes and File Systems](#) section.

Data restore from an image of an entire storage device to another storage device.

**Apple CoreStorage**

In this case the result will be the exact copy of the imaged storage device.

Data restore from an image of an unencrypted an Apple CoreStorage/File Vault volume device to the place of a locked encrypted volume.

**Apple CoreStorage**
In this case the result will be an unencrypted volume on the place of the previous encrypted volume.

**Data restore from an image of an unencrypted Apple CoreStorage/File Vault volume device to the place of an unlocked encrypted volume.**

**Apple CoreStorage**

R-Drive Image displays both this volume and its members on the **Partition Selection** panel.

**Apple Fusion Drive Imaging**

R-Drive Image also shows its respective components.

**Data Restore from an Image of Apple Fusion Drive Volumes**

You may restore data from an image of an Apple Fusion Drive volume with the limitations described in the **Support for Various Disk Partition Schemes and File Systems** section.
Apple Fusion Drive

4.6 Linux mdadm RAIDs

`mdadm` is a Linux utility used to manage and monitor software RAID devices. **R-Drive Image** supports such devices and when drives from a `mdadm` RAID are connected to a Windows computer, it automatically detects them and assembles `mdadm` RAIDs accordingly.

**`mdadm` RAIDs Volume Imaging**

*R-Drive Image* displays both `mdadm` RAIDs and their components on the **Partition Selection** panel.
Linux mdadm RAID5

Data Restore from an Image of a mdadm RAIDs Volume
You may restore data from an image of a mdadm RAIDs with the limitations described in the Support for Various Disk Partition Schemes and File Systems section.
4.7 Linux Logical Volume Manager Volumes

Linux LVM is a logical volume manager for the Linux OS that manages disk drives and other data storage devices. Using it, it is possible to create single logical volumes on several physical disks, add and replace them in a running system, resize logical volumes, create various RAID configuration, and so on. You may read more about Linux LVM on this Wikipedia article: Logical Volume Manager (Linux).

LVM volume example

![LVM volume example](image)

LVM volume Imaging

R-Drive Image displays both LVM volumes and their components on the Partition Selection panel.

LVM Volume

![LVM Volume](image)

When you select a certain LVM volume, R-Drive Image also shows its respective members.
Data Restore from an Image of a LVM volume
You may restore data from an image of a LVM volumes with the limitations described in the Support for Various Disk Partition Schemes and File Systems section.

LVM Volume

V Startup Version

There are two types of the R-Drive Image startup mode: with the Graphic User Interface (GUI) and with the Text User Interface (TUI). The interface of the later is actually pseudo-graphic. The GUI type has the same interface as that of the Windows version and its operation is similar. You may refer to the respective help pages for detailed instructions. This chapter describes the operation of the TUI startup version.

This chapter explains how to perform disk actions using the R-Drive Image Startup Version such as:

- Create Startup Disk
- Load Computer into Startup Mode
- Restore Data From an Image
- Create an Image
- Disk to Disk Copy
- Create an Image from Files
- Partition Manager
- Check an Image File
- Network Drives

The Disk Actions chapter explains disk actions such as:

- Create an Image of a partition, logical disk, or entire hard drive
- Create an Image from Files
- Restore Data from an Image
- Copy Disk to Disk to make an exact copy of one disk on another
- Manage partition and logical disks
- Mount an Image as a Virtual Logical Disk (read-only)
- Unmount Virtual Logical Disks
- Check an Image File to check an existing image file

The **RAIDs, and Various Disk and Volume Managers** chapter explains how to perform disk actions with various compound volumes such as:
- Windows Software RAIDs, Spanned, and Other Volumes
- Windows Storage Spaces
- Mac RAIDs
- Linux Logical Volume Manager Volumes

The **Scheduled Actions, Command Line Operations, and Scripting** chapter explains how to start disk actions automatically at scheduled times/events and create scripts that can be performed from a command line.
- Scheduler and Unattended Actions
- Scripting and Command Line Operations
- Rotation schemes (backup sets)

The **Technical Information** chapter gives technical information on
- Creating consistent point-in-time backups
- Support for Various non-MBR/GPT Partition Layouts
- Supported CD and DVD Recorders
- List of Hardware Devices Supported in the Startup Mode

The **R-Drive Image OEM kit** chapter explains how computer system integrators can create system recovery disks for their systems
- Create a Master Image
- Create Startup Media

Follow this link to obtain **R-Drive Image Contact Information and Technical Support**

### 5.1 Create Startup Disks

You need to create a startup CD/DVD disc, USB removable storage device, or 6 floppy disks to restore data to a system or other locked disk. You may also create an ISO image of a startup CD disc and burn it using your favorite CD writing software.

If there is a non-IDE disk controller in your system, or you plan to use network disks or external hardware devices, first check the list of supported hardware.

If you have problems with starting your computer up from the **R-Drive Image** startup disks, select **configure startup media troubleshooting options**. Then the **Startup Media Troubleshooting Options** panel will appear. You may configure these options to eliminate those problems.
Those options will help you if you have problems with starting your computer up from the R-Drive Image startup disks.

### Startup Media Troubleshooting Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display kernel startup messages</td>
<td>If this checkbox is enabled, R-Drive Image displays all startup messages. That may be useful to locate the source of the problem when your system hangs during R-Drive Image startup.</td>
</tr>
<tr>
<td>Trace drivers loading</td>
<td>Select this checkbox when you want to see loading drivers to find which one may lock the system.</td>
</tr>
<tr>
<td>Disables ACPI</td>
<td>Select these checkboxes when your system detects some hardware incorrectly during R-Drive Image startup and displays messages like: hda: lost interrupt</td>
</tr>
<tr>
<td>Disables APIC</td>
<td></td>
</tr>
<tr>
<td>Disables USB devices support</td>
<td>Select these checkbox if your system experiences problems with USB devices during R-Drive Image startup.</td>
</tr>
<tr>
<td>Disables SCSI devices support</td>
<td>Select these checkbox if your system experiences problems with SCSI devices during R-Drive Image startup.</td>
</tr>
<tr>
<td>Disables PATA devices support</td>
<td>Select these checkbox if your system experiences problems with Parallel ATA devices during R-Drive Image startup.</td>
</tr>
<tr>
<td>Disables PCMCIA devices support</td>
<td>Select these checkbox if your system experiences problems with PCMCIA devices during R-Drive Image startup.</td>
</tr>
<tr>
<td>Disables DMA for all IDE disk drives</td>
<td>Select these checkbox if your system experiences problems with IDE disks during R-Drive Image startup.</td>
</tr>
<tr>
<td>IRQ polling mode</td>
<td>Select this checkbox if R-Drive Image does not recognize a device although it is in the supported device list.</td>
</tr>
<tr>
<td>Default clocksource</td>
<td>Select this checkbox to select computer default clocksource.</td>
</tr>
<tr>
<td>PCI BIOS</td>
<td>Select an appropriate option if your system experiences problems with computer</td>
</tr>
</tbody>
</table>
### ACPI OSI

An option informing the computer BIOS which OS type is going to start. Default is Linux, but it may cause the computer BIOS to drop support for some computer hardware. Change this option if the startup version cannot recognize some computer hardware, or it malfunctions.

### Disable specified drivers

Enter the drivers that may cause system lock. Driver names should be separated by a space or comma.

#### To create a startup CD disc:

**Supported CD and DVD Recorders**

1. Select **Create Startup Disks** on the Action Selection panel and click the Next button

2. Select the CD-recorder in the list of supported startup devices with removable storage on the Create Sturtup Disk panel and click the Next button

3. Click the Start button on the Processing panel

4. R-Drive Image will start creating the startup CD disc

   When you click the Start button, **R-Drive Image** will open the CD-R/RW drive tray and the **Insert a blank CD-R/RW disc**... message will appear. Insert a blank CD-R/RW disc and click the OK button. When **R-Drive Image** finishes creating the startup CD disc, the **Startup disks created successfully** message will appear.

   If you mistakenly insert a non-empty CD-R/RW disc, the **CD-R/RW disc is not empty**... message will appear. Change the disc to another empty CD-R/RW disc and click the OK button.
To create an ISO image:

1. Select **Create Startup Disks** on the **Action Selection** panel and click the Next button.
2. Select **ISO** on the **Create Startup Disk** panel, specify a file name for the ISO image, and click the Next button.
3. Click the Start button on the **Processing** panel.
   > When **R-Drive Image** finishes writing the file with the ISO image, the **Startup disks created successfully** message will appear.

4. Create the startup CD using your favorite CD creation software.
   Load the created ISO image into the CD creation software. Consult documentation for the software for details.

To create a startup USB removable device:

It may be a USB flash disk, ZIP drive, etc. It should be FAT/FAT32 formatted and connected to the computer before selecting **Create Startup Disks** on the **Action Selection** panel. If there is some data on that device, it will not be overwritten.

1. Select **Create Startup Disks** on the **Action Selection** panel and click the Next button.
2. Select the required removable device in the list of supported startup devices with removable storage on the **Create Startup Disk** panel and click the Next button.
3. Click the Start button on the **Processing** panel.
   > **R-Drive Image** will start creating the startup USB disc.
   When **R-Drive Image** finishes creating the startup USB disk, the **Startup disks created successfully** message will appear.

The **Disk Actions** chapter explains basic disk actions.

The **Startup Version** chapter explains how to perform disk actions using the **R-Drive Image Startup Version**.

The **Technical Information** chapter gives technical information on **Supported CD and DVD Recorders** and **List of Hardware Devices Supported in the Startup Mode** and another useful technical information.

Follow this link to obtain **R-Drive Image Contact Information and Technical Support**.

### 5.2 Load Computer into Startup Mode

Sometimes you may need to start your computer into **R-Drive Image** startup mode, for example, to restore data to a system disk.

You may do that through the following methods:

- **If you have a Mac computer**...

The startup version of **R-Drive Image** can perform basic disk imaging operations for Mac computers. See the **Support for Various Disk Partition Schemes and File Systems** section for details.
To start a Mac computer with the R-Drive Image startup disk,
1. Insert a CD/DVD disc or connect a USB disk
2. Switch the Mac on.
3. While loading, press the **Option** key on the Mac keyboard (the **Alt** key if you use a non-Apple keyboard).

4. Select the **EFI boot** disk and press **Enter**.

**From the R-Drive Image Graphical User Interface**

*Note: You cannot use this method if your computer uses **UEFI** to start up. Use external startup media, like a USB or CD disk instead.*

If you try to restart an UEFI computer from the Windows, you'll get a **Cannot prepare to reboot...** message.
1. Select the file with the image, the object in the image file, select the system disk as the destination as it is described in the Restore Data from an Image topic. Do not pay much attention to the image file, as it will be eventually discarded. The only important option at this stage is the image destination. Select the system disk.

2. When you click the Next button on the Image Object Selection panel, the Disk not locked message will appear.

3. Select Restart computer (recommended) and click the OK button. The You are about to restart... message will appear. Click the Yes button. (If you click the Cancel button on the Disk not locked message, the Cannot lock the disk message will appear, and R-Drive Image will stay on the Image Object Selection panel.)

You computer will restart. The following text will appear on the screen:

Please select the operating system to start:

R-DriveImage Autopart v.2.0
Microsoft Windows XP Professional

4. Select R-DriveImage Autopart v.2.0 and press the Enter button. You may select Microsoft Windows XP Professional to start Windows normally.

using the R-Drive Image startup CD disc or USB disk

1. Make sure that the first startup device in the system BIOS is the required drive. Disable "Secure boot" in the system BIOS if your computer is certified to run Windows 8 and later. Refer to your system documentation for details.

2. Insert the CD disc or connect the USB disk and start your computer.

R-Drive Image will start in the startup mode and a startup screen will appear:
Select the **R-Drive Image GUI (Graphic Mode)** to run **R-Drive Image** in the graphic mode in which its user interface is similar to the Windows version. If **R-Drive Image** cannot run in this mode, restart the system in the Safe VGA mode (only VESA-compliant) which is compatible with most video cards and monitors. If it fails too, select the Text mode in which the **R-Drive Image** user interface is shown in the pseudo-graphic mode compatible with all video cards. The help below describes this pseudo-graphic mode.

Use the Tab key to switch between the control areas and the arrow keys to select options within the control areas. Press the Enter key to activate the selected button.

You may also activate a key by pressing the highlighted letter key. You may exit the program by pressing the x key.

**Secure boot:**

It may be impossible to start a Windows 8 and later certified computer with the R-Drive Image startup disk without some additional actions. This happens because any computer should use a so-called "Secure boot" procedure to comply with Windows 8 hardware certification from Microsoft. In brief, this procedure prevents computer from booting into any operating system that isn't digitally signed with an appropriate digital signature. "Secure boot" is claimed to prevent unauthorized modification of the boot sector by bootkits, viruses, trojans, and other malicious software. To the date, only Windows 8, Windows Server 2012, and selected Linux distributions support this feature. As a side effect, it also prevents most LiveCDs, rescue disks (R-Studio and R-Drive Image included), and other OS from running.

Likely enough, the other requirement of Windows 8 hardware certification is to make it possible for the user to disable the Secure boot procedure. Those settings can be done through the system BIOS under the Boot options. Generally, it's enough to enable Legacy support in those options, but sometimes it may require additional actions. Please, refer to your system documentation to learn more about disabling/enabling Secure boot.

When Secure boot is disabled, it should be possible to start the computer with the R-Drive Image startup disk. Please note that you should enable this feature back after using the startup disks because Windows 8 or Server 2012 may not start properly without the Secure boot feature enabled.

When the **Action Selection** panel will appear.
Specifying video settings for the GUI startup version.
You may specify video screen resolution when necessary.

1. Select Display settings in the shortcut menu

2. Select the required screen resolution and click the OK button
5.3 Restore Data from an Image

Restoring data to a system or other locked disk:

Note: This help page describes the operation of the TUI startup version. Go to the Restore Data from an Image help page for the GUI version and to the network drives help if necessary.

You cannot restore data to the system (the disk from which Windows starts) or other locked disk the same way you do that to any other disk. You need either to restart R-Drive Image in its startup mode, or start your computer from another computer local disk or from specially created startup disk(s).

We recommended that you print out this topic and have the hardcopy on hand while you are performing this action.

If there is a non-IDE disk controller in your system, or you plan to use network disks or external hardware devices, first check the List of Hardware Devices Supported in the Startup Mode.

If you plan to use any external device, turn it on before starting the system.

If the motherboard in your computer supports the Serial ATA (SATA) devices, but IDE disks are also present, only the SATA devices should be set to the Enhanced Mode in BIOS.

Please, note that the startup version of R-Drive Image can restore data only to fixed-provisional Windows Storage Spaces You may read more about thin-provisioned or fixed Windows Storage Spaces in Microsoft's Storage Spaces Overview.

We recommend you stop all other programs before you start restoring data on a partition.

1. Restart your computer in the startup mode
2. Select Restore from an Image on the Action Selection panel and press the N key

Action Selection Panel

Use the arrow keys to switch between the options.
3 Select the file with the image on the **Open an Image File** panel and press the Enter key

![Open an Image File Panel](image)

**R/O** Read-only disk. You cannot create images on such disks.

Use the **Tab** key to switch between the control areas and the arrow and **Enter** keys to navigate within the **File** area.

You may also connect **network drives**.

4 Select the object in the image file on the **Select an object** panel you want to restore data from and press the N key

![Select Source Object Panel](image)

Use the arrow keys to select the object.

5 Select time and data of the data to restore on the **Select Image Date/Time** panel and press the N key

Use the arrow keys to select the object.
6 Select the destination for the data on the **Select a target for copy/restore operation** panel and press the N key

**Select Target Object Panel**

Use the arrow keys to switch between the target objects.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H</strong></td>
<td>Hard drive</td>
</tr>
<tr>
<td><strong>P</strong></td>
<td>Primary partition</td>
</tr>
<tr>
<td><strong>L</strong></td>
<td>Logical disk</td>
</tr>
<tr>
<td><strong>U</strong></td>
<td>Unallocated space</td>
</tr>
</tbody>
</table>

7 Specify restore parameters on the **Copy/restore options** panel and press the N key

**Copy/Restore Options Panel**

**For restoring/copying one or several partition(s):**

<table>
<thead>
<tr>
<th>Restore Options</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Free space before</td>
<td>You may specify the size of free space that will be left on the hard drive before the beginning of the partition.</td>
</tr>
<tr>
<td>Partition size</td>
<td>You may specify the size of the partition to be restored. Should be between the minimum and maximum partition size.</td>
</tr>
<tr>
<td>Partition type Primary(Active) Primary Logical</td>
<td>You may specify the type of the partition to be restored. Do not change this setting unless you have serious reasons to do so.</td>
</tr>
</tbody>
</table>
For restoring/copying an entire hard drive to another hard drive:

**HDD Copy/Restore Options Panel**

<table>
<thead>
<tr>
<th>HDD Copy Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw disk copy</td>
<td><strong>R-Drive Image</strong> writes sector-by-sector the data from the original drive or its image to the target one making an exact copy of the original disk regardless of its partitioning method. Can be used if other methods create a non-bootable disk due to incorrect detection of drive's geometry or non-standard loader. Drawback: partition sizes cannot be changed.</td>
</tr>
<tr>
<td>Copy all partitions onto original places</td>
<td><strong>R-Drive Image</strong> copies all partitions to their original places. If <strong>R-Drive Image</strong> detects the drive's geometry correctly, and there is no non-standard loader, it makes the same result as during Raw disk copy.</td>
</tr>
<tr>
<td>Realign partitions</td>
<td><strong>R-Drive Image</strong> will copy the partitions on the disk with a 512KB alignment. This is very useful for SSD and advanced-formatted disks. If there are empty (non-used) spaces between partitions, those spaces will be removed taking into account the alignment.</td>
</tr>
<tr>
<td>Expand/Shrink partition to whole disk</td>
<td>If there are empty (not-used) places between the partitions or they occupy less or more space than the target drive, <strong>R-Drive Image</strong> proportionally expands/shrinks them to occupy the entire target drive. Otherwise it is similar to Copy all partitions onto original places.</td>
</tr>
<tr>
<td>Fixed active partition</td>
<td><strong>R-Drive Image</strong> preserves the original offset/size of the active partition (in case the loader has links to it).</td>
</tr>
</tbody>
</table>

See [Support for Various Disk Partition Schemes and File Systems](#) for details.

When you restore data from an image of a system disk, a disk signature collision may occur. In this case, the **Disk Signature Collision** panel will appear. You may specify the way to resolve this collision on this panel.

<table>
<thead>
<tr>
<th>Disk Signature Collision Resolving</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same signature for both disk</td>
<td><strong>R-Drive Image</strong> will create an identical copy of the source disk with the same signature. To avoid disk signature collision, you'll have to disconnect one of the disks and restart the computer, if necessary. Use this mode if you clone a system disk for another computer or only the target disk will be used in yours.</td>
</tr>
<tr>
<td>Different signature on the target disk</td>
<td><strong>R-Drive Image</strong> will write another disk signature to the target disk. Don’t use this mode if you clone a system disk, Windows won’t start from it. To get access to the target disk after cloning, you’ll have to restart the computer or re-connect it if it’s an external USB disk.</td>
</tr>
</tbody>
</table>
### Change the disk signature on the source disk.

R-Drive Image will change the disk signature on the source disk. Use this mode if you want to start Windows from the target disk, but be warned: the computer won’t start from the source disk anymore.

8 **Verify that the information on the Confirm operations panel is correct and press the N key**

> **R-Drive Image** will start restoring the data from the image file to the selected destination.

   The Progress window will show the progress of the current operation and overall process. When the image is restored, the **Operation completed successfully** message will appear.

9 **Verify that the information on the Processing panel is correct and click the Start button**

> **R-Drive Image** will start restoring the files from the image file to the selected destination.

   When the image is restored, the **Files restored successfully** message will appear.

The **Disk Actions** chapter explains basic disk actions.

The **Startup Version** chapter explains how to perform disk actions using the R-Drive Image Startup Version.

The **Technical Information** chapter gives technical information on **Supported CD and DVD Recorders** and **List of Hardware Devices Supported in the Startup Mode** and another useful technical information.

Follow this link to obtain **R-Drive Image Contact Information and Technical Support**

### 5.4 Create an Image

**Note:** You may read about **Support for Various Disk Partition Schemes and File Systems** to learn more about possible options for your specific case.

**It is recommended that you print out this topic and have the hardcopy on hand while you are performing this action.**

**Note:** This help page describes the operation of the TUI startup version. Go to the **Create an Image** help page for the GUI version and to the **network drives** help if necessary.

If there is a non-IDE disk controller in your system, or you plan to use network disks or external hardware devices, first check the **list of supported hardware**.

If you plan to use any external device, turn it on before starting the system.

If the motherboard in your computer supports the Serial ATA (SATA) devices, but IDE disks are also present, only the SATA devices should be set to the Enhanced Mode in BIOS.

1 **Restart your computer in the startup mode**

2 **Select Create an Image on the Select an action and press the N key**

   Use the arrow keys to switch between the options.
**Action Selection Panel**

![Image of Action Selection Panel]

**R-Drive Image** will start analyzing the computer disk configuration, the **Progress...** message showing the progress. Then the **R-Drive Image: Select an object you want to archive/backup/copy** panel will show the configuration.

<table>
<thead>
<tr>
<th><strong>H</strong></th>
<th>Hard drive</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P</strong></td>
<td>Primary partition</td>
</tr>
<tr>
<td><strong>L</strong></td>
<td>Logical disk</td>
</tr>
<tr>
<td><strong>U</strong></td>
<td>Unallocated space</td>
</tr>
</tbody>
</table>

3. **Select an object which image you want to create on the Select source object panel** and press the **N** key.

Use the arrow keys to switch between the objects and the **SPACEBAR** to select the object.

![Image of Select Source Object Panel]

4. **Select the place on the Create an Image panel** to which the image files will be written, specify the file name, and press the **O** key.

![Image of Create an Image File Panel]
Read-only disk. You cannot create images on such disks.

Use the Tab key to switch between the control areas.

External USB drives with the NTFS file system: the startup version of R-Drive Image can save image files on such disks if they are properly disconnected in a Windows system using the Safely Remove Hardware icon in the system tray or while shutting Windows down.

You may also connect network drives.

5 Specify image options on the Image Options panel and click the Next button.

You may specify image options on this panel.

<table>
<thead>
<tr>
<th>Image options</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Options</strong></td>
</tr>
<tr>
<td>Image name:</td>
</tr>
<tr>
<td>Check the image file immediately upon its creation</td>
</tr>
<tr>
<td>Image compression ratio</td>
</tr>
<tr>
<td>Backup type</td>
</tr>
</tbody>
</table>
Estimated size | Shows the estimated size of the image file. An actual image size depends on how much empty space is on the selected partition and what file types are there.

Image split size | You may set this option to Automatic and let Windows decide how to split the image file. This mostly depends on the file system on the destination disk. You may also either explicitly specify the split size, or choose a preset for various devices with removable storage. Select Fixed size for that.

Password | You may protect your image file with a password. Note: This feature provides a relatively moderate protection against conventional unauthorized access.

Image description | You may attach a text description to the image for annotation. Maximum length of the description is 255 characters.

6 Verify that the information on the Confirm operations panel is correct and click the N key

> R-Drive Image will start creating the image file

The Progress window will show the progress of the current operation and overall process. If you selected a read-only disk as the target, you will see the File is read-only. Press OK to retry. message.

The Disk Actions chapter explains basic disk actions.

The Startup Version chapter explains how to perform disk actions using the R-Drive Image Startup Version.

The Technical Information chapter gives technical information on Supported CD and DVD Recorders and List of Hardware Devices Supported in the Startup Mode and another useful technical information.

Follow this link to obtain R-Drive Image Contact Information and Technical Support

5.5 Disk to Disk Copy

It is recommended that you print out this topic and have the hardcopy on hand while you are performing this action.

Note: This help page describes the operation of the TUI startup version. Go to the Copy a Disk to a Disk help page for the GUI version and to the network drives help If necessary.

If there is a non-IDE disk controller in your system, or you plan to use network disks or external hardware devices, first check the list of supported hardware.

If you plan to use any external device, turn it on before starting the system.

If the motherboard in your computer supports the Serial ATA (SATA) devices, but IDE disks are also present, only the SATA devices should be set to the Enhanced Mode in BIOS.

1 Restart your computer in the startup mode

2 Select Disk to disk copy on the Action Selection panel and press the N key

R-Drive Image will start analyzing the computer disk configuration, the Progress... message showing the progress. Then the R-Drive Image: Select an object you want to archive/backup/copy panel will show the configuration.
### Action Selection Panel

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H</strong></td>
<td>Hard drive</td>
</tr>
<tr>
<td><strong>P</strong></td>
<td>Primary partition</td>
</tr>
<tr>
<td><strong>L</strong></td>
<td>Logical disk</td>
</tr>
<tr>
<td><strong>U</strong></td>
<td>Unallocated space</td>
</tr>
</tbody>
</table>

Use the arrow keys to switch between the options.

3. **Select an object you want to copy** on the **Select an object you want to archive/backup/copy** panel and press the **N** key

### Select an object you want to archive/backup/copy Panel

Use the arrow keys to switch between the objects.
4 Select the destination for the data on the Select a target for copy/restore operation panel and press the N key

Select a target for copy/restore operation Panel

Use the arrow keys to switch between the target objects.

5 Specify restore parameters on the Copy/restore options panel and press the N key

Copy/restore options Panel

For restoring/copying one or several partition(s):

<table>
<thead>
<tr>
<th>Restore Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free space before</td>
<td>You may specify the size of free space that will be left on the hard drive before the beginning of the partition.</td>
</tr>
<tr>
<td>Partition size</td>
<td>You may specify the size of the partition to be restored. Should be between the minimum and maximum partition size.</td>
</tr>
<tr>
<td>Partition type Primary(Active) Primary Logical</td>
<td>You may specify the type of the partition to be restored. Do not change this setting unless you have serious reasons to do so.</td>
</tr>
</tbody>
</table>
For restoring/copying an entire hard drive to another hard drive:

HDD Copy/restore options Panel

<table>
<thead>
<tr>
<th>HDD Copy Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw disk copy</td>
<td>R-Drive Image writes sector-by-sector the data from the original drive or its image to the target one making an exact copy of the original disk regardless of its partitioning method. Can be used if other methods create a non-bootable disk due to incorrect detection of drive's geometry or non-standard loader. Drawback: partition sizes cannot be changed.</td>
</tr>
<tr>
<td>Copy all partitions onto original places</td>
<td>R-Drive Image copies all partitions to their original places. If R-Drive Image detects the drive's geometry correctly, and there is no non-standard loader, it makes the same result as during Raw disk copy.</td>
</tr>
<tr>
<td>Realign partitions</td>
<td>R-Drive Image will copy the partitions on the disk with a 512KB alignment. This is very useful for SSD and advanced-formatted disks. If there are empty (non-used) spaces between partitions, those spaces will be removed taking into account the alignment.</td>
</tr>
<tr>
<td>Expand/Shrink partition to whole disk</td>
<td>If there are empty (not-used) places between the partitions or they occupy less or more space than the target drive, R-Drive Image proportionally expands/shrinks them to occupy the entire target drive. Otherwise it is similar to Copy all partitions onto original places.</td>
</tr>
<tr>
<td>Fixed active partition</td>
<td>R-Drive Image preserves the original offset/size of the active partition (in case the loader has links to it).</td>
</tr>
</tbody>
</table>


When you copy a system disk, a disk signature collision may occur. In this case, the Disk Signature Collision panel will appear. You may specify the way to resolve this collision on this panel.

<table>
<thead>
<tr>
<th>Disk Signature Collision Resolving</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same signature for both disk</td>
<td>R-Drive Image will create an identical copy of the source disk with the same signature. To avoid disk signature collision, you'll have to disconnect one of the disks and restart the computer, if necessary. Use this mode if you clone a system disk for another computer or only the target disk will be used in yours.</td>
</tr>
<tr>
<td>Different signature on the target disk</td>
<td>R-Drive Image will write another disk signature to the target disk. Don’t use this mode if you clone a system disk, Windows won’t start from it. To get access to the target disk after cloning, you’ll have to restart the computer or re-connect it if it’s an external USB disk.</td>
</tr>
<tr>
<td>Change the disk signature on the source disk.</td>
<td><strong>R-Drive Image</strong> will change the disk signature on the source disk. Use this mode if you want to start Windows from the target disk, but be warned: the computer won’t start from the source disk anymore.</td>
</tr>
</tbody>
</table>

6 **Verify that the information on the Confirm operations panel is correct and click the N key**

> **R-Drive Image** will start copying the data from the source disk to the selected destination

The **Progress** window will show the progress of the current operation and overall process. When the data is copied, the **Operation completed successfully** message will appear.

The **Disk Actions** chapter explains basic disk actions.

The **Startup Version** chapter explains how to perform disk actions using the **R-Drive Image Startup Version**.

The **Technical Information** chapter gives technical information on **Supported CD and DVD Recorders** and **List of Hardware Devices Supported in the Startup Mode** and another useful technical information.

Follow this link to obtain **R-Drive Image Contact Information and Technical Support**
5.6 Create an Image from Files

This action is available on the GUI version only. Go to the the Create an Image from Files help page for instruction and to the network drives help If necessary.

5.7 Partition Manager

This action is available on the GUI version only. Go to the the Partition Manager help page for instruction and to the network drives help If necessary.

5.8 Check an Image File

Note: This help page describes the operation of the TUI startup version. Go to the Check an Image File help page for the GUI version and to the network drives help If necessary.

To check an image file:

1. Click Check an Image File on the Action Selection panel

![](Action_Selection_Panel.png)

2. Select the file with the image on the Image File Selection panel and click the Next button

![](Image_File_Selection_Panel.png)

You may also connect network drives.
3 Verify that the information on the **Processing** panel is correct and click the Start button

R-Drive Image will start checking the data in the image file.

The **Disk Actions** chapter explains basic disk actions.

The **Startup Version** chapter explains how to perform disk actions using the **R-Drive Image Startup Version**.

The **Technical Information** chapter gives technical information on **Supported CD and DVD Recorders** and **List of Hardware Devices Supported in the Startup Mode** and another useful technical information.

Follow this link to obtain **R-Drive Image Contact Information and Technical Support**

### 5.9 Network Drives

If your computer is on a local network, you may write image files or restore images to / from network drives. To do so, you need to map such a network drive.

**To map a network drive,**

1. Click the **Map Network Drive** button and enter required information

   ![Map Network Drive](image)

   For the network drive' path `//SERVER/Backups`,
   - **Server IP address**: The IP address of the **SERVER** computer
   - **Server share name**: Backups.

Sometimes it may be necessary to manually configure network settings, if, for example, there is no DHCP server on the network. Click the **Configure network** button, select the required field, click the **Edit Address** button, and enter the required information.
Network Settings

VI  Scheduled Actions, Command Line Operations, and Scripting

This chapter explains how to start disk actions automatically at scheduled times/events and create scripts that can be performed from a command line or command files.

- **Batch Mode**
- **Scheduler and Unattended Actions**
- **Rotation Options (Backup Sets)**
- **Scripting and Command Line Operations**

The **Disk Actions** chapter explains disk actions such as:

- **Create an Image** of a partition, logical disk, or entire hard drive
- **Create an Image from Files**
- **Restore Data from an Image**
- **Copy Disk to Disk** to make an exact copy of one disk on another
- **Manage partition and logical disks**
- **Mount an Image as a Virtual Logical Disk** (read-only)
- **Unmount Virtual Logical Disks**
- **Check an Image File** to check an existing image file

The **RAIDs, and Various Disk and Volume Managers** chapter explains how to perform disk actions with various compound volumes such as:
• Windows Software RAIDs, Spanned, and Other Volumes
• Windows Storage Spaces
• Mac RAIDs
• Linux Logical Volume Manager Volumes

The **Startup Version** chapter explains how to perform disk actions using the **R-Drive Image Startup Version** such as:

- Create Startup Disk
- Restoring Data to a System or Other Locked Disk
- Create an Image Using the Startup Disks
- Disk to Disk Copy Using the Startup Disks

The **Technical Information** chapter gives technical information on

- Creating consistent point-in-time backups
- Support for Various Disk Partition Schemes and File Systems
- Supported CD and DVD Recorders
- List of Hardware Devices Supported in the Startup Mode

The **R-Drive Image OEM kit** chapter explains how computer system integrators can create system recovery disks for their systems

- Create a Master Image
- Create Startup Media

Follow this link to obtain **R-Drive Image Contact Information and Technical Support**

### 6.1 Scheduler and Unattended Actions

You may schedule some disk actions at a certain time or event, and **R-Drive Image** will perform them unattended. You may also execute a task manually. Right-click the task and select **Execute Now** in the context menu.

- Create a task
- Edit a task
- Delete a task
- Run a Task Manually

The **Disk Actions** chapter explains basic disk actions.

The **Startup Version** chapter explains how to perform disk actions using the **R-Drive Image Startup Version**.

The **Technical Information** chapter gives technical information on **Supported CD and DVD Recorders** and **List of Hardware Devices Supported in the Startup Mode** and another useful technical information.

Follow this link to obtain **R-Drive Image Contact Information and Technical Support**

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6.1.1 Create a Task

Generally, you may set a scheduled task the same way you set a regular action for creating an image of a disk, partition, or an entire hard drive.

To create a new task:

1. Click Scheduler/Create Script on the Action Selection panel
   - The Scheduled Tasks panel will appear.
   - You may create a task for creating an image, image from files, or verifying an image.

2. Click the Create Task button on the Scheduled Tasks panel

3. Select the objects you want to backup on the Partition Selection panel, image destination on the Image Destination panel, specify necessary parameters on the Image options, Notification options, Backup options panels, and on the Rotation options panel.
   - Go to the Create an Image topic for more details.
   - Please note that you may use Rotation options (backup sets) for creating complex data backup tasks and maintaining data files.
4 Specify the time or event at which the task should start on the Task execution schedule panel and click the Next button.

You may specify time/event options on this panel.

<table>
<thead>
<tr>
<th>Task execution schedule options</th>
</tr>
</thead>
<tbody>
<tr>
<td>task is active</td>
</tr>
<tr>
<td>If this options is not selected, the task will not start at its scheduled time/event</td>
</tr>
<tr>
<td>Perform this task:</td>
</tr>
<tr>
<td>The task will start repeatedly on a daily time interval</td>
</tr>
<tr>
<td>Feature</td>
</tr>
<tr>
<td>-------------------------------</td>
</tr>
<tr>
<td>Start time</td>
</tr>
<tr>
<td>Repeat task every</td>
</tr>
<tr>
<td>Delay task up to</td>
</tr>
<tr>
<td>Start date</td>
</tr>
<tr>
<td>Run this task every</td>
</tr>
<tr>
<td>End date: (optional)</td>
</tr>
<tr>
<td>Weekly</td>
</tr>
<tr>
<td>Start time</td>
</tr>
<tr>
<td>Repeat task every</td>
</tr>
<tr>
<td>Delay task up to</td>
</tr>
<tr>
<td>Start date</td>
</tr>
<tr>
<td>Run this task every</td>
</tr>
<tr>
<td>On days:</td>
</tr>
<tr>
<td>End date: (optional)</td>
</tr>
<tr>
<td>Monthly</td>
</tr>
<tr>
<td>Start time</td>
</tr>
<tr>
<td>Repeat task every</td>
</tr>
<tr>
<td>Delay task up to</td>
</tr>
<tr>
<td>Start date</td>
</tr>
<tr>
<td>Month schedule</td>
</tr>
<tr>
<td>On day... of month</td>
</tr>
<tr>
<td>Or...</td>
</tr>
<tr>
<td>Months</td>
</tr>
<tr>
<td>Once</td>
</tr>
<tr>
<td>Start time</td>
</tr>
<tr>
<td>Repeat task every</td>
</tr>
<tr>
<td>Delay task up to</td>
</tr>
<tr>
<td>Start date</td>
</tr>
<tr>
<td>At system startup</td>
</tr>
<tr>
<td>At user logon</td>
</tr>
<tr>
<td>wake the computer to run this task</td>
</tr>
<tr>
<td>Run under user account</td>
</tr>
</tbody>
</table>

> A new task will appear on the **Scheduled Tasks** panel
The Disk Actions chapter explains basic disk actions. The Startup Version chapter explains how to perform disk actions using the R-Drive Image Startup Version.

The Technical Information chapter gives technical information on Supported CD and DVD Recorders and List of Hardware Devices Supported in the Startup Mode and another useful technical information.

Follow this link to obtain R-Drive Image Contact Information and Technical Support.

6.1.2 Edit a Task

You may edit a scheduled task.

To rename a task
1 Click Scheduler/Create Script on the Action Selection panel
   The Scheduled Tasks panel will appear.
2 Right-click the task which you want to rename on the Scheduled Tasks panel
3 Select in the context menu Rename and enter a new task name
   Note: You may also use a keyboard shortcut F2 to rename a task

To edit the time or event at which a scheduled task should start:
1 Click Scheduler/Create Script on the Action Selection panel
   The Scheduled Tasks panel will appear.
2 Select a task which event you want to edit on the Scheduled Tasks panel and click the Edit an Event button
   The Task execution schedule panel will appear.
   Note: You may also right-click the task and select Edit an event in the context menu.
3 Edit the time or event at which the task should start on the Task execution schedule panel and click the Save button
   Go to the Create a Task topic for details
   > The task will appear on the Scheduled Tasks panel with the new starting Time/Event

To edit an entire scheduled task:
1 Click Scheduler/Create Script on the Action Selection panel
   The Scheduled Tasks panel will appear.
2 Select a task which you want to edit on the Scheduled Tasks panel and click the Edit button
   Note: You may also right-click the task and select Edit a task in the context menu.
3 Edit the objects you want to backup on the Partition Selection panel, image destination on the Choose destination of new image panel, necessary parameters on the Image options, Notification options, Backup options panels, and on the Rotation options panel.
   Go to the Create an Image topic for more details.
4 Edit the time or event at which the task should start on the Task execution schedule panel, and click the Save button
   Go to the Create a Task topic for more details.
   > The task will appear on the Scheduled Tasks panel with the new options
The **Disk Actions** chapter explains basic disk actions.
The **Startup Version** chapter explains how to perform disk actions using the **R-Drive Image Startup Version**.
The **Technical Information** chapter gives technical information on **Supported CD and DVD Recorders** and **List of Hardware Devices Supported in the Startup Mode** and another useful technical information.
Follow this link to obtain **R-Drive Image Contact Information and Technical Support**

### 6.1.3 Delete a Task

You may delete a scheduled task that you do not need any more.

**To delete a scheduled task:**

1. Click **Scheduler/Create Script** on the **Action Selection** panel
   The **Scheduled Tasks** panel will appear.

2. **Select a task you want to delete** on the **Scheduled Tasks** panel and **click the Delete a Task button** or **Right-click** the task and select **Delete a Task** in the context menu.
   The **Delete selected task** message will appear.

3. **Click** the OK button
   > The task will disappear on the **Scheduled Tasks** panel

### 6.1.4 Run a Task Manually

You may run a task manually at any time.

**To run a scheduled task manually:**

1. **Click** **Scheduler/Create Script** on the **Action Selection** panel
   The **Scheduled Tasks** panel will appear.

2. **Right-click** a task you want to run and select **Execute now** on the context menu.
You may also **create a script from a task** and run it manually.

### 6.2 Rotation Schemes (Backup Sets)

Rotation backup schemes is a way to create sets of files (usually a file for a full image of an object and a number of its incremental/differential backups) which **R-Drive Image** treats as one unit. Those schemes may be used to
create images of the same objects with the same filenames but with different parameters. Rotation schemes make it possible for you to flexibly control the parameters of complex backup tasks. You may specify a total size allocated for the image files, a number of image files you want to keep, and the time for which you want to keep the data, etc. All this can be done on the Rotation options panel.

R-Drive Image supports the following types of rotation schemes:

- **Simple Rotation Schemes**
- **Custom Rotation Schemes** (available only in the Corporate, Technician, and Commercial versions)

And this page gives an example of the outcome of a rotation scheme:

- **An example of a rotation scheme**

### 6.2.1 Simple Rotation Schemes

These scheme types are available in all R-Drive Image versions:

The following simple rotation schemes can be used:

**No rotation**

- **No rotation**

![Rotation options panel]

**Imaging mode**

Specifies how the data will be written to an existing image file.

- **Different**: Select this option to preserve the data in the existing image file and append only changes. Appended changes will be those between the last saved changes and the current state. You may restore data as they were on each time of data imaging.

- **Increment**: Select this option to preserve the data in the existing image file and append only changes. Appended changes will be those between the first saved full image and the current state. You may restore data as they were on each time of data imaging.

- **Overwrite**: Select this option if you want to completely replace the data in the image file.

**Minimum file sizes**: If you need to keep only the latest backup instant, you may use the Differentially option and delete all previous differential files. If you need to keep all instances, you may use the Incrementally option to keep overall file sizes smaller.

**Data safety**: If any of the differential file is damaged, data will be lost only for that backup instant. If any of the incremental file is damaged, data will be lost for all subsequent backup instances starting from the damaged file until the next full of differential backup.

**Rotation scheme outcome**: the first image will be a full one, the rest images will be differential ones.
## Simple

### Simple rotation scheme

![Simple Rotation Scheme](image)

#### Imaging mode options

<table>
<thead>
<tr>
<th>Imaging mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full</td>
<td>All data in the image file will be replaced with the current one.</td>
</tr>
<tr>
<td>Differentially</td>
<td>Appended changes will be those between the saved full image and the current state. If there is no full image, it will be created instead. When restoring data, you will need the full image and ONLY the differential file created at the instant to which you want to restore data.</td>
</tr>
<tr>
<td>Incrementally</td>
<td>Appended changes will be those between the last saved changes and the current state. If there is no full image, it will be created instead. When restoring data, you will need the full image and ALL files (both incremental and differential ones) created to the instant to which you want to restore data.</td>
</tr>
</tbody>
</table>

#### Minimum file sizes

- If any of the differential file is damaged, data will be lost only for that backup instant. If any of the incremental file is damaged, data will be lost for all subsequent backup instances starting from the damaged file until the next full of differential backup.

#### Data safety

- If any of the differential file is damaged, data will be lost only for that backup instant. If any of the incremental file is damaged, data will be lost for all subsequent backup instances starting from the damaged file until the next full of differential backup.

### Simple rotation schemes options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full image every</td>
<td>Specifies the number of differential/incremental images after which a full image will be created.</td>
</tr>
<tr>
<td>Maximum number of full images</td>
<td>Specifies the number of full images. If it is exceeded, the older full backup files will be removed.</td>
</tr>
<tr>
<td>Maximum image files age</td>
<td>Specifies the number of days for which R-Drive Image will keep the files. Then the files will be removed.</td>
</tr>
<tr>
<td>Maximum number of image files</td>
<td>Specifies the number of image files. If it is exceeded, the older files will be removed.</td>
</tr>
<tr>
<td>Maximum size of all image files</td>
<td>Specifies the total size of all files. If it is exceeded, the older files will be removed.</td>
</tr>
</tbody>
</table>
Apply quota

Before & After imaging: the settings will be applied before creating the image, but as if it’s already been created. For example, if the number of files is set to 3, and there are already 3 files, the oldest file will be deleted before creation of the new image file.

After imaging: R-Drive Image will create the image file first, then deletes the oldest file.

Always leave first full image

If this option is selected, the very first image will always be kept.

**Rotation scheme outcome:** the first image will be a full one, then next 6 images will be differential ones, then another full image, followed by 6 differential images. One full image and all respective differential imaged will be deleted when 3 full images have been created. You may see the outcome of this scheme on the [An example of a rotation scheme](#) help page.

You may read more about next rotation schemes in Wikipedia: [Backup rotation scheme](#).

**Grandfather-Father-Son**

**Grandfather-Father-Son scheme**

- **Keep Daily images**
  Specifies the number of days for which R-Drive Image will keep Daily image files. Then the files will be removed.

- **Keep Weekly images**
  Specifies the number of weeks for which R-Drive Image will keep Weekly image files. Then the files will be removed.

- **Keep Monthly images**
  Specifies the number of months for which R-Drive Image will keep Monthly image files. Then the files will be removed.

- **Maximum size of all image files**
  Specifies the total size of all files. If it is exceeded, the older files will be removed.

- **Apply quota**
  Before & After imaging: the settings will be applied before creating the image, but as if it’s already been created. For example, if the number of files is set to 3, and there are already 3 files, the oldest file will be deleted before creation of the new image file.
After imaging: **R-Drive Image** will create the image file first, then deletes the oldest file.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always leave first full image</td>
<td>If this option is selected, the very first image will always be kept.</td>
</tr>
</tbody>
</table>

**Rotation scheme outcome:** the first image will be a full one, then every day a incremental image, every week a differential image, every month a full image. All incremental images will be deleted when a differential image has been created. All differential images will be deleted when a monthly image has been created. The oldest full image and respective differential / incremental images will be deleted in 3 months.

**Tower-of-Hanoi**

**Tower-of-Hanoi schemes options**

<table>
<thead>
<tr>
<th>Number of tiers</th>
<th>Number of successive image creation steps/</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keep Monthly images</td>
<td>Specifies the number of months for which <strong>R-Drive Image</strong> will keep Monthly image files. Then the files will be removed.</td>
</tr>
<tr>
<td>Apply quota</td>
<td>Before &amp; After imaging: the settings will be applied before creating the image, but as if it's already been created. For example, if the number of files is set to 3, and there are already 3 files, the oldest file will be deleted before creation of the new image file. After imaging: <strong>R-Drive Image</strong> will create the image file first, then deletes the oldest file.</td>
</tr>
<tr>
<td>Always leave first full image</td>
<td>If this option is selected, the very first image will always be kept.</td>
</tr>
</tbody>
</table>

**Rotation scheme outcome:** the first image will be a full one, the next image will be the differential one, then an incremental one. A full image will be created in 4 images. The rest of the images will be deleted.

The **Disk Actions** chapter explains basic disk actions.
The **Startup Version** chapter explains how to perform disk actions using the **R-Drive Image Startup Version**.

The **Technical Information** chapter gives technical information on **Supported CD and DVD Recorders** and **List of Hardware Devices Supported in the Startup Mode** and another useful technical information.

Follow this link to obtain **R-Drive Image Contact Information and Technical Support**.
6.2.2 Custom Rotation Schemes

These scheme types are available only in the Corporate, Technician, and Commercial versions.

It gives much more flexibility to you in controlling the outcome of the rotation scheme.

**Custom rotation scheme**

![Custom rotation scheme](image)

**Custom rotation schemes options**

<table>
<thead>
<tr>
<th>Rotation scheme</th>
<th>The name of the rotation scheme.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum number of image files</td>
<td>Specifies the number of image files. If it is exceeded, the older files will be removed.</td>
</tr>
<tr>
<td>Maximum size of all image files</td>
<td>Specifies the total size of all files. If it is exceeded, the older files will be removed.</td>
</tr>
<tr>
<td>On exceed</td>
<td>Specifies the action that performs when the quota is exceeded. The following actions are available: No actions Delete Move Command</td>
</tr>
<tr>
<td>Apply quota</td>
<td>Before &amp; After imaging: the settings will be applied before creating the image, but as if it's already been created. For example, if the number of files is set to 3, and there are already 3 files, the oldest file will be deleted before creation of the new image file. After imaging: R-Drive Image will create the image file first, then deletes the oldest file.</td>
</tr>
<tr>
<td>Always leave first full image</td>
<td>If this option is selected, the very first image will always be kept.</td>
</tr>
</tbody>
</table>

**Rotation scheme outcome:** the first image will be a full one, then next 6 images will be incremental ones, then a differential image, the incremental images will be deleted, then next 6 incremental images and another differential image. A full image will be created once a month.
6.2.3 An example of a rotation scheme

The scheme and settings
This scheme is shown on the Simple Rotation Scheme help page. It should create a full backup every Sunday and differential backups every other day. The task should start at 5:00 PM and 3 full backup images should always be kept.

It has the following parameters:

- Rotation scheme: Simple
- Imaging mode: Differential
- Full image every: 6 images
- Maximum number of full images: 3
- Maximum image files age: 20 days
- Maximum number of image files: 22
- Maximum size of all image files: 500000 MB
- Apply quota: After imaging
- Always leave first full image: No

The setting should be the following:

On the Rotation options panel
The following setting should be specified:

- Simple rotation scheme

On the Task execution schedule panel:
The following setting should be specified:
Task execution schedule

And the task should be activated on Monday, say, August 2, 2021.

File name convention:

Full backup:  \(<\text{FileName}>\_<\text{Date_of_First_Backup}>\_<\text{Time_of_First_Backup}>\_1.\text{rdr}\)

Differential backup:

\(<\text{FileName}>\_<\text{Date_of_First_Backup}>\_<\text{Time_of_First_Backup}>\_N+1.\text{rdr}\)

\(N\) is the number of differential backup

The scheme outcome

The files created

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Files created on the destination, the last is the newly created on: Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/2/2021</td>
<td>Monday</td>
<td>Test_Image_08022021_05PM0000_1.rdr ;Full backup 1</td>
</tr>
<tr>
<td>8/3/2021</td>
<td>Tuesday</td>
<td>Test_Image_08022021_05PM0000_1.rdr ;Full backup 1, Test_Image_08022021_05PM0000_2.rdr ;Differential backup 1:1</td>
</tr>
<tr>
<td>8/4/2021</td>
<td>Wednesday</td>
<td>Test_Image_08022021_05PM0000_1.rdr ;Full backup 1, Test_Image_08022021_05PM0000_2.rdr ;Differential backup 1:1, Test_Image_08022021_05PM0000_3.rdr ;Differential backup 1:2</td>
</tr>
<tr>
<td>8/5/2021</td>
<td>Thursday</td>
<td>Test_Image_08022021_05PM0000_1.rdr ;Full backup 1, Test_Image_08022021_05PM0000_2.rdr ;Differential backup 1:1, Test_Image_08022021_05PM0000_3.rdr ;Differential backup 1:2, Test_Image_08022021_05PM0000_4.rdr ;Differential backup 1:3</td>
</tr>
<tr>
<td>8/6/2021</td>
<td>Friday</td>
<td>Test_Image_08022021_05PM0000_1.rdr ;Full backup 1, Test_Image_08022021_05PM0000_2.rdr ;Differential backup 1:1, Test_Image_08022021_05PM0000_3.rdr ;Differential backup 1:2, Test_Image_08022021_05PM0000_4.rdr ;Differential backup 1:3, Test_Image_08022021_05PM0000_5.rdr ;Differential backup 1:4</td>
</tr>
<tr>
<td>8/7/2021</td>
<td>Saturday</td>
<td>Test_Image_08022021_05PM0000_1.rdr ;Full backup 1, Test_Image_08022021_05PM0000_2.rdr ;Differential backup 1:1, Test_Image_08022021_05PM0000_3.rdr ;Differential backup 1:2, Test_Image_08022021_05PM0000_4.rdr ;Differential backup 1:3, Test_Image_08022021_05PM0000_5.rdr ;Differential backup 1:4, Test_Image_08022021_05PM0000_6.rdr ;Differential backup 1:5</td>
</tr>
</tbody>
</table>
### 8/8/2021 Sunday
- Test Image 08022021_05PM0000_1.rdr; Full backup 1
- Test Image 08022021_05PM0000_2.rdr; Differential backup 1:1
- Test Image 08022021_05PM0000_3.rdr; Differential backup 1:2
- Test Image 08022021_05PM0000_4.rdr; Differential backup 1:3
- Test Image 08022021_05PM0000_5.rdr; Differential backup 1:4
- Test Image 08022021_05PM0000_6.rdr; Differential backup 1:5
- Test Image 08022021_05PM0000_1.rdr; Full backup 2

### 8/9/2021 Monday
- Test Image 08022021_05PM0000_1.rdr; Full backup 1
- Test Image 08082021_05PM0000_1.rdr; Full backup 2
- Test Image 08082021_05PM0000_2.rdr; Differential backup 2:1

### 8/10/2021 Tuesday
- Test Image 08042021_05PM0000_1.rdr; Full backup 1
- Test Image 08082021_05PM0000_1.rdr; Full backup 2
- Test Image 08082021_05PM0000_2.rdr; Differential backup 2:1
- Test Image 08082021_05PM0000_3.rdr; Differential backup 2:1

### 8/11/2021 Wednesday
- Test Image 08042021_05PM0000_1.rdr; Full backup 1
- Test Image 08082021_05PM0000_1.rdr; Full backup 2
- Test Image 08082021_05PM0000_2.rdr; Differential backup 2:1
- Test Image 08082021_05PM0000_3.rdr; Differential backup 2:2
- Test Image 08082021_05PM0000_4.rdr; Differential backup 2:2

### 8/14/2021 Saturday
- Test Image 08042021_05PM0000_1.rdr; Full backup 1
- Test Image 08082021_05PM0000_1.rdr; Full backup 2
- Test Image 08082021_05PM0000_3.rdr; Differential backup 2:1
- Test Image 08082021_05PM0000_4.rdr; Differential backup 2:2
- Test Image 08082021_05PM0000_5.rdr; Differential backup 2:3
- Test Image 08082021_05PM0000_6.rdr; Differential backup 2:4
- Test Image 08082021_05PM0000_7.rdr; Differential backup 2:5

### 8/15/2021 Sunday
- Test Image 08042021_05PM0000_1.rdr; Full backup 1
- Test Image 08092021_05PM0000_1.rdr; Full backup 2
- Test Image 08152021_05PM0000_1.rdr; Full backup 3

### 8/16/2021 Monday
- Test Image 08042021_05PM0000_1.rdr; Full backup 1
- Test Image 08092021_05PM0000_1.rdr; Full backup 2
- Test Image 08152021_05PM0000_1.rdr; Full backup 3
- Test Image 08152021_05PM0000_2.rdr; Differential backup 3:1

### 8/17/2021 Tuesday
- Test Image 08042021_05PM0000_1.rdr; Full backup 1
- Test Image 08092021_05PM0000_1.rdr; Full backup 2
- Test Image 08152021_05PM0000_1.rdr; Full backup 3
- Test Image 08152021_05PM0000_2.rdr; Differential backup 3:1
- Test Image 08152021_05PM0000_3.rdr; Differential backup 3:2

### 8/21/2021 Saturday
- Test Image 08042021_05PM0000_1.rdr; Full backup 1
- Test Image 08092021_05PM0000_1.rdr; Full backup 2
- Test Image 08152021_05PM0000_1.rdr; Full backup 3
- Test Image 08152021_05PM0000_2.rdr; Differential backup 3:1
- Test Image 08152021_05PM0000_3.rdr; Differential backup 3:2
- Test Image 08152021_05PM0000_4.rdr; Differential backup 3:3
- Test Image 08152021_05PM0000_5.rdr; Differential backup 3:4
- Test Image 08152021_05PM0000_6.rdr; Differential backup 3:5
<table>
<thead>
<tr>
<th>Date</th>
<th>Backup Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/22/2021</td>
<td>Test Image 08152021_05PM0000_1.rdr; Full backup 1</td>
</tr>
<tr>
<td></td>
<td>is deleted</td>
</tr>
<tr>
<td></td>
<td>Test Image 08092021_05PM0000_1.rdr; Full backup 2</td>
</tr>
<tr>
<td></td>
<td>Test Image 08152021_05PM0000_1.rdr; Full backup 3</td>
</tr>
<tr>
<td></td>
<td>Test Image 08222021_05PM0000_1.rdr; Full backup 4</td>
</tr>
<tr>
<td>8/23/2021</td>
<td>Test Image 08092021_05PM0000_1.rdr; Full backup 2</td>
</tr>
<tr>
<td></td>
<td>Test Image 08152021_05PM0000_1.rdr; Full backup 3</td>
</tr>
<tr>
<td></td>
<td>Test Image 08222021_05PM0000_1.rdr; Full backup 4</td>
</tr>
<tr>
<td></td>
<td>Test Image 08222021_05PM0000_2.rdr; Differential</td>
</tr>
<tr>
<td></td>
<td>backup 4:1</td>
</tr>
</tbody>
</table>

...
6.3 Scripting and Command Line Operations

You may create scripts for frequently repeated or unattended disk actions and execute them from a command line or file. The same script commands may be executed directly from a command line.

Currently, R-Drive Image supports scripts for creating a new image file, appending data to an existing one, restoring data from an image, check an image, and mount/unmount images as virtual logical disk.

To create a script

- Creating a script from R-Drive Image
- Creating a script manually

To execute a script:

1. Type in the command line:

   ```
   r-driveimagecl [/switches] cmd="<ScriptName>.rdi"
   ```

   where `<ScriptName>` is the script name and its path, if necessary, and press the Enter key

   Note: if `<ScriptName>` contains no spaces, double quotes (") may be omitted. No characters in `<ScriptName>` should be escaped.

<table>
<thead>
<tr>
<th>Switch</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>A non-interactive mode. R-Drive Image will not ask the user any questions. If it cannot perform the action, it will generate an error.</td>
</tr>
<tr>
<td>d</td>
<td>A debug mode. R-Drive Image will display all the information as it was performing the action, but will not perform the actual action.</td>
</tr>
<tr>
<td>f</td>
<td>If an error occurs, R-Drive Image will not exit the script and continue perform it from the following command. Inapplicable to actions started from the command line</td>
</tr>
<tr>
<td>i</td>
<td>Not functioning since version 4.7! The <code>a</code> and <code>d</code> parameters will use disk indexes rather than disk numbers. Disk indexes are disk serial numbers and can be seen either on the R-Drive Image Partition Selection panel or Windows Disk Management.</td>
</tr>
<tr>
<td>o</td>
<td>If a file with a specified filename exists, R-Drive Image will overwrite it quietly.</td>
</tr>
<tr>
<td>hoff</td>
<td>will shut down the computer when it finishes the command.</td>
</tr>
</tbody>
</table>

Switches set in the command lines also is used as default values for parameters in scripts.

> R-Drive Image will start executing the script showing the operation parameters and progress.

When R-Drive Image completes the operation, the Commit OK message will appear in the command prompt.

You may include this command to a command file and automatically run such command file either manually or using any scheduling software for unattended disk actions.
To perform an action from the command line:

1. Type in the command line:
   
   R-DriveImage [/switches] command <params>

   to start R-Drive Image application
   
   or
   
   r-driveimagecl [/switches] command <params>

   to start R-Drive Image console application

   and press the Enter key.

   > R-Drive Image will start executing the command showing the action's progress.
   
   When R-Drive Image completes the action, the Commit OK message will appear in the command prompt.

   Note: the /f switch is not applicable to the actions performed from the command prompt.

The Disk Actions chapter explains basic disk actions.

The Startup Version chapter explains how to perform disk actions using the R-Drive Image Startup Version.

The Technical Information chapter gives technical information on Supported CD and DVD Recorders and List of Hardware Devices Supported in the Startup Mode and another useful technical information.

Follow this link to obtain R-Drive Image Contact Information and Technical Support

6.3.1 Create a Script from R-Drive Image

You may create scripts directly from R-Drive Image the same way you set a regular action for creating an image of a disk, partition, or an entire hard drive.

To create a script from a disk action

1. Click Create an Image on the Action Selection panel and specify all the options and parameters as it is described on the Create an Image topic.

   2. Click the Script to Clipboard button on the Processing panel and paste the script to any text-processing utility

   3. Save the script in a file

       The default extension for R-Drive Image scripts is .rdi. Go to the Scripting and Command Line Operation topic to learn how to use scripts

      To create a script from an existing task

      1. Click Scheduler/Create Script on the Action Selection panel

         The Scheduled Tasks panel will appear.

      2. Right-click the task the Scheduled Tasks panel

      3. Select Save as Script in the shortcut menu and specify the name of the script

         > R-Drive Image will save the script in the specified file

         The default extension for R-Drive Image scripts is .rdi. Go to the Scripting and Command Line Operation topic to learn how to use scripts
To create a new script from the Scheduler

1. Click **Scheduler/Create Script** on the **Action Selection** panel.
   
The **Scheduled Tasks** panel will appear.
2. Click the **Create a Script** button on the **Scheduled Tasks** panel.
3. Select the objects you want to backup on the **Select disk(s) to create image** panel, image destination on the **Choose destination of new image** panel, specify necessary parameters on the **Image options**, **Notification options**, **Backup options** panels, and on the **Rotation options** panel.

   Go to the [Create an Image](#) topic for more details.

   Please note that you may use rotation schemes (backup sets) for creating complex data backup tasks and maintaining data files.
4. Verify that the information on the **Processing** panel is correct and click the **Save** button.

   You may also click the **Script to Clipboard** button to copy this script into the Clipboard and paste the script to any text-processing utility.

> R-Drive Image will save the script in the specified file.

   The default extension for R-Drive Image scripts is `.rdi`. Go to the [Scripting and Command Line Operation](#) topic to learn how to use scripts.

To create a script from a scheduled task

1. Click **Scheduler/Create Script** on the **Action Selection** panel.
   
The **Scheduled Tasks** panel will appear.
2. Right-click the task from which you want to create a script on the **Scheduled Tasks** panel.
3. Select in the context menu either **Save as script** to save the script in a file or **Script to Clipboard** (Ctrl+C) to copy and paste the script to any text-processing utility.

The [Disk Actions](#) chapter explains basic disk actions.

The [Startup Version](#) chapter explains how to perform disk actions using the R-Drive Image Startup Version.

The [Technical Information](#) chapter gives technical information on Supported CD and DVD Recorders and List of Hardware Devices Supported in the Startup Mode and another useful technical information.

Follow this link to obtain R-Drive Image Contact Information and Technical Support.

### 6.3.2 Create a Script Manually

R-Drive Image has a very powerful and versatile script language that enables you to create scripts for all your needs.

A script consists of commands and their parameters. All commands, parameter, and their values are case-sensitive.

**Incompatibilities with ver.3.x**

<table>
<thead>
<tr>
<th></th>
<th>Ver. 3.x</th>
<th>Ver. 4.x</th>
</tr>
</thead>
<tbody>
<tr>
<td>File names with &quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>Escaping of the &quot; character has been changed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>File names with &amp;</td>
<td>&amp;</td>
<td>&amp;</td>
</tr>
</tbody>
</table>
Escaping of the $ character has been changed

| Partition list | -s="part1" -s="part2" -s="part3" | -s="part1 part2 part3" |

**General:**
The default extension for R-Drive Image script files is .rdi.

Parameter values may be inclosed in single ('') or double (""") quotes. If the value does not contain spaces, the quotes may be omitted.

R-Drive Image ignores spaces in the beginning of a line. R-Drive Image treats multiple spaces as one space, except when they are in a parameter value enclosed in quotes.

**Examples:**
Below are equal lines:
```
create -a = "c:\archive.rdr"
create   -a = "c:\archive.rdr"
```
Below are not equal lines:
```
create -a = "c:\archive 1.rdr"
create -a = "c:\archive    1.rdr"
```

**Comments:**
R-Drive Image treats lines which the first non-space character is ; or the first non-space character is [ and the last one is ], as comments.

**Examples:**
```
; This is a comment line
[This is a comment line]
```

**Multiple lines:**
If the last non-space character in a line is \, R-Drive Image appends the next line to it:

**Example:**
```
Lines:
create -a = "c:\archive.rdr" -s = "1:1" \
c = "5"
are equal to the line:
create -a = "c:\archive.rdr" -s="1:1" c= "5"
```

**Disk size units**
Values specifying disk sizes may be in units.

<table>
<thead>
<tr>
<th>b</th>
<th>bytes</th>
<th>2^10 = 1,024 b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kb</td>
<td>kilobytes</td>
<td></td>
</tr>
<tr>
<td>Mb</td>
<td>megabytes</td>
<td>2^20 = 1,024 Kb</td>
</tr>
<tr>
<td>Gb</td>
<td>gigabytes</td>
<td>2^30 = 1,024 Mb</td>
</tr>
</tbody>
</table>

If the units are used, enclose the value in quotes.
Default values are Mb (megabytes).
Characters to substitute
If the following characters are to appear in the parameter values, they should be substituted by the following rules:

<table>
<thead>
<tr>
<th>Character</th>
<th>String to substitute</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>'</td>
<td>'</td>
</tr>
<tr>
<td>&amp;</td>
<td>&amp;</td>
</tr>
<tr>
<td>carriage</td>
<td>&amp;cr;</td>
</tr>
<tr>
<td>return</td>
<td>&amp;nl;</td>
</tr>
<tr>
<td>new line</td>
<td>&amp;nl;</td>
</tr>
</tbody>
</table>

Note: This is the incompatibility with scripts created for the earlier versions of R-Drive Image.

URL paths
For remote hosts, R-Drive Image supports URL of two types:

- \[[domain;]username[:password]@[hostname\share\path
- smb://[[domain;]username[:password]@[hostname[:<port>].share/path

They can be used instead local paths.

Script commands and parameters:

<table>
<thead>
<tr>
<th>Command</th>
<th>Optional/ Mandatory</th>
<th>Description and examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>list</td>
<td></td>
<td>Returns a partition list for local drives or an image file. If the drive contains an APFS container, the command will show both the APFS container and its APFS volumes.</td>
</tr>
<tr>
<td>-a=&lt;PathOfNewArchiveFile&gt;</td>
<td>Mandatory</td>
<td>Specifies a path (including its file name) to the image file. Examples: -a=C:\Images\Test.rdr or -a=&quot;C:\Image Files\Test1.rdr&quot;</td>
</tr>
<tr>
<td>-p=&lt;Password&gt;</td>
<td>Mandatory/Not used</td>
<td>Specifies an image password. Mandatory if the image file has been already encrypted. It there is a space in the password, the password should be in quotes. Examples: -p=Password or -p='My Password'</td>
</tr>
<tr>
<td>-t=&lt;TimeSliceNumber&gt;</td>
<td>Optional</td>
<td>Specifies which incremental data will be used to list the partitions in the image. If the TimeSliceNumber is not specified, the first data in the image will be used. -1 specifies the last incremental data in the image. first: R-Drive Image will use the first incremental data in the image. last: R-Drive Image will use the last incremental data in the image. +&lt;n&gt;: R-Drive Image will use the n-th incremental data from the beginning in the image. -&lt;n&gt;: R-Drive Image will use the n-th incremental data from the end in the image. Examples: -t=&quot;+2&quot; specifies the second incremental data from the beginning in the image will be used to list partitions.</td>
</tr>
</tbody>
</table>

Example:
list -a=C:\Images\Test.rdr -p="mY pasSsworRrd"
This script command returns a list of partitions stored in the C:\Images\Test.rdr image file protected by the password mY pasSsworRrd.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sysdump</td>
<td>Creates a system dump that may be necessary to obtain technical support. An image file can be included into that system dump. In this case, the keys -a, -p, -t from the list command should be used.</td>
</tr>
<tr>
<td>-sysdump=&quot;&lt;SysDumpFile&gt;&quot;</td>
<td>Mandatory</td>
</tr>
</tbody>
</table>

Example:

sysdump -sysdump="MySysDump" -a=C:\Images\Test.rdr -p="mY pasSsworRrd"

This script command creates a file with the system dump, its name is MySysDump. The system dump includes the image file C:\Images\Test.rdr protected by the password mY pasSsworRrd.

register | Registers R-Drive Image from the command line. |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>-reg-user=&quot;&lt;UserName&gt;&quot;</td>
<td>Mandatory</td>
</tr>
<tr>
<td>-reg-key=&quot;&lt;RegistrationKey&gt;&quot;</td>
<td>Mandatory</td>
</tr>
<tr>
<td>-reg-company=&quot;&lt;UserCompany&gt;&quot;</td>
<td>Optional</td>
</tr>
</tbody>
</table>

Example:

register -reg-user="Tester 1" -reg-company=R-TT Testing Team" -reg-key="fafaasertghzfvasfje134"

This script command registers R-Drive Image for the user Tester 1 from the company R-TT Testing Team using the key fafaasertghzfvasfje134.

Disk descriptors used in the -s and -d commands

Below is the list of disk descriptors R-Drive Image uses to identify hard drives, logical disks, and partitions. It is written in the order of importance, from the most important descriptor to the least important one. If there are several objects with identical disk descriptors, R-Drive Image identifies them using the most important disk descriptor with different values.

<table>
<thead>
<tr>
<th>Disk descriptor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>hdd_vtype</td>
<td>HDD type.</td>
</tr>
<tr>
<td>real</td>
<td>a basic disk</td>
</tr>
<tr>
<td>dynamic</td>
<td>a dynamic disk</td>
</tr>
<tr>
<td>pure</td>
<td>disk objects like USB pendrives with only one logical disk on it.</td>
</tr>
<tr>
<td>Example: hdd_vtype=real</td>
<td></td>
</tr>
<tr>
<td>hdd_size</td>
<td>HDD size</td>
</tr>
<tr>
<td>Disk size should be specified in bytes, no KB or MB are allowed.</td>
<td></td>
</tr>
<tr>
<td>Example: hdd_size=40060403712</td>
<td></td>
</tr>
<tr>
<td>hdd_name</td>
<td>HDD name</td>
</tr>
<tr>
<td>Example: hdd_name=SAMSUNG#32;SP0411NTW100-11 &quot;&amp;&quot; denotes a space</td>
<td></td>
</tr>
<tr>
<td>hdd_serial</td>
<td>HDD serial number</td>
</tr>
<tr>
<td>Example: hdd_serial=S01JJ30X912841</td>
<td></td>
</tr>
<tr>
<td>hdd_bus_type</td>
<td>Type of the HDD bus</td>
</tr>
<tr>
<td>Can be: none, ata, atapi, scsi, floppy, usb, firewire, ssa, fibre, raid, smart, abios, sata, sata2.</td>
<td></td>
</tr>
<tr>
<td>Example: hdd_bus_type=ata</td>
<td></td>
</tr>
<tr>
<td>Field</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>hdd_port_num</td>
<td>Port number for HDD</td>
</tr>
<tr>
<td>hdd_target_id</td>
<td>Target ID for HDD</td>
</tr>
<tr>
<td>hdd_num</td>
<td>Disk number, coincides with the disk number used in the old notations.</td>
</tr>
<tr>
<td>part_free_space</td>
<td>Free space mark 1 if this object is a disk free space, 0 if not.</td>
</tr>
<tr>
<td>part_ofs</td>
<td>Partition offset in bytes. Partition offset should be specified in bytes, no KB or MB are allowed.</td>
</tr>
<tr>
<td>part_size</td>
<td>Partition size Partition size should be specified in bytes, no KB or MB are allowed.</td>
</tr>
<tr>
<td>part_fs</td>
<td>Partition file system Can be: none, ntfs, fat12, fat16, fat32, exfat, ext2fs, ext3fs, ext4fs, ufs1, ufs2, hfs ,hfsplus ,hfsx, iso9660</td>
</tr>
<tr>
<td>part_label</td>
<td>Disk label</td>
</tr>
<tr>
<td>part_mounted</td>
<td>Disk letter of folder</td>
</tr>
<tr>
<td>part_num</td>
<td>Partition number, coincides with the partition number used in the old notations. Free space is considered as a partition.</td>
</tr>
<tr>
<td>part_id</td>
<td>Partition identifier.</td>
</tr>
<tr>
<td>vol_id</td>
<td>APFS volume identifier in an APFS container.</td>
</tr>
<tr>
<td>used_id</td>
<td>Partition identifier when free space is omitted.</td>
</tr>
<tr>
<td>unused_id</td>
<td>Free space identifier when</td>
</tr>
</tbody>
</table>
A partition may be identified using its descriptors:
```
hdd_size=40060403712+part_num=2+hdd_num=1+hdd_target_id=0+hdd_bus_type=ata+part_label=Part2+part_ofs=16778264576+part_mounted=G:\+hdd_name=SAMSUNG\SP0411NTW100-11+part_size=23279435776+hdd_port_num=0+hdd_serial=S01JJ30X912831+part_fs=ntfs+hdd_vtype=real
```

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| **create** | Specifies a source object to create the image or append to it. The `<SourceDisk>` parameter consists of one or several disk descriptors written in the form: descriptor_name=value[+descriptor_name=value...]. The disk descriptors are presented in the Disk descriptors section of this table. Old notation is also valid: Old notation examples:  
  for hard drive 1: `-s=1`  
  for the second partition on hard drive 1 (empty space is treated as a partition): `-s=1:2`  
  for the second partition on hard drive 1 skipping empty spaces: `-s=1:p2`  
  for the first empty space on hard drive 1 skipping partitions: `-s=1:f1`  
  for a logical disk: `-s=D:`  
  for several logical disks: `-s="D: F:"`

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-s=&lt;SourceDisk&gt;</code></td>
<td>Mandatory</td>
</tr>
<tr>
<td><code>-a=&lt;PathOfNewArchiveFile&gt;</code></td>
<td>Mandatory</td>
</tr>
<tr>
<td><code>-c=&lt;CompressionLevel&gt;</code></td>
<td>Optional</td>
</tr>
<tr>
<td><code>-u</code></td>
<td>Optional</td>
</tr>
<tr>
<td><code>-v=&lt;ArchiveSize&gt;</code></td>
<td>Optional</td>
</tr>
<tr>
<td><code>-append-inc</code></td>
<td>Optional</td>
</tr>
<tr>
<td><code>-p=&lt;Password&gt;</code></td>
<td>Mandatory/Not used</td>
</tr>
<tr>
<td><code>-r=&lt;Description_of_archive&gt;</code></td>
<td>Optional</td>
</tr>
</tbody>
</table>

Differentially appends data to an existing image file. If such file does not exist, it will be created.

Specifies a path (including its file name) to the image file. Examples:
```
-a=C:\Images\Test.rdr or -a="C:\Image Files\Test 1.rdr"
```

Specifies compression level (1...11). Example: `-c=3`

Backups useful information only. May be used as a **Boolean parameter**.

Specifies image split size. May be in the float-point format. Example: `-v=650 or -v='4.5 Gb'`

Creates an incremental backup.

Specifies an image password. Mandatory if the append command is used and the image file has been already encrypted. It there is a space in the password, the password should be in quotes. Examples: `-p=Password or -p='My Password'`

Specifies an image description. It there is a space in the description, the description should be in quotes.
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-s-xw</code></td>
<td>Optional Makes <strong>R-Drive Image</strong> not to use the Windows snapshot provider.</td>
</tr>
<tr>
<td><code>-s-xr</code></td>
<td>Optional Makes <strong>R-Drive Image</strong> not to use the R-TT snapshot provider.</td>
</tr>
<tr>
<td><code>-s-n</code></td>
<td>Optional Notifies system application that a snapshot is being taken.</td>
</tr>
<tr>
<td><code>-s-b0</code></td>
<td>Optional Specifies an application that will start before the backup operation starts. The application should return a 0 exit code. Example: <code>-s-b0=&quot;C:\commands\start.exe&quot;</code></td>
</tr>
<tr>
<td><code>-s-b1</code></td>
<td>Optional Specifies an application that will start after the backup operation completes. The application should return a 0 exit code. Example: <code>-s-b1=&quot;C:\commands\end.exe&quot;</code></td>
</tr>
<tr>
<td><code>-s-s0</code></td>
<td>Optional Specifies an application that will start before the snapshot is taken. The application should return a 0 exit code. Example: <code>-s-s0=&quot;C:\commands\startsnapshot.exe&quot;</code></td>
</tr>
<tr>
<td><code>-s-s1</code></td>
<td>Optional Specifies an application that will start after the snapshot is taken. The application should return a 0 exit code. Example: <code>-s-s1=&quot;C:\commands\endsnapshot.exe&quot;</code></td>
</tr>
<tr>
<td><code>-xe</code></td>
<td>Optional Specifies a command line that will start an application if <strong>R-Drive Image</strong> fails to perform the specified action. If there is a space in the command line, the command line should be in quotes. Examples: <code>-xe=error.exe</code> or <code>-xe=&quot;winamp C:\sounds\error.mp3&quot;</code></td>
</tr>
<tr>
<td><code>-xs</code></td>
<td>Optional Specifies a command line that will start an application if <strong>R-Drive Image</strong> successfully performs the specified action. If there is a space in the command line, the command line should be in quotes. Examples: <code>-xs=success.exe</code> or <code>-xs=&quot;winamp C:\sounds\success.mp3&quot;</code></td>
</tr>
<tr>
<td><code>-bs</code></td>
<td>Optional Specifies that <strong>R-Drive Image</strong> will use rotation schemes (backup sets).</td>
</tr>
<tr>
<td><code>-bs-size</code></td>
<td>Optional May be used only if the <code>-bs</code> is set. Specifies the total size in MB on the disk allocated for the backup set. If it is exceeded, the backup set (all its files) will be removed. Example: <code>-bs-size=&quot;20000&quot;</code></td>
</tr>
<tr>
<td><code>-bs-num-b</code></td>
<td>Optional May be used only if the <code>-bs</code> is set. Specifies the number of rotation schemes (backup sets) If it is exceeded, the older rotation schemes (backup sets) (all their files) will be removed. Example: <code>-bs-num-b=&quot;10&quot;</code></td>
</tr>
<tr>
<td><code>-bs-num-f</code></td>
<td>Optional May be used only if the <code>-bs</code> is set. Specifies the number of files in all rotation schemes (backup sets). If it is exceeded, the older rotation schemes (backup sets) (all their files) will be removed. Example: <code>-bs-num-f=&quot;30&quot;</code></td>
</tr>
<tr>
<td><code>-bs-age</code></td>
<td>Optional May be used only if the <code>-bs</code> is set. Specifies the number of days for which <strong>R-Drive Image</strong> will keep the backup set. Then the backup set will be removed. Example: <code>-bs-age=&quot;14&quot;</code></td>
</tr>
</tbody>
</table>
-cd-cache  
Optional  
Used when an image file is written to CD discs. R-Drive Image creates an ISO image of the CD disc and then copies it to the CD disc. Without it R-Drive Image writes data directly to the CD disc.

-<cd-speed>=<Speed>  
Optional  
Used when an image file is written to CD discs. Specifies burning speed in KB/sec.
Example: -cd-speed="1200"

-dvd-cache  
Optional  
Used when an image file is written to DVD discs. R-Drive Image creates an ISO image of the DVD disc and then copies it to the DVD disc. Without it R-Drive Image writes data directly to the DVD disc.

-dvd-speed  
Optional  
Used when an image file is written to DVD discs. Specifies burning speed in KB/sec.
Example: -dvd-speed="3324"

Example:
create -
s="hdd_size=40060403712+part_num=1+hdd_num=2+hdd_target_id=0+hdd_bus_type=ata+part_label=Part1+part_ofs=1048576+part_mounted=F:\hdd_name=SAMSUNG\#32;SP0411NTW100-11+part_size=16777216000+hdd_port_num=0+hdd_serial=S01JJ30X912831+part_fs=ntfs+hdd_vtype=real,hdd_size=40060403712+part_num=2+hdd_num=2+hdd_target_id=0+hdd_bus_type=ata+part_label=Part2+part_ofs=16778264576+part_mounted=H:\hdd_name=SAMSUNG\#32;SP0411NTW100-11+part_size=23279435776+hdd_port_num=0+hdd_serial=S01JJ30X912831+part_fs=ntfs+hdd_vtype=real" -a="I:\Test Image.rdr" -c=3 -u = true -p="My Password" -r="This is a test image" -xe="winamp C:\sounds\error.mp3" -xs="winamp C:\sounds\success.mp3"

This script command creates an image of logical disks F: and H: on the Samsung HDD. The path and filename for this image file is I:\Test Image.rdr, with compression level 3, and only useful information on this disk will be written to the image. This image is protected with the password "My Password", and its description is "This is a test image". If the script action has been performed successfully, the winamp application will play the success.mp3 file, and if an error occurs, it will play the error.mp3 file.

restore  
Removes data from an image to a specified disk place.

copy  
Copies a disk to a disk.

-s=<SourceDisk>  
Mandatory  
Specifies a source object to copy. The <SourceDisk> parameter consists of one or several disk descriptors written in the form: descriptor_name1=value[+descriptor_name1=value...]. The disk descriptors are presented in the Disk descriptors section of this table. Old notation is also valid:
Old notation examples:
for hard drive 1: -s=1
for the second partition on hard drive 1 (empty space is treated as a partition): -s=1:2
for the second partition on hard drive 1 skipping empty spaces: -s=1:p2
for the first empty space on hard drive 1 skipping partitions: -s=1:f1
for a logical disk: -s=D:
for several logical disks: -s="D: F:"
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>d=&lt;DestinationDisk&gt;</strong></td>
<td>Mandatory</td>
</tr>
<tr>
<td><strong>a=&lt;PathOfArchiveFile&gt;</strong></td>
<td>Mandatory</td>
</tr>
<tr>
<td><strong>k=&lt;&quot;Partition Status&quot;&gt;</strong></td>
<td>Optional</td>
</tr>
<tr>
<td><strong>-ou</strong></td>
<td>Optional</td>
</tr>
<tr>
<td><strong>t=&lt;TimeSliceNumber&gt;</strong></td>
<td>Optional</td>
</tr>
<tr>
<td>Parameter</td>
<td>Type</td>
</tr>
<tr>
<td>--------------------</td>
<td>--------</td>
</tr>
<tr>
<td>-t=&lt;time&gt;</td>
<td>Optional</td>
</tr>
<tr>
<td>-lr=&lt;DiskLetter&gt;</td>
<td>Optional</td>
</tr>
<tr>
<td>-sz=&lt;PartitionSize&gt;</td>
<td>Optional</td>
</tr>
<tr>
<td>-of=&lt;PartitionOffset&gt;</td>
<td>Optional</td>
</tr>
<tr>
<td>-bs-use=&lt;Parameter&gt;</td>
<td>Optional</td>
</tr>
<tr>
<td>-p=&lt;password&gt;</td>
<td>Mandatory / Not used</td>
</tr>
<tr>
<td>-hdd-mode=&lt;ModeType&gt;</td>
<td>Optional</td>
</tr>
</tbody>
</table>

Example:
This script command restores data to the logical disk G: on the Samsung HDD, the source image is stored in the "I:\Test Image.rdr", the data is taken from the first partition in the image. This image is protected with the password "My Password". If the script action has been performed successfully, the winamp application will play the success.mp3 file, and if an error occurs, it will play the error.mp3 file.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>restorefiles</td>
<td>Restores individual files from images to a specified destination</td>
</tr>
</tbody>
</table>
| \( s=\)"<SourceDisk>" \) | Mandatory. Specifies a source object to restore. The \(<SourceDisk>\) parameter consists of one or several disk descriptors written in the form: \( \text{descriptor_name1=value[+descriptor_name1=value...]} \). The disk descriptors are presented in the Disk descriptors section of this table. Old notation is also valid:  
  Old notation examples:  
  for hard drive 1: \(-s=1\)  
  for the second partition on hard drive 1: \(-s=1:2\)  
  for a logical disk: \(-s=D:\) |
| \( a=\)"<PathOfArchivoFile>" \) | Mandatory. Specifies a path (including its file name) to the image file from which data is to be restored. It there is a space in the path, the path should be in quotes.  
  Examples: \(-a=C:\Images\Test.rdr\) or \(-a="C:\Image Files\Test.rdr"\) |
| \( \text{filelist=}"<ListOfFilestoRestore>" \) | Mandatory. Specifies list of files from the image that should be restored.  
  Example: \(-\text{filelist="MyPhoto/*,Photo/Picture 001.jpg,Photo/Picture 003.jpg"}\) |
| \( \text{outdir=}"<OutputFolder>" \) | Mandatory. Specifies the folder to which files will be restored.  
  Example: \(-\text{outdir="D:\1111"}\) |

Example:
```
restorefiles -s="hdd_size=40060403712+part_num=1+hdd_num=1+hdd_target_id=0+hdd_bus_type=ata+part_label=Part2+part_ofs=16778264576+part_mounted=G:\+hdd_name=SAMSUNG\&32;SP0411NTW100-11+part_size=23279435776+hdd_port_num=0+hdd_serial=S01JJ30X912831+part_fs=ntfs+hdd_vtype=real"-
da="hdd_size=40060403712+part_num=2+hdd_num=1+hdd_target_id=0+hdd_bus_type=ata+part_label=Part2+part_ofs=16778264576+part_mounted=G:\+hdd_name=SAMSUNG\&32;SP0411NTW100-11+part_size=23279435776+hdd_port_num=0+hdd_serial=S01JJ30X912831+part_fs=ntfs+hdd_vtype=real"-
p="My Password" -xe="winamp C:\sounds\error.mp3" -xs="winamp C:\sounds\success.mp3"
```
This script command restores the specified files to the destination path `D:\1111` from the source image of the first partition of the hard drive stored in the file `I:\Test_Image.rdr`.

<table>
<thead>
<tr>
<th>check</th>
<th>Mounts an image file as a read-only virtual disk.</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-a=&lt;PathOfArchiveFile&gt;</code></td>
<td>Specifies a path (including its file name) to the image which integrity is to be checked. If there is a space in the path, the path should be in quotes. Examples: <code>-a=C:\Images\Test.rdr</code> or <code>-a=&quot;C:\Image Files\Test.rdr&quot;</code></td>
</tr>
<tr>
<td>Example:</td>
<td>check -a=&quot;I:\Test Image.rdr&quot;</td>
</tr>
</tbody>
</table>

This script command checks the image file `I:\Test Image.rdr` for its consistency.

| mount                  | Specifies an object in the image to mount. The `<SourceDisk>` parameter consists of one or several disk descriptors written in the form: `descriptor_name1=value[+descriptor_name1=value...]`. The disk descriptors are presented in the Disk descriptors section of this table. Old notation is also valid: Old notation examples:
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-s=&lt;SourceDisk&gt;</code></td>
<td>for the second partition on hard drive 1: <code>-s=1:2</code></td>
</tr>
<tr>
<td></td>
<td>for a logical disk: <code>-s=D:</code></td>
</tr>
<tr>
<td><code>-lr=&lt;DiskLetter&gt;</code></td>
<td>Specifies a disk letter. This parameter is case-insensitive. Examples: <code>-lr=&quot;K&quot;</code> or <code>-lr=K</code>.</td>
</tr>
<tr>
<td><code>-t=&lt;TimeSliceNumber&gt;</code></td>
<td>Specifies which incremental data in the image will be used to mount a disk. If the TimeSliceNumber is not specified, the first data in the image will be used. <code>-1</code> specifies the last incremental data in the image. first: <strong>R-Drive Image</strong> will use the first incremental data in the image. last: <strong>R-Drive Image</strong> will use the last incremental data in the image. +&lt;n&gt;: <strong>R-Drive Image</strong> will use the n-th incremental data from the beginning in the image. -&lt;n&gt;: <strong>R-Drive Image</strong> will use the n-th incremental data from the end in the image. Examples: <code>-t=&quot;+2&quot;</code> specifies the second incremental data from the beginning in the image will be used to mount a disk.</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-bs-use=&quot;&lt;Parameter&gt;&quot;</td>
<td>Optional parameter for setting the backup set R-Drive Image will use to mount as a logical disk. The parameter may be: first: R-Drive Image will use the first backup set. last: R-Drive Image will use the last backup set. +&lt;n&gt;: R-Drive Image will use the n-th backup set from the beginning. -&lt;n&gt;: R-Drive Image will use the n-th backup set from the end. &lt;date&gt;: R-Drive Image will use the backup set containing the date in its name. Examples: -bs-use=&quot;+3&quot;: R-Drive Image will use the 3-rd backup set from the beginning. -bs-use=&quot;20080521&quot;: R-Drive Image will use the backup set containing the &quot;20080521&quot; string in its name.</td>
</tr>
</tbody>
</table>

Example:

```bash
mount -a="I:\Test Image.rdr" -s=1:2 lr=F: -t=-1
```

This script command mounts the second partition of the first hard drive contained in the image file I:\Test Image.rdr. The virtual logical disk will have the F: letter.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>unmount</td>
<td>Unmounts a mounted virtual disk.</td>
</tr>
<tr>
<td>-lr=&lt;DiskLetter&gt;</td>
<td>Mandatory parameter for specifying a disk letter. This parameter is case-insensitive. Examples: -lr=&quot;K&quot; or -lr=K.</td>
</tr>
</tbody>
</table>

Example:

```bash
unmount lr=F:
```

This script command unmounts the virtual logical disk F:.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>activate</td>
<td>Sets a specified partition active. The required partition should be specified.</td>
</tr>
<tr>
<td>-s=&lt;SourceDisk&gt;</td>
<td>Mandatory parameter for specifying the partition on the disk to set active. The &lt;SourceDisk&gt; parameter consists of one or several disk descriptors written in the form: descriptor_name1=value[+descriptor_name1=value...]. The disk descriptors are presented in the Disk descriptors section of this table. Old notation is also valid: Old notation examples: for the second partition on hard drive 1: -s=1:2 for a logical disk: -s=D:</td>
</tr>
</tbody>
</table>

Example:

```bash
activate -s=1:1
```

This script command sets the first partition of the first hard drive active.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>delete</td>
<td>Deletes a partition on a drive. The required partition should be specified.</td>
</tr>
<tr>
<td>-s=&lt;SourceDisk&gt;</td>
<td>Mandatory parameter for specifying the partition to delete. The &lt;SourceDisk&gt; parameter consists of one or several disk descriptors written in the form: descriptor_name1=value[+descriptor_name1=value...]. The disk descriptors are presented in the Disk descriptors section of this table. Old notation is also valid:</td>
</tr>
</tbody>
</table>

Example:

```bash
activate -s=1:1
```
Old notation examples:
for the second partition on hard drive 1: -s=1:2
for a logical disk: -s=D:

Example:
  delete -s=F:
This script command deletes the logical disk F:.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>clear</td>
<td>Deletes all partitions on a drive</td>
</tr>
<tr>
<td>-s=&lt;SourceDisk&gt;</td>
<td>Mandatory</td>
</tr>
<tr>
<td></td>
<td>Specifies the hard drive where all partitions should be deleted. The &lt;SourceDisk&gt; parameter consists of one or several disk descriptors written in the form: descriptor_name=value[+descriptor_name=value...]. The disk descriptors are presented in the Disk descriptors section of this table. Old notation is also valid: Old notation examples: for hard drive 1: -s=1</td>
</tr>
</tbody>
</table>

Example:
clear -s=2
This script command deletes all partitions on the second hard drive.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>fixmbr</td>
<td>Installs a default boot loader on a hard drive</td>
</tr>
<tr>
<td>-s=&lt;SourceDisk&gt;</td>
<td>Mandatory</td>
</tr>
<tr>
<td></td>
<td>Specifies the hard drive where the boot loader will be installed.</td>
</tr>
<tr>
<td></td>
<td>Example: for hard drive 1: -s=1</td>
</tr>
</tbody>
</table>

Example:
  fixmbr -s=1
This script command installs the default boot loader to the first hard drive.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mail</td>
<td>Specifies all mail options globally for the entire script</td>
</tr>
<tr>
<td></td>
<td>Example: mail -ms=mail.example.com -ma=<a href="mailto:rtt1@example.com">rtt1@example.com</a> -mr=<a href="mailto:rtt2@example.com">rtt2@example.com</a> -ml=rtt1:password -me -mx -mz=ssl</td>
</tr>
<tr>
<td></td>
<td>This script command sends e-mails confirming success or error of the action from <a href="mailto:rtt1@example.com">rtt1@example.com</a> to <a href="mailto:rtt2@example.com">rtt2@example.com</a> via the mail.example.com SMTP server using the default (25) port with the rtt1 login and password password. The SSL option is SSL.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameters applicable to all commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>These parameters can be used in all commands</td>
</tr>
<tr>
<td>-log=&quot;&lt;LogOptions&gt;&quot;</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
<filename> writes the log to the specified file name and path. Example: c:\mylogs\mylog.txt. The "", character in the file name should be doubled. 

<filepath> writes the log files (a separate one to each session) to the specified folder. Each file name will have the following filename: date_time.rdl. Examples: c:\mydir\, file name: 20081003_215302.rdl.

#syslog: outputs logs into WinNT event log.

#sysdir: outputs logs into C:\Documents and Settings\All Users\Application Data\R-TT\R-Drive Image\Logs. 
Example: -log="#nodefault,c:\mylog.txt,c:\mydir\,#sysdir"

This will make R-Drive Image write its logs to the c:\mylog.txt file, and to the c:\mydir\ and C:\Documents and Settings\All Users\Application Data\R-TT\R-Drive Image\Logs\ folders without writing to WinNT event log.

<table>
<thead>
<tr>
<th>mail options</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sends e-mail messages if the action fails or succeeds and specifies e-mail parameters. If a personal firewall is installed on your computer, you should allow the r-driveimagecl.exe application to get access to the e-mail server.</td>
<td></td>
</tr>
</tbody>
</table>

- **me** | Optional |
| Sends an e-mail message when R-Drive Image fails to perform the specified action. May be used as a **Boolean parameter**. |

- **mx** | Optional |
| Sends an e-mail message when R-Drive Image successfully performs the specified action. May be used as a **Boolean parameter**. |

- **ms=<SMTPServer[:port]>** | Mandatory/Not used |
| Specifies an SMTP server and port (optional). Examples: -ms@mail.example.com or -ms@mail.example.com:25 |

- **ma=<SenderEmail>** | Mandatory/Not used |
| Specifies a sender's e-mail address. Example: -ma=rtt1@example.com |

- **mr=<RecipientEmail>** | Mandatory/Not used |
| Specifies a recipient's e-mail address or addresses. Example: -ma=rtt2@example.com |

- **ml=<Login:Password>** | Optional |
| Specifies a login and password at the SMTP server. Example: -ml=rtt1:password |

- **mz=<SSLOptions>** | Optional |
| Specifies the SSL options. Can be auto, no, ssl, tls. Default is auto. Example: -mz=ssl |

- **mn=<SenderName>** | Optional |
| Specifies the sender name. Example: -mn="Jhon Smith" |

- **mc=<MailSubject>** | Optional |
| Specifies the mail subject. Example: -mc="Backup Result" |
### Boolean parameters
Those are parameters that may have Boolean values:

- true, 1, yes, false, 0, no.

They may be used as keys (example: `-u`) or as parameters with values (example: `-u=true`).

### Entities or Variables
Entities may be used as variables to create various text strings. They start with `&` and end with `;`.

#### Version Entities
In the examples below, the **R-Drive Image** version is assumed as 4.1.67

<table>
<thead>
<tr>
<th>Entity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&amp;rdi.ver;</td>
<td>The <strong>R-Drive Image</strong> version. Example: &quot;4.1&quot;</td>
</tr>
<tr>
<td>&amp;rdi.ver.build;</td>
<td>The <strong>R-Drive Image</strong> build. Example: &quot;4167&quot;</td>
</tr>
<tr>
<td>&amp;rdi.ver.major;</td>
<td>The <strong>R-Drive Image</strong> major version. Example: &quot;4&quot;</td>
</tr>
<tr>
<td>&amp;rdi.ver.minor;</td>
<td>The <strong>R-Drive Image</strong> minor version. Example: &quot;1&quot;</td>
</tr>
<tr>
<td>&amp;rdi.ver.subminor;</td>
<td>The <strong>R-Drive Image</strong> sub-minor version. Example: &quot;67&quot;</td>
</tr>
</tbody>
</table>

#### Result Entities

<table>
<thead>
<tr>
<th>Entity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&amp;rdi.last_result;</td>
<td>Returns the last result of <strong>R-Drive Image</strong> operation. May be undefined, success, failed.</td>
</tr>
</tbody>
</table>

#### Time Entities
In the examples below, the system time is assumed as 11:10:04 AM

<table>
<thead>
<tr>
<th>Entity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&amp;sys.time;</td>
<td>System time in the locale format. Example: &quot;11:10:04&quot;</td>
</tr>
<tr>
<td>&amp;sys.time.m;</td>
<td>Minutes</td>
</tr>
<tr>
<td>&amp;sys.time.h;</td>
<td>Hours in the 24 h format</td>
</tr>
<tr>
<td>&amp;sys.time.h12;</td>
<td>Hours in the 12 h format</td>
</tr>
<tr>
<td>&amp;sys.time.s;</td>
<td>Seconds</td>
</tr>
<tr>
<td>&amp;sys.time._m;</td>
<td>PM or AM</td>
</tr>
</tbody>
</table>

#### Date Entities
In the examples below, the system date is assumed as February 1, 2007, Thursday

<table>
<thead>
<tr>
<th>Entity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&amp;sys.date;</td>
<td>System date in the locale format. Example: &quot;29/01/07&quot;</td>
</tr>
<tr>
<td>&amp;sys.date.d;</td>
<td>Month day. Example: &quot;01&quot;</td>
</tr>
<tr>
<td>&amp;sys.date.m;</td>
<td>Month. Example: &quot;02&quot;</td>
</tr>
<tr>
<td>&amp;sys.date.y;</td>
<td>Short year. Example: &quot;07&quot;</td>
</tr>
</tbody>
</table>
Enumeration Entities

<table>
<thead>
<tr>
<th>Entity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&amp;rdi.enum;</td>
<td>Defines the number of calls to this entity. Starts from 0.</td>
</tr>
<tr>
<td>&amp;rdi.enum.&lt;Num&gt;</td>
<td>Defines the number of calls to this entity. Starts from 0. Num specifies the format of the number. Example: &amp;rdi.enum.3; will return 001 for the second calls to this entity.</td>
</tr>
</tbody>
</table>

User-defined entities

You may create your own entities using the set command. Example:

```bash
set creat_date = "\&sys.date.m.name;-\&sys.date.d;-\&sys.date.y;"
```

You may use this entity, for instance, set a command creating files with their date of creation as the file name:

```bash
create -a="D:\archive\&creat_date;.rdr" -s="c:"
```

If the date when the script has been run is February 1, 2007, Thursday, this command will create an image of the logical disk C: and write it to the `D:\archive\February-01-07.rdr` file.

Please note that the set command defines the entities rather than specifies their value. The actual value of an entity will be determined each time the entity is used. Example:

```bash
set creat_time = "\&sys.time.h24;-\&sys.time.m;-\&sys.time.s;"
```

and the creat_time entity is used in two commands in a script:

```bash
create -a="D:\archive\&creat_time;.rdr" -s="c:"
create -a="D:\archive\&creat_time;.rdr" -s="c:"
```

R-Drive Image will create two different files with different file names, each representing the time of file creation.

The unset command deletes entities. Example:

```bash
unset creat_date creat_time
```

After this command the creat_date and creat_time entities cannot be used and cause R-Drive Image to generate an error if they appear further in the script.

The Disk Actions chapter explains basic disk actions.

The Startup Version chapter explains how to perform disk actions using the R-Drive Image Startup Version.

The Technical Information chapter gives technical information on Supported CD and DVD Recorders and List of Hardware Devices Supported in the Startup Mode and another useful technical information.

Follow this link to obtain R-Drive Image Contact Information and Technical Support.
VII Technical Information

This chapter gives technical information on:

- Updates
- Logging
- Creating consistent point-in-time backups
- Support for Various Disk Partition Schemes and File Systems
- Disk Wiping Algorithms
- Supported CD and DVD Recorders
- List of Hardware Devices Supported in the Startup Mode

The Disk Actions chapter explains disk actions such as:

- Create an Image of a partition, logical disk, or entire hard drive
- Create an Image from Files
- Restore Data from an Image
- Copy Disk to Disk to make an exact copy of one disk on another
- Manage partition and logical disks
- Mount an Image as a Virtual Logical Disk (read-only)
- Unmount Virtual Logical Disks
- Check an Image File to check an existing image file

The RAIDs, and Various Disk and Volume Managers chapter explains how to perform disk actions with various compound volumes such as:

- Windows Software RAIDs, Spanned, and Other Volumes
- Windows Storage Spaces
- Mac RAID
- Linux Logical Volume Manager Volumes

The Startup Version chapter explains how to perform disk actions using the R-Drive Image Startup Version such as:

- Create Startup Disk
- Restoring Data to a System or Other Locked Disk
- Create an Image Using the Startup Disks
- Disk to Disk Copy Using the Startup Disks

The Scheduled Actions, Command Line Operations, and Scripting chapter explains how to start disk actions automatically at scheduled times/events and create scripts that can be performed from a command line.

- Scheduler and Unattended Actions
- Scripting and Command Line Operations
- Rotation schemes (backup sets)
The **R-Drive Image OEM kit** chapter explains how computer system integrators can create system recovery disks for their systems

- **Create a Master Image**
- **Create Startup Media**

Follow this link to obtain **R-Drive Image Contact Information and Technical Support**

### 7.1 Updates

You may get R-Drive Image updates either on the **About R-Drive Image** dialog box, or on the **Action selection** panel.

#### R-Drive Image Action selection panel

![R-Drive Image Action selection panel](image)

### 7.2 Logging

**R-Drive Image** stores logs of several last actions. You may see them on the **Executed operation(s) log** panel.

When **R-Drive Image** finishes its work it can show you a brief descriptions and result of the performed operations.

Click the **Open logs** button and the **Operation details** window will appear.
You may save the log, print the log, or send it somewhere via email. **R-Drive Image** keeps a log of all performed operations on the **Executed operation(s) log** panel.

You may turn on saving the log into a file.

**To turn logging on:**
1. Click the **About** button
2. Select **Logging** and specify a log file name and its path on the **About R-Drive Image** dialog box.
7.3 Creating Consistent Point-in-Time Backups

Some programs may write some data on the disk while **R-Drive Image** is creating a data backup. To avoid data inconsistency, **R-Drive Image** uses two mechanisms for creating consistent point-in-time backups.

**Windows XP, Windows Server 2003, Windows Vista, and later**

**R-Drive Image** uses Microsoft Volume Shadow Copy Service (VSS) to notify other applications supporting this service that it is going to start a data backup process in order for them to flush all necessary data to the disk. Most applications like Microsoft Exchange Server, Microsoft SQL Server, and Oracle software support this service.

Options Windows Volume Snapshot Service and Notify system application on the **Backup Options** panel enable/disable the use of this service.

If a software that does not support VSS runs on your computer, you may use **Backup AUX applications** and **Snapshot AUX applications** on the **Backup Options** panel (and their respective commands/parameters in scripts) to send special commands to your application that will make that application flush its data to the disk before the backup process starts.

**Windows 2000 and earlier**

**R-Drive Image** uses its own driver to create a file system snapshot but it does not notify other applications that it is going to start a backup process. Therefore, if an application stores some of its data in memory, they will not be saved in the backup file. To avoid data inconsistency, we recommend you to use **Backup AUX applications** and **Snapshot AUX applications** on the **Backup Options** panel (and their respective commands/parameters in scripts) to send special commands to your application that will make that application flush its data to the disk before the backup process starts.

Option **R-TT Volume Snapshot Service** on the **Backup Options** panel enables/disables the use of this service.

<table>
<thead>
<tr>
<th><strong>Backup Options</strong></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Snapshot provider</strong></td>
<td>A snapshot provider is a service <strong>R-Drive Image</strong> uses to read the disk content while creating its image. <strong>R-Drive Image</strong> uses the snapshot providers in the order specified on the tab. If it fails to use the first one selected, it tries to use the second one, and so on.</td>
</tr>
<tr>
<td><strong>Windows Volume Snapshot Service</strong></td>
<td>If this check box is selected, <strong>R-Drive Image</strong> will try to use the Windows native snapshot provider. This snapshot provider is able to notify system applications that a snapshot is being taken. If this option is selected, pagefile.sys and hibernate.sys files are excluded from the image of the system disk.</td>
</tr>
<tr>
<td><strong>R-TT Volume Snapshot Service</strong></td>
<td>If this check box is selected, <strong>R-Drive Image</strong> will try to use R-TT snapshot provider. This snapshot provider is not able to notify system applications that a snapshot is being taken.</td>
</tr>
<tr>
<td><strong>Notify system applications</strong></td>
<td>If this check box is selected, the snapshot provider, if it supports this feature, notifies system applications that a snapshot is being taken.</td>
</tr>
<tr>
<td><strong>Limit I/O rate</strong></td>
<td>Specifies the rate limits for reading/writing data from/to disks</td>
</tr>
<tr>
<td><strong>Limit read</strong></td>
<td>The rate limit for reading from the source disk</td>
</tr>
<tr>
<td><strong>Limit write</strong></td>
<td>The rate limit for writing to the destination disk</td>
</tr>
<tr>
<td><strong>Process priority</strong></td>
<td>These options specify how much computer resources <strong>R-Drive Image</strong> will consume during a backup process.</td>
</tr>
<tr>
<td>Backup Process Priority</td>
<td>Specifies the priority of the backup process. Similar to that specified in Windows Task Manager.</td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Use CPU cores</td>
<td>Specifies how many processor cores <strong>R-Drive Image</strong> will use for the backup process.</td>
</tr>
<tr>
<td>Ignore disk read errors (bad sectors)</td>
<td>If this check box is selected, <strong>R-Drive Image</strong> will ignore possible read errors when it tries to read data from bad sectors. <strong>R-Drive Image</strong> works with disks with bad sectors in the following way: It reads a certain part of disk (predefined by Windows) and • If read errors are ignored, the entire part with bad sectors will be filled with zeros. • If read errors are not ignored, <strong>R-Drive Image</strong> reads that part sector by sector and shows a warning message for every bad sector with two options: skip the sector or try to read it again. In this case only the bad sectors will be filled with zeros, but all that requires manual actions and extremely slows the imaging process. Please note that <strong>R-Drive Image</strong> is developed for the work with normally functioning disks. If you need to image a malfunctioning disk, use <strong>R-Studio</strong>, a data recovery utility. It has more controls for imaging, and can create <strong>R-Drive Image</strong>-compatible images even in its demo mode, that is, without registering.</td>
</tr>
</tbody>
</table>

### Backup AUX applications

**R-Drive Image** is able to make applications run before and after all backup operations. Please note that those application should return a 0 exit code. Leave these fields blank if in doubt.

#### Before

An application **R-Drive Image** starts before the backup operations starts. If you need to start several application, you may use a command file.

Example: "cmd.exe /c example.bat"

#### After

An application **R-Drive Image** starts after the backup operations completes. If you need to start several application, you may use a command file.

Example: "cmd.exe /c example.bat"

### Snapshot AUX applications

**R-Drive Image** is able to make applications run before and after taking the snapshot of one or several volumes. Please note that those application should return a 0 exit code. Leave these fields blank if in doubt.

#### Before

An application **R-Drive Image** starts before it takes the snapshot of one or several volumes. If you need to start several application, you may use a command file.

Example: "cmd.exe /c example.bat"

#### After

An application **R-Drive Image** starts after it takes the snapshot of one or several volumes. If you need to start several application, you may use a command file.

Example: "cmd.exe /c example.bat"

If any of **Backup AUX applications** and **Snapshot AUX applications** are executed, the following environment variables are set:

<table>
<thead>
<tr>
<th><strong>R_CALLBACK_UID</strong></th>
<th>A unique digital backup id used in all calls for external commands pertaining to that backup process.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>R_CALLBACK_STAGE</strong></td>
<td>Takes the following values:</td>
</tr>
</tbody>
</table>

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BEFORE_BACKUP
AFTER_BACKUP
BEFORE_SNAPSHOT
AFTER_SNAPSHOT

**R_VOLUME NAMES**
A comma-separated name list of partitions to be processed.

**R_VOLUME GUIDS**
A comma-separated GUID list of partitions to be processed.

Therefore, the same command may be used for all the fields provided it will determine using **R_CALLBACK_STAGE** in which context it is called.

Below is an example of the variables when disks C: and D: are being backed up:

```
R_CALLBACK_UID=2008
R_CALLBACK_STAGE=BEFORE_BACKUP
R_VOLUME_NAMES=C:,D:
R_VOLUME_GUIDS={d5f570a1-2978-11dc-83bf-005056c00008},{9636e065-f75e-11dc-981a-829328f78201}

R_CALLBACK_UID=2008
R_CALLBACK_STAGE=BEFORE_SNAPSHOT
R_VOLUME_NAMES=C:
R_VOLUME_GUIDS={d5f570a1-2978-11dc-83bf-005056c00008}

R_CALLBACK_UID=2008
R_CALLBACK_STAGE=AFTER_SNAPSHOT
R_VOLUME_NAMES=C:
R_VOLUME_GUIDS={d5f570a1-2978-11dc-83bf-005056c00008}

R_CALLBACK_UID=2008
R_CALLBACK_STAGE=BEFORE_SNAPSHOT
R_VOLUME_NAMES=D:
R_VOLUME_GUIDS={9636e065-f75e-11dc-981a-829328f78201}

R_CALLBACK_UID=2008
R_CALLBACK_STAGE=AFTER_SNAPSHOT
R_VOLUME_NAMES=D:
R_VOLUME_GUIDS={9636e065-f75e-11dc-981a-829328f78201}

R_CALLBACK_UID=2008
R_CALLBACK_STAGE=AFTER_BACKUP
R_VOLUME_NAMES=C:,D:
R_VOLUME_GUIDS={d5f570a1-2978-11dc-83bf-005056c00008},{9636e065-f75e-11dc-981a-829328f78201}
```

**Note:** If the system settings permit, several disks may appear in one snapshot. Then the following calls will appear:

```
R_CALLBACK_UID=2008
R_CALLBACK_STAGE=BEFORE_BACKUP
R_VOLUME_NAMES=?:,D:
R_VOLUME_GUIDS={d5f570a1-2978-11dc-83bf-005056c00008},{9636e065-f75e-11dc-981a-829328f78201}

R_CALLBACK_UID=2008
R_CALLBACK_STAGE=BEFORE_SNAPSHOT
```

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7.4 Support for Various Disk Partition Schemes and File Systems

**R-Drive Image** supports various non-MBR/GPT disk partition schemes: Dynamic disk, BSD Slice, Apple Partition Map with the following restrictions:

- Changes in disk partition layout are supported for basic (regular) and dynamic MBR/GPT disks. **R-Drive Image** can change partition layout (the number of partitions and their sizes) while restore the data.
- The other partition layouts may be backed up and then restored only on their original places or other partitions of the same size. For example, a backup of dynamic disk D: may be restored on disk D:, or on any other dynamic partition provided that its size matches exactly that of disk D:.
- A basic partition may be restored on another partition of another layout with the above limitation, and a partition of another layout may be restored as a basic one without limitations.

Partitions with various file systems are supported by **R-Drive Image** differently:

<table>
<thead>
<tr>
<th>File system</th>
<th>Imaging/Copy</th>
<th>Restore</th>
<th>Partition Resizing*</th>
<th>Virtual Disk Mount</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAT (16/32), NTFS</td>
<td>Byte-by-byte and Useful Information Only</td>
<td>Entire partition and Selected folders and files.</td>
<td>Yes.</td>
<td>Yes</td>
</tr>
<tr>
<td>exFAT, ReFS</td>
<td>Byte-by-byte and Useful Information Only</td>
<td>Entire partition and Selected folders and files.</td>
<td>No</td>
<td>Yes (if the Windows version supports)</td>
</tr>
<tr>
<td>HFS/HFS+</td>
<td>Byte-by-byte and Useful Information Only</td>
<td>Entire partition and Selected folders and files.</td>
<td>Yes</td>
<td>No (Yes, if third-party file system drivers are installed)</td>
</tr>
<tr>
<td>APFS</td>
<td>Byte-by-byte and Useful Information Only</td>
<td>Entire partition and Selected folders and files.</td>
<td>No</td>
<td>No (Yes, if third-party file system drivers are installed)</td>
</tr>
<tr>
<td>Little and Big Endian variants of UFS1/UFS2</td>
<td>Byte-by-byte and Useful Information Only</td>
<td>Entire partition and Selected folders and files.</td>
<td>No</td>
<td>No (Yes, if third-party file system drivers are installed)</td>
</tr>
</tbody>
</table>
and Ext2/Ext3/Ext4 FS (Linux) drivers are installed).

| Unknown | Byte-by-byte | Entire partition | No | No |

* For non-MBR/GPT disk partition schemes, partition resizing can be done within existing disk partition layout.

### 7.5 Disk Wiping Algorithms

Data wiping is necessary only for files stored on conventional hard drives. Data stored on SSD storage devices cannot be effectively wiped out due to the principles of operation of these devices.

Currently **R-Drive Image** supports 5 wiping algorithms:

**Wipe an object panel**

![Wipe an object panel](image)

#### Wiping algorithms

| **Zeroes** | The disk is filled with zeroes through 1 pass. The fastest but the least secure algorithm. Also it does not conceal the fact that the disk or file has been wiped. |
| **Pseudo-random numbers** | The disk is filled with pseudo-random numbers through 1 pass. A slower but little bit more secure algorithm than the **Zeroes** algorithm and it also conceals to some degree the fact that the disk or file has been wiped. |
| **DoD 5220.22-M(3)** | The disk is wiped using Department of Defense standard 5220.22-M(3). Provides high-grade data wiping filling the unused space or file with a special digital pattern through 3 passes. This algorithm is very secure, but slow. |
| **DoD 5200.28-STD(7)** | The disk is wiped using Department of Defense standard 5200.28-STD(7). Provides high-grade data wiping filling the unused space or file with a special digital pattern through 7 passes. This algorithm is very secure, but very slow. |
| **Bruce Schneier(7)** | The disk is wiped using the Bruce Schneier's algorithm. Provides high-grade data wiping filling the unused space or file with a special digital pattern through 7 passes. This algorithm is very secure, but very slow. |
| **Peter Gutmann (35)** | The disk is wiped using the Peter Gutmann's algorithm. Provides high-grade data wiping filling the unused space or file with a special digital pattern through 35 passes. This algorithm is military-level secure, but horribly slow. |
What algorithm is to choose, depends on your specific needs. All of these wiping algorithms make recovery of wiped data with any software-based data recover utility impossible. So if you want to protect your information from a casual snooper, you may safely choose either the **Zeroes** or **Pseudo-random numbers** algorithm. The latter also conceals the fact that you wiped the data.

**If you want more security**, you need to know the following:

There are some techniques for recovery of wiped data. These techniques are based on the fact that magnetic medium on the hard drive’s platters "store" some information about previously written data. Such information cannot be completely removed. Wiped data may be recovered even from mechanically damaged platters. So the only safe way to completely remove data from a hard drive is to mechanically grind the magnetic medium off the drive platters or dissolve them in special chemical solvents.

But in order to recover the wiped data using one of these techniques, a hard drive must be disassembled, its platters placed in a precise magnetic field measurement system, and the results of such measurement statistically processed. All that is very expensive and requires a very qualified and experienced personnel and a specially developed equipment. Only a very advanced organization such as a law enforcement or intelligence agency of a developed nation, or a special high-tech firm can afford this. Moreover, each successive wiping pass makes such data recovery much and much harder. So, the **DoD 5220.22-M(3)** clearing and sanitizing standard overwriting the data with a special pattern through 3 passes is a rather reliable and safe choice for this case.

If you need the ultimate security, use the **DoD 5220.22-M(7)** clearing and sanitizing standard, or even the **Peter Gutmann (35)** wiping algorithm. They render data almost unrecoverable, but they are extremely slow.

### 7.6 Supported CD and DVD Recorders

**Supported CD recorders**

All IDE/SCSI/USB/FireWire (IEEE1394) CD recorders compatible with the MMC specification.

**Supported DVD recorders**

Any DVD+R/RW or DVD-R/RW drives for which packet (UDF) record software is installed (DirectCD/InCD/DLA). DVD discs should be formatted.

The **Disk Actions** chapter explains basic disk actions.

The **Startup Version** chapter explains how to perform disk actions using the **R-Drive Image Startup Version**.

The **Technical Information** chapter gives technical information on **Supported CD and DVD Recorders** and **List of Hardware Devices Supported in the Startup Mode** and another useful technical information.

Follow this link to obtain **R-Drive Image Contact Information and Technical Support**.

### 7.7 List of Hardware Devices Supported in the Startup Mode

In the startup mode, **R-Drive Image** supports the following hardware devices:

<table>
<thead>
<tr>
<th><strong>Data Storage Devices</strong></th>
<th><strong>Networking Devices</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial ATA and Parallel ATA drivers</td>
<td>3Com 3c574 PCMCIA</td>
</tr>
<tr>
<td>ACPI firmware driver for PATA</td>
<td>3Com 3c589 PCMCIA</td>
</tr>
<tr>
<td>ACard AHCI variant (ATP 8620)</td>
<td>3c501 'EtherLink'</td>
</tr>
<tr>
<td>AHCI SATA</td>
<td>3c503 'EtherLink II'</td>
</tr>
</tbody>
</table>
ALi PATA
AMD/NVidia PATA
ARTOP 6210/6260 PATA
ARTOP/Acard ATP867X PATA
ATI PATA
CMD / Silicon Image 680 PATA
CMD640 PCI PATA
CMD64x PATA
CS5510/5520 PATA
CS5530 PATA
CS5535 PATA
CS5536 PATA
Compaq Triflex PATA
Cypress CY82C693 PATA
EFAR SLC90E66
Generic ATA
HPT 343/363 PATA
HPT 366/368 PATA
HPT 370/370A/371/372/374/302 PATA
HPT 371N/372N/302N PATA
IT8211/2 PATA
IT8213 PATA
Initio 162x SATA
Intel ESB, ICH, PIIX3, PIIX4 PATA/SATA
Intel PATA MPIIX
Intel PATA old PIIX
Intel SCH PATA
JMicron PATA
Legacy ISA PATA
Marvell PATA support via legacy mode
Marvell SATA
NETCELL Revolution RAID
NVIDIA SATA
Nat Semi NS87410 PATA
Nat Semi NS87415 PATA
Ninja32/Delkin Cardbus ATA
OPTI FireStar PATA
OPTI621/6215 PATA
Older Promise PATA controller
PCMCIA PATA

3c505 ‘EtherLink Plus’
3c507 ‘EtherLink 16’
3c509/3c529 (MCA)/3c579 ‘EtherLink III’
3c515 ISA ‘Fast EtherLink’
3c590/3c900 series (592/595/597) ‘Vortex/Boomerang’
3cr990 series ‘Typhoon’
AMD 8111 (new PCI LANCE)
AMD LANCE and PCnet (AT1500 and NE2100)
AMD PCnet32 PCI
AT1700/1720
Adaptec Starfire/DuraLAN
Alteon AceNIC/3Com 3C985/NetGear GA620 Gigabit
Ansel Communications EISA 3200
Apricot Xen-II on board Ethernet
Asix AX88190 PCMCIA
Atheros L1C Gigabit Ethernet
Atheros L1E Gigabit Ethernet
Atheros L2 Fast Ethernet
Atheros/Attansic L1 Gigabit Ethernet
Broadcom 440x/47xx ethernet
Broadcom CNIC
Broadcom NetXtremeII
Broadcom NetXtremeII 10Gb
Broadcom Tigon3
Brocade 1010/1020 10Gb Ethernet Driver
CS89x0
Cabletron E21xx
Chelsio 10Gb Ethernet
Chelsio Communications T3 10Gb Ethernet
Chelsio Communications T4 Ethernet
Chelsio Communications T4 Virtual Function Ethernet
Cisco VIC Ethernet NIC Support
DECchip Tulip (dc2114x) PCI
DL2000/TC902x-based Gigabit Ethernet
Dave ethernet support (DNET)
Davicom DM910x/DM980x
Early DECchip Tulip (dc2104x) PCI
EtherExpress 16
EtherExpressPro support/EtherExpress 10 (i82595)
Pacific Digital ADMA
Pacific Digital SATA QStor
Platform AHCI SATA
Promise PATA 2027x
Promise SATA SX4
Promise SATA TX2/TX4
QDI VLB PATA
RADISYS 82600 PATA
RDC PATA
SC1200 PATA
SERVERWORKS OSB4/CSB5/CSB6/HT1000 PATA
ServerWorks Frodo / Apple K2 SATA
SiS 964/965/966/180 SATA
SiS PATA
Silicon Image 3124/3132 SATA
Silicon Image SATA
Toshiba Piccolo
ULi Electronics SATA
VIA PATA
VIA SATA
VITESSE VSC-7174 / INTEL 31244 SATA
Winbond SL82C105 PATA
Winbond W83759A VLB PATA

**SCSI low-level drivers**

3ware 5/6/7/8xxx ATA-RAID
3ware 97xx SAS/SATA-RAID
3ware 9xxx SATA-RAID
7000FASST SCSI
ACARD SCSI
ARECA (ARC11xx/12xx/13xx/16xx)
SATA/SAS RAID Host Adapter
Adaptec AACRAID
Adaptec AHA152X/2825
Adaptec AHA1542
Adaptec AIC79xx U320
Adaptec AIC7xxx
Adaptec AIC7xxx Fast -> U160
Adaptec AIC94xx SAS/SATA
Adaptec I2O RAID

Exar X3100 Series 10GbE PCIe Server Adapter
Exar Xframe 10Gb Ethernet Adapter
Fujitsu FMV-J18x PCMCIA
Generic DECchip & DIGITAL EtherWORKS PCI/EISA
HP 10/100VG PCLAN (ISA, EISA, PCI)
HP PCLAN (27245 and other 27xxx series)
HP PCLAN+ (27247B and 27252A)
ICL EtherTeam 16i/32
IP1000 Gigabit Ethernet
Intel(R) 10GbE PCI Express adapters
Intel(R) 82575/82576 PCI-Express Gigabit Ethernet
Intel(R) 82576 Virtual Function Ethernet
Intel(R) PRO/100+
Intel(R) PRO/1000 Gigabit Ethernet
Intel(R) PRO/1000 PCI-Express Gigabit Ethernet
Intel(R) PRO/10GBe
JMicron(R) PCI-Express Gigabit Ethernet
LP486E on board Ethernet
Marvell Yukon 2
Marvell Yukon Gigabit Ethernet
Mellanox Technologies 10Gbit Ethernet
Micrel KS8851 MLL
Micrel KSZ8841/2 PCI
Myricom Myri-10G Ethernet
Myson MTD-8xx PCI Ethernet
NE2000 compatible PCMCIA
NE2000/NE1000
NI5210
NI6510
National Semiconductor DP8381x series PCI Ethernet
National Semiconductor DP83820
NetXen Multi port (1/10) Gigabit Ethernet NIC
New Media PCMCIA
OKI SEMICONDUCTOR IOH(ML7223/ML7831) GbE
OpenCores 10/100 Mbps Ethernet MAC
PCI NE2000 and clones support (see help)
QLOGIC QLCNIC 1/10Gb Converged Ethernet NIC Support
Advansys SCSI
Always IN2000 SCSI
BusLogic SCSI
DMX3191D SCSI
DTC3180/3280 SCSI
EATA ISA/EISA/PCI (DPT and generic EATA/DMA-compliant boards)
Emulex LightPulse Fibre Channel Support
Future Domain 16xx SCSI/AHA-2920A
Generic NCR5380/53c400 SCSI MMIO
Generic NCR5380/53c400 SCSI PIO
HP Smart Array SCSI driver
HighPoint RocketRAID 3xxx/4xxx Controller
IBM Power Linux RAID adapter
IBM ServeRAID
Initio 9100U(W)
Initio IN1-A100U2W
Intel(R) C600 Series Chipset SAS Controller
Intel/ICP (former GDT SCSI Disk Array) RAID Controller
LSI Logic Legacy MegaRAID Driver
LSI Logic Management Module
LSI Logic MegaRAID Driver
LSI Logic MegaRAID SAS RAID Module
LSI MPT Fusion SAS 2.0 Device Driver
Marvell 88SE64XX/88SE94XX SAS/SATA
Microsoft Hyper-V virtual storage driver
NCR53c406a SCSI
PAS16 SCSI
PMC SIERRA Linux MaxRAID adapter
PMC-Sierra SPC 8001 SAS/SATA Based Host Adapter driver
Promise SuperTrak EX Series
QLogic ISP4XXX and ISP82XX host adapter family
QLogic QL42XXX Fibre Channel Support
QLogic FAS SCSI
QLogic QLA 1240/1x80/1x160 SCSI
SYM53c8XX Version 2 SCSI
Symbios 53c416 SCSI
Tekram DC390(T) and Am53/79C974 SCSI
QLogic QLA3XXX Network Driver Support
QLogic QLGE 10Gb Ethernet Driver Support
RDC R6040 Fast Ethernet Adapter
Realtek RTL-8129/8130/8139 PCI Fast Ethernet Adapter
Realtek RTL-8139 C+ PCI Fast Ethernet Adapter
Realtek 8169 gigabit ethernet
Realtek PCIe GBE Family Ethernet Adapter
SEEQ8005
SMC 9194
SMC 91Cxx PCMCIA
SMC EtherPower II
SMC Ultra
SMSC LAN9420 PCI ethernet adapter
STMicroelectronics 10/100/1000 Ethernet driver
ServerEngines' 10Gbps NIC - BladeEngine
SiS 900/7016 PCI Fast Ethernet Adapter
SiS190/SiS191 gigabit ethernet
Silan SC92031 PCI Fast Ethernet Adapter driver
Solarflare SFC4000/SFC9000-family
Sun Cassini
Sun GEM
Sun Happy Meal 10/100baseT
Sun Neptune 10Gbit Ethernet
Sundance Alta
TI ThunderLAN
Tehuti Networks 10G Ethernet
ULi M526x controller
VIA Rhine
VIA Velocity
VD80*3
Winbond W89c840 Ethernet
Xircom 16-bit PCMCIA
Zenith Z-Note
nForce Ethernet

**USB Network Adapters**

ASIX AX88xxx Based USB 2.0 Ethernet Adapters
CDC EEM
CDC Ethernet support (smart devices such as cable modems)
Tekram DC395(U/UW/F) and DC315(U) SCSI
Trantor T128/T128F/T228 SCSI
UltraStor 14F/34F
UltraStor SCSI
VMware PVSCSI driver
Workbit NinjaSCSI-32Bi/UDE
iSCSI Boot Sysfs Interface

**USB support**
- CF/PCMCIA support for SL811HS HCD
- ChipIdea Highspeed Dual Role Controller
- Cypress C67x00 HCD
- Datafab Compact Flash Reader
- Freecom USB/ATAPI Bridge
- ISD-200 USB/ATA Bridge
- ISP 1760 HCD
- ISP116X HCD
- ISP1362 HCD
- Lexar Jumpshot Compact Flash Reader
- OXU210HP HCD
- Olympus MAUSB-10/Fuji DPC-R1
- R8A66597 HCD
- SL811HS HCD
- SSB usb host driver
- SanDisk SDDR-09 (and other SmartMedia, including DPCM)
- SanDisk SDDR-55 SmartMedia
- USB 2.0
- USB Mass Storage
- USB Monitor
- USBAT/USBAT02-based storage
- xHCI HCD (USB 3.0)

**Block devices**
- Compaq SMART2
- Compaq Smart Array 5xxx
- Mylex DAC960/DAC1100 PCI RAID Controller
- Normal floppy disk
- Promise SATA SX8

**IEEE 1394 (FireWire) support**
- Legacy alternative FireWire driver stack
- Storage devices (SBP-2 protocol)
Other devices

- Microsoft Hyper-V Utilities driver
- Microsoft Hyper-V client drivers
- Microsoft Hyper-V virtual block driver
- Microsoft Hyper-V virtual network driver
- Microsoft Hyper-V virtual storage driver

The **Disk Actions** chapter explains basic disk actions.
The **Startup Version** chapter explains how to perform disk actions using the R-Drive Image Startup Version.

The **Technical Information** chapter gives technical information on Supported CD and DVD Recorders and List of Hardware Devices Supported in the Startup Mode and another useful technical information.

Follow this link to obtain R-Drive Image Contact Information and Technical Support
VIII  R-Drive Image OEM kit

Available in the System Recovery Media Creator version.

R-Drive Image OEM kit allows system integrators, consultants, and computer assemblers to create special system recovery disks/devices and include them with their fully assembled computer systems. The license for R-Drive Image OEM kit allows its licensee to distribute unlimited number of those system recovery devices with its computers provided that an unregistered copy of R-Drive Image OEM is pre-installed on each distributed computer and the R-Drive Image software icon is placed on the end-user desktop.

The end user of such computer systems can use those system recovery disks to restore the system files, registry keys, installed programs, etc., to a state the computer system or hardware was initially set up (a fresh setup). R-Drive Image OEM kit is intended only to restore the original system disk configuration as part of a service or maintenance procedure. Use of this kit to install software on any other computer or system is strictly prohibited.

R-Drive Image OEM kit consists of three components:

R-Drive Image System Recovery Media Creator (R-Drive Image SRMC)

It can create a special R-Drive Image System Recovery OEM media device, that is, startup disk(s) that may be used to restore a computer system after a complete failure when it requires a complete fresh setup (system recovery disks). It may be a CD/DVD/USB disk, ZIP drive or any other removable media device.

R-Drive Image System Recovery OEM

Actually, R-Drive Image System Recovery OEM is a startup device containing a special R-Drive Image startup version with a master disk image. This R-Drive Image startup version restores data from a master image only to a hard drive or logical disk of a target system.

R-Drive Image OEM

This is a R-Drive Image version similar in its functionality to a conventional R-Drive Image.

Note: You need to obtain an OEM license to activate the OEM functionality in R-Drive Image. You may obtain a free demo key on the R-Drive Image site to test that functionality. OEM System Recovery Media created in the demo mode will perform all the required operations but without actual data recovery. If you want to disable the OEM functionality after tests, simply enter that free demo key once again. The the OEM functionality will disappear.
When you enter the OEM registration key, this message disappears and the OEM recovery system can be created.

**R-Drive Image SRMC Features:**
- The master image can be placed on the startup disk(s) or on a separate device.
- Flexible data restoring: **R-Drive Image** may automatically find the disk to restore data to, or the user can manually select places for data recovery.

Creating **OEM System Recovery Media** consists of two steps:

1. **Creating the master image of the system**
2. **Creating the startup media**

When the user will start the system up with such disk(s), **R-Drive Image** will either restore the system automatically, or ask the user to specify the source and target for system requirement, depending on the options specified during the disk creation.

The **Disk Actions** chapter explains disk actions such as:
- **Create an Image** of a partition, logical disk, or entire hard drive
- **Restore Data from an Image**
- **Copy Disk to Disk** to make an exact copy of one disk on another
- **Mount an Image as a Virtual Logical Disk** (read-only)
- **Unmount Virtual Logical Disks**
- **Check an Image File** to check an existing image file

The **Startup Version** chapter explains how to perform disk actions using the **R-Drive Image Startup Version** such as:
- **Create Startup Disk**
8.1 Create a Master Image

A master image is the image of the hard drive/logical disk or partition which you will use to restore the system.

The safest way to create a master image for a system rescue disk is to set the system up, turn it off, then start it up with the R-Drive Image startup version and write the master image file either to a network drive or to a USB disk. Please note that you have to connect the USB disk before you start up the system.

If you are going to create the master image in the same way as a regular image, it is necessary to understand how OEM System Recovery Media searches for the target drives/partitions to restore data to.

**Hard drives:** OEM System Recovery Media identifies drives by their identity info (vendor+model+revision). So, when creating the master image, avoid connecting the source drive to a non-standard drive controller. It may change the drive name and/or size, making it impossible for OEM System Recovery Media to identify the target drive correctly when restoring data.

**Partitions:** OEM System Recovery Media identifies partitions by their offset+size and, with lesser priority, by their file system information (file system type and label). If OEM System Recovery Media find one object which properties coincide with those in the master image, it believes that it has found the target partition. If there are several same partitions on different drives, OEM System Recovery Media selects the target partition by its HDD identity info.

**Note:** When creating the master image, specify the Image split size option on the Image Options panel according to the requirements of the target where you want to store the master image and do not pay attention to the size requirements of the media type you plan to use. When producing the startup disk, R-Drive Image will split the image accordingly.

8.2 Create Startup Media

When the master image of the system is created, you may create the startup data recovery disk(s).

**To create a startup data recovery disk(s):**

1. Click Create OEM System Recovery Media on the Action Selection panel.
2. Select the file with the master image on the Master image file panel and click the Next button.
When you click the file, you may view its content below.

3 Select the device you want to use to create the system recovery disks on the Create OEM System Recovery Media panel and click the Next button.

If you have problems with starting the computers up from the R-Drive Image startup disks, select configure startup media troubleshooting options. Then the Startup Media Troubleshooting Options panel will appear. You may configure these options to eliminate those problems. Those options will help you if you have problems with starting your computer up from the R-Drive Image startup disks.

- **Startup Media Troubleshooting Options**

  Display kernel startup messages if this checkbox is enabled, R-Drive Image displays all startup messages. That may be useful to locate the source of the problem when your system hangs during
<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trace drivers loading</strong></td>
<td>Select this checkbox when you want to see loading drivers to find which one may lock the system.</td>
</tr>
<tr>
<td><strong>Disables ACPI</strong></td>
<td>Select these checkboxes when your system detects some hardware incorrectly during <strong>R-Drive Image</strong> startup and displays messages like: <em>hda: lost interrupt</em></td>
</tr>
<tr>
<td><strong>Disables APIC</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Disables USB devices support</strong></td>
<td>Select these checkbox if your system experiences problems with USB devices during <strong>R-Drive Image</strong> startup.</td>
</tr>
<tr>
<td><strong>Disables SCSI devices support</strong></td>
<td>Select these checkbox if your system experiences problems with SCSI devices during <strong>R-Drive Image</strong> startup.</td>
</tr>
<tr>
<td><strong>Disables PATA devices support</strong></td>
<td>Select these checkbox if your system experiences problems with Parallel ATA devices during <strong>R-Drive Image</strong> startup.</td>
</tr>
<tr>
<td><strong>Disables PCMCIA devices support</strong></td>
<td>Select these checkbox if your system experiences problems with PCMCIA devices during <strong>R-Drive Image</strong> startup.</td>
</tr>
<tr>
<td><strong>Disables DMA for all IDE disk drives</strong></td>
<td>Select these checkbox if your system experiences problems with IDE disks during <strong>R-Drive Image</strong> startup.</td>
</tr>
<tr>
<td><strong>IRQ polling mode</strong></td>
<td>Select this checkbox if <strong>R-Drive Image</strong> does not recognize a device although it is in the supported device list.</td>
</tr>
<tr>
<td><strong>Default clocksource</strong></td>
<td>Select this checkbox to select computer default clocksource.</td>
</tr>
<tr>
<td><strong>PCI BIOS</strong></td>
<td>Select an appropriate option if your system experiences problems with computer hardware.</td>
</tr>
<tr>
<td><strong>ACPI OSI</strong></td>
<td>An option informing the computer BIOS which OS type is going to start. Default is Linux, but it may cause the computer BIOS to drop support for some computer hardware. Change this option if the startup version cannot recognize some computer hardware, or it malfunctions.</td>
</tr>
<tr>
<td><strong>Disable specified drivers</strong></td>
<td>Enter the drivers that may cause system lock. Driver names should be separated by a space or comma.</td>
</tr>
</tbody>
</table>
4 Specify the options for the system recovery disks on the **OEM System Recovery Media Options** panel and click the Next button

![OEM System Recovery Media Options](image)

**OEM System Recovery Media Options**

- **Media:** Select the media type you would like to have. **R-Drive Image** will automatically split the data accordingly.

- **Options**
  - **If this check box is selected**
  - **Create media in demo mode**
    - **R-Drive Image** will create a demo recovery disk. During the recovery process, it will be possible to perform all the required operations without actual data recovery. The license count will not be decremented.
  - **Don't copy the master image**
    - **R-Drive Image** will create the startup version only without copying the master image to the media. Select this option if you want to store the master image separately from the **R-Drive Image** startup version. The master image may be stored on a hidden partition of the hard drive.
  - **Client will search image on all disks**
    - **R-Drive Image** will search for the master image on all disks (in their root only) in the system rather than on the startup disk only.
  - **Disable target (and source) disk selection**
    - the user will not be able to specify the target object to which the data will be restored if **R-Drive Image** could not find the target for data recovery automatically. If this option is clear, the user could click the **Back** button on the **Confirm Operation** panel and manually select the target to which the data will be restored. When this option is selected, the Disable source disk selection option will also be selected.
  - **Disable source disk selection**
    - the user will not be able to select the source disk/partition in the master image manually. If this option is clear, the user could click the **Back** button on the **Confirm Operation** panel and manually select the source for data recovery in the image.
<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw disk copy/restore</td>
<td><strong>R-Drive Image</strong> will enforce the Raw disk copy/restore as the first option during data restoring.</td>
</tr>
<tr>
<td>Automatically reboot on successful restore</td>
<td><strong>R-Drive Image</strong> will open the disk tray for the data recovery CD disc, and restart the system automatically upon data recovery.</td>
</tr>
<tr>
<td>Perform restoration without confirmation</td>
<td><strong>R-Drive Image</strong> will not require action confirmation from the user. If <strong>R-Drive Image</strong> finds the drive/disk corresponding to the master image, it will start data recovery automatically. If not, either an error message will appear, or the user will be asked about the target for data recovery, depending on the Disable target disk selection option.</td>
</tr>
<tr>
<td>GUI mode</td>
<td><strong>R-Drive Image</strong> will start in the following GUI mode: GUI, GUI/Safe, GUI/SVGA, TUI</td>
</tr>
</tbody>
</table>

If you want to start data recovery automatically, select the two last check boxes.

5 Click the **Start button** on the **Processing panel**

> **R-Drive Image** will start creating the startup data recovery disk(s)
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