



Paragon® Hard Disk Manager™ for Mac OS X User Guide

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Product Overview

Hard Disk Manager for Mac (HDM for Mac) is a port of the best-selling Paragon's storage management solution for Windows. It covers all aspects of a Mac computer life cycle: drive partitioning, file system optimization and repair functions, data backup capabilities, and irreversible data wiping. Unlike Disk Utility or similar Mac tools, the program supports all file systems of OS X, Windows, and Linux. Besides, it can back up system and data volumes through a patent-pending snapshot technology, which is several times more effective and user-friendly than the popular Time Capsule.

Among other strong benefits the following features are worth mentioning: redistribution of free space between volumes without the system restart, conversion of a file system that contains data, conversion from MBR to GPT and vice versa, recovery of an accidentally deleted volume, and irreversible destruction of not only all on-disk information, but remnants of deleted files without affecting the used data.

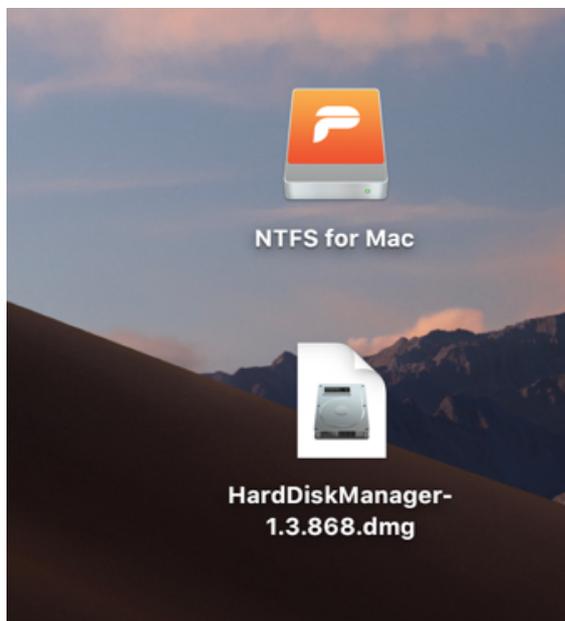
Getting Started

System Requirements

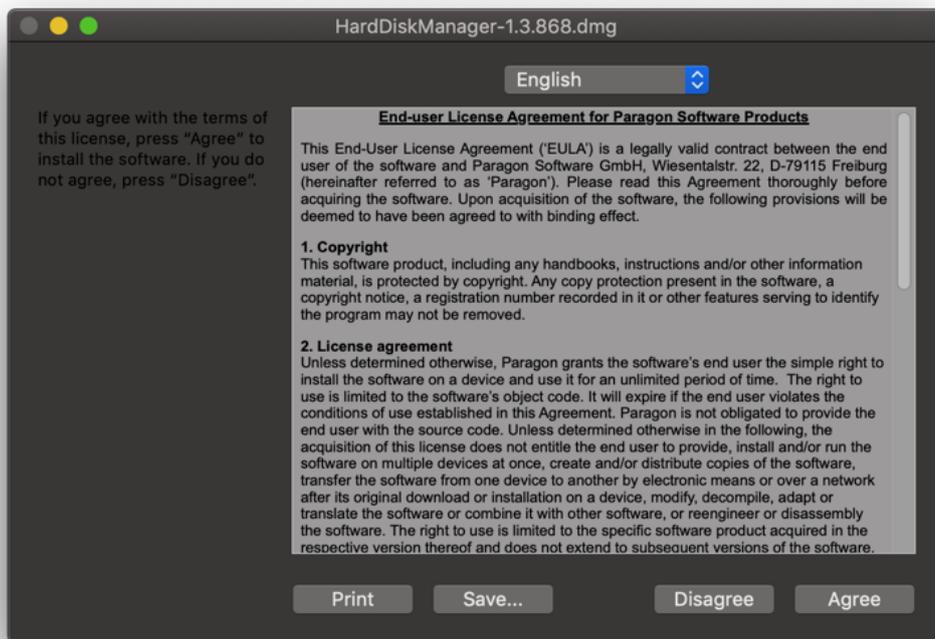
An Intel-based Mac computer
OS X 10.10 and later
2 GB of RAM

Installation

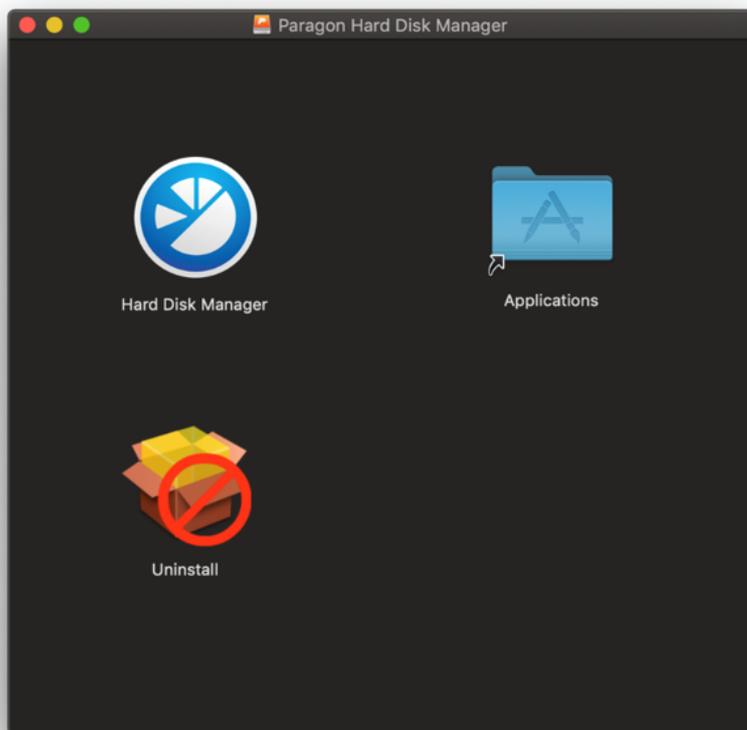
1. Double click the supplied .dmg image.



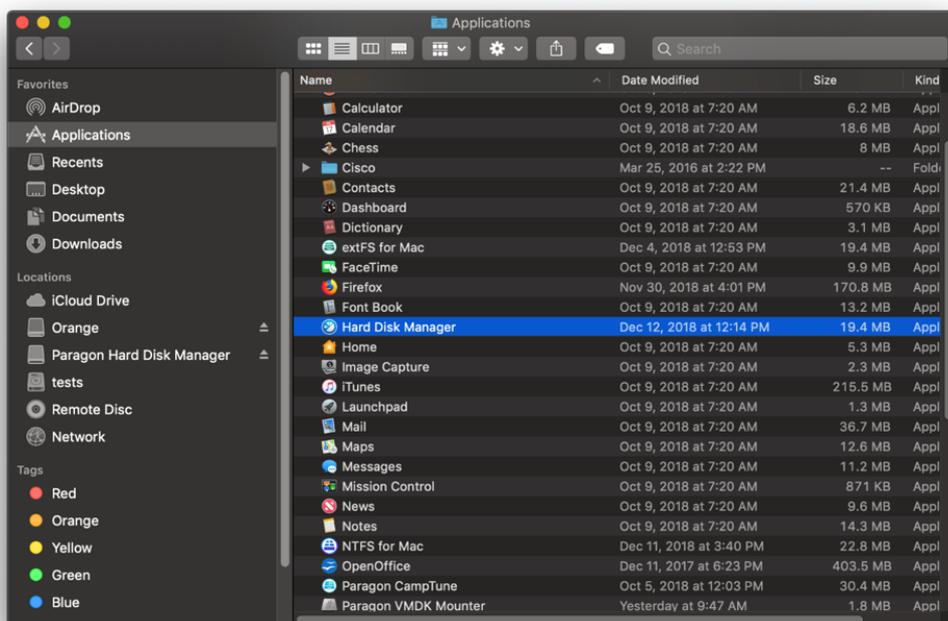
2. First, you are to accept all conditions stated in Paragon's license agreement by clicking the **Agree** button. You can also save or print out the agreement by using the appropriate buttons.



3. Drag the program's icon to the Applications folder.



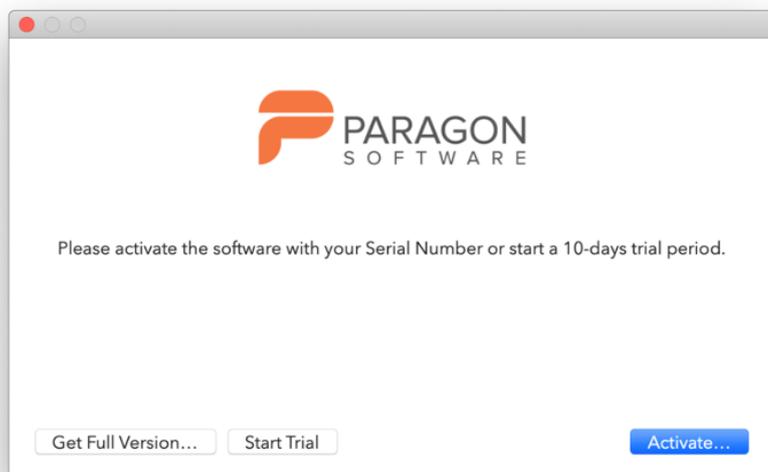
4. After the installation, you can see an icon of Paragon's Hard Disk Manager in the Applications folder. Double click the icon to launch the utility.



First Start

Activating the Product

Once started, you will see an activation dialog. HDM for Mac is a commercially distributed product, which is however can be used with no limitations for free during a 10-day trial period. After that, you will not be able to use the product until activated over the Internet.



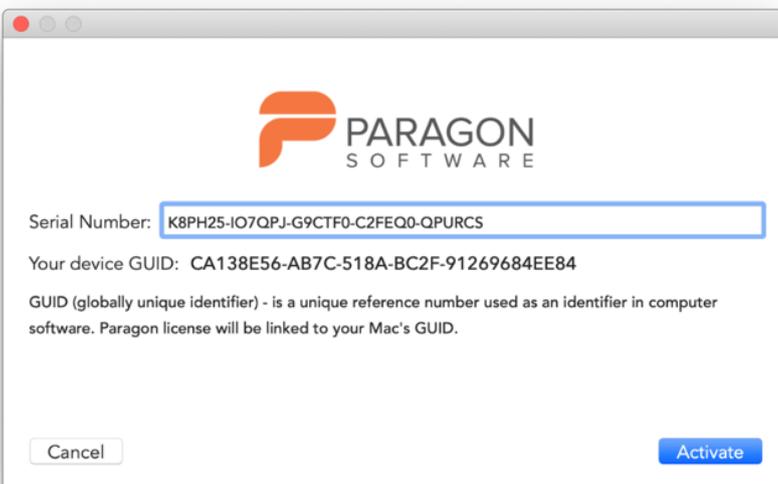
There are two ways of activating the product: with login to MyParagon Customer Portal or Facebook and without it. We highly recommend the first option, so that we could offer personal discounts in the future. Besides, you will be able to issue support tickets directly from the product.

1. First, purchase the product by clicking **Get Full Version**. As a result, you should have your own serial number.
2. Click **Activate...**, enter an email and password of your Paragon's account, then click **Sign in**. If you do not have an account yet, please create it by clicking the corresponding option. Alternatively, you can sign in with your Facebook account.



If you do not want to activate the product with MyParagon Customer Portal login, click **Skip**.

3. If you have purchased the product online as described in the first step, your serial number will appear automatically. If having to do with a box version of the product, enter your serial number and click **Activate**. This info will be sent to our activation server to complete the procedure.



4. Next, you are to provide a password of a user with the administrator privilege.

5. You will get a notification in case of successful activation.

Installing Auxiliary Components

After you are done with the activation dialog, the program will notify you about installing several auxiliary components. These include the **Snapshot** to get instant copies of a disk or several disks at a specific point in time and the **VMDK Mounter** to mount existing backup images in read-only mode.

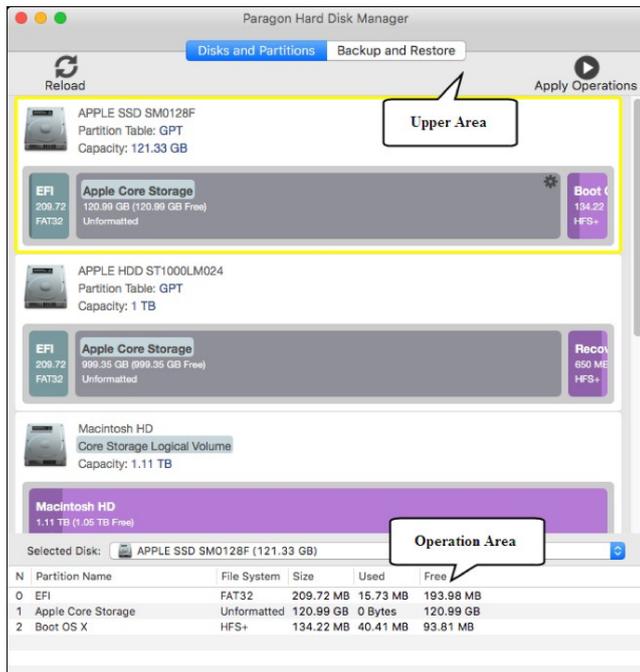


Working with the Product



The program provides wide opportunities in the field of hard disk structure modification, so it's highly recommended to back up your data before carrying out any operation.

The main window can be conditionally subdivided into several sections:



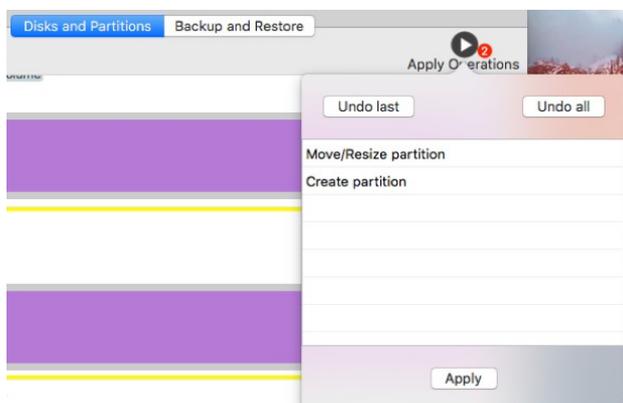
Upper Area

In the main window's upper area you can switch between two operation modes:

- Click the **Disks and Partitions** tab (active by default) to partition drives, optimize and repair file system, or wipe data from disks;
- Click the **Backup and Restore** tab to protect your system and data from system or hardware failures or an accidental data loss.

There are two more buttons in the Upper Area:

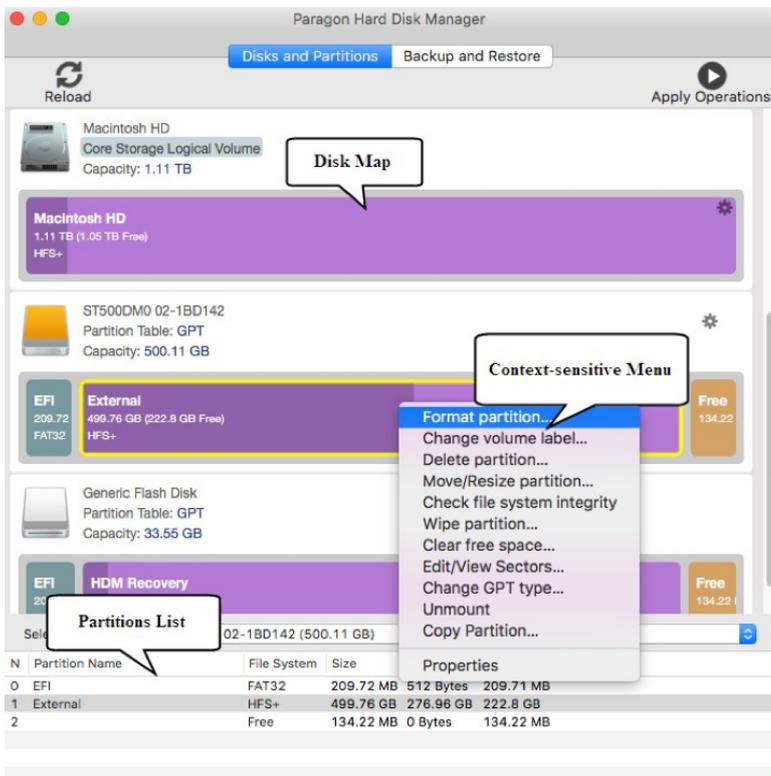
- **Reload** button updates the displayed information after connecting an external disk or mounting a virtual image;
- **Apply Operations** button executes pending changes. In fact, the program does not accomplish operations immediately, but puts them on a special waitlist (so-called virtual mode). Firstly, it helps to avoid possible mistakes, as you should confirm all provided changes. Secondly, it saves your time and effort when executing several operations, as you don't need to wait for each operation to complete before proceeding to the next one.



Operation Area

Contents of the Operation Area vary depending on the selected operation mode in the Upper Area.

Disks and Partitions



In this mode, you can see all physical and virtual storage devices available in the system, including mounted .dmg images. Graphical display of the information helps you accomplish the required task with the minimal effort.

Disk Map

The Disk Map displays the storage devices layout. Each device is shown as a white rectangle bar containing colored bars, which represent partitions or logical disks. Their color depends on the file system of the corresponding partition (blue for APFS, purple for HFS, teal for ExtFS, blue for NTFS, etc.). By the bar's shaded area size you can estimate the used disk space. For the selected at the moment object, you can call a context sensitive popup menu with available operations.



White bars display the following storage device information:

- Type (physical, virtual, apple disk image),
- Partitioning scheme (MBR or GPT),
- Total capacity.

Colored bars display the following information about logical disks and blocks of free space:

- Volume label (if exists),
- Total size,
- File system.

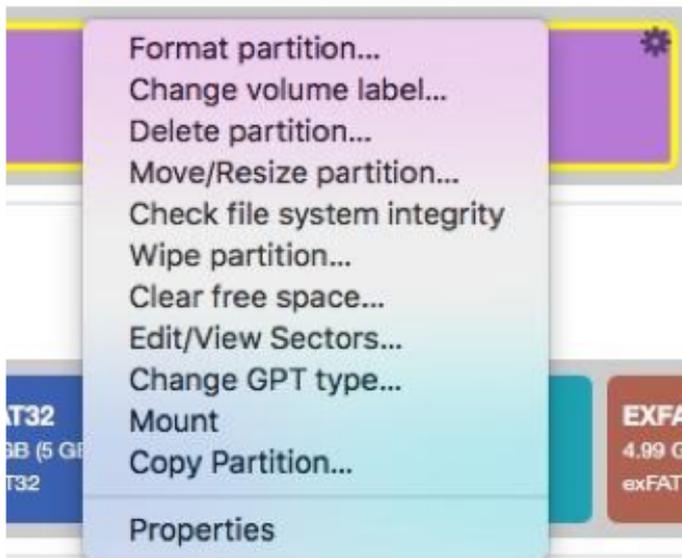
Partition List

The Partition List is another tool displaying a clear-cut picture of the system storage devices state. All objects (disks, partitions, blocks of free space, or disk images) on the list are sorted by their starting position. You can call a context-sensitive popup menu with available operations for every item.

N	Partition Name	File System	Size	Used	Free
0	FAT16	FAT16	1.9 GB	2.56 MB	1.9 GB
1		Free	3.1 GB	0 Bytes	3.1 GB
2	FAT32	FAT32	5 GB	1.05 MB	5 GB
3	NTFS	NTFS	5 GB	17.62 MB	4.98 GB
4	EXFAT	exFAT	4.99 GB	2.65 MB	4.99 GB

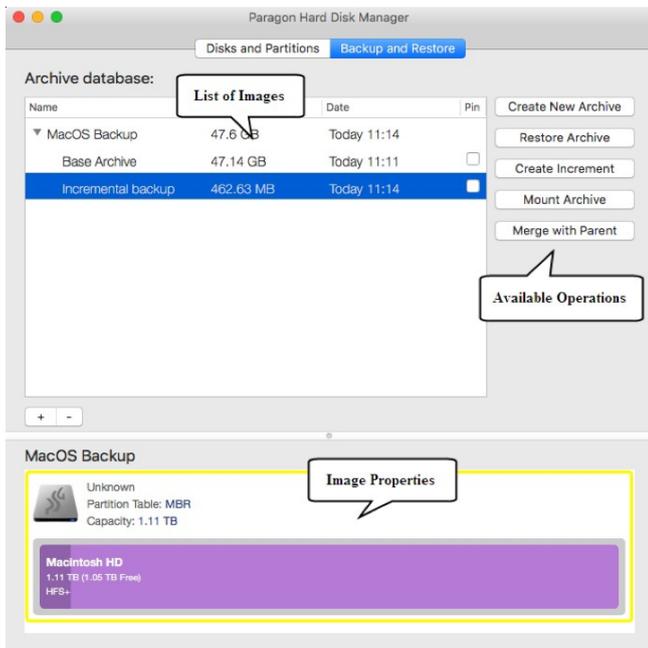
Context-sensitive Menu

Right click a disk, partition, or block of free space on the Disk Map or Partitions List or left click the gear icon for the currently selected object on the disk map to call a context-sensitive menu with available operations. Select a desired operation to call the corresponding dialog.



To learn more about drive partitioning, file system optimization and other storage management operations, please consult the Manage Partitions and Disk chapter.

Backup and Restore



In this tab you can see a list of created backup images. Left click on image and detailed information and properties will be displayed in the lower panel. Depending on the selected object, you can initiate one of the available operations.



To learn more about backup and restore operations, please consult the [Protect System and Data](#) chapter.

Preparing Bootable Recovery Media

Recovery media can help you boot your Mac into Recovery Environment to get access to your disk(s) for maintenance or recovery purposes when OS X fails to start up. It includes a standard set of utilities (terminal, reinstall OS X tool, etc.) and the Hard Disk Manager (HDM) application. HDM for Mac includes a user-friendly wizard that guides you through the process of media creation on a flash stick or external disk. The only prerequisite is to have the native OS X Recovery HD partition in the system as the basis.

1. Select from the main menu: **Wizards > Create Bootable Recovery Media**.



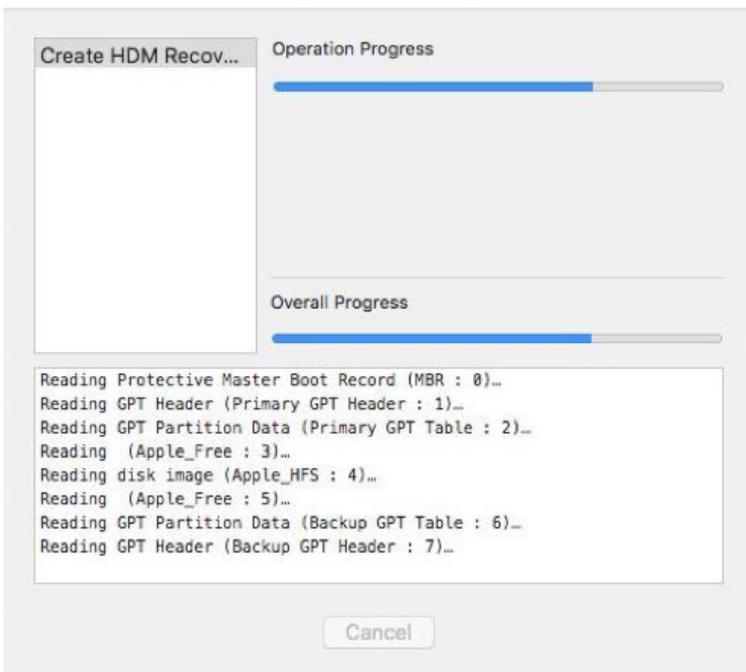
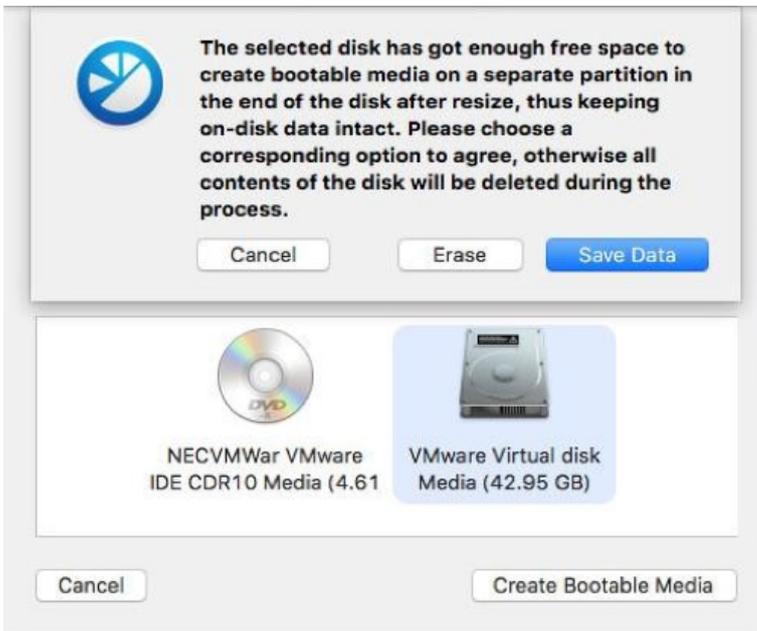
If running HDM for Mac on Mac OS X El Capitan where the System Integrity Protection (SIP) is enabled by default, you'll be prompted to either create the recovery media and accomplish otherwise prohibited operations from it or switch off SIP at the first program start. For more details, please consult HDM for Mac and SIP.



2. Choose a flash stick or external disk from the list of available storage devices, then click **Create Bootable Media**.



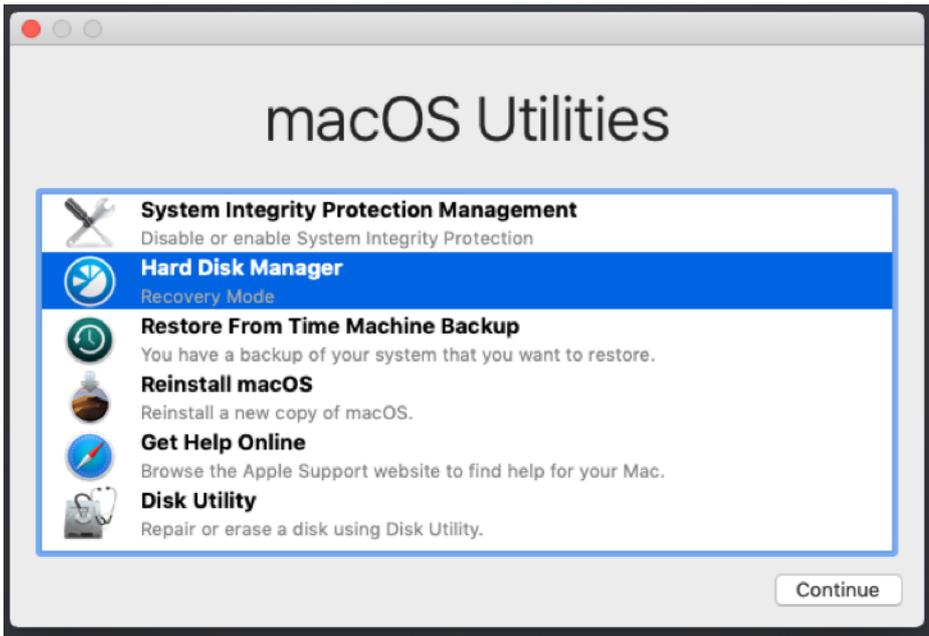
3. If the selected disk contains enough free space, the wizard suggests you either to create the recovery media on a separate partition after resize to keep the on-disk data intact, or to erase the entire disk contents. If the selected storage device is a GPT disk, where the last partition can be downsized by 700MB, the wizard suggests either to create the recovery media on a separate partition ("HDM Recovery") at the end of the disk after resizing to keep the on-disk data intact, or to erase the entire disk contents. In case the disk is MBR, the wizard prompts you to erase it, creating a GPT disk with three partitions: EFI, "User Data" (takes the bulk of the available free space), and "HDM Recovery" (700MB). Click on the required option to initiate the operation, which takes a couple of minutes.



4. Once completed, wizard asks you to restart your Mac from the just created media. If you decide not to do it right now, click **Don't restart**.



5. To start up the computer from the recovery media later you will need to hold the **Option** (alt) key during the system restart until the Startup Manager appears, then select **Hard Disk Manager** as boot source. Alternatively, you can use the Startup Disk System Preferences.



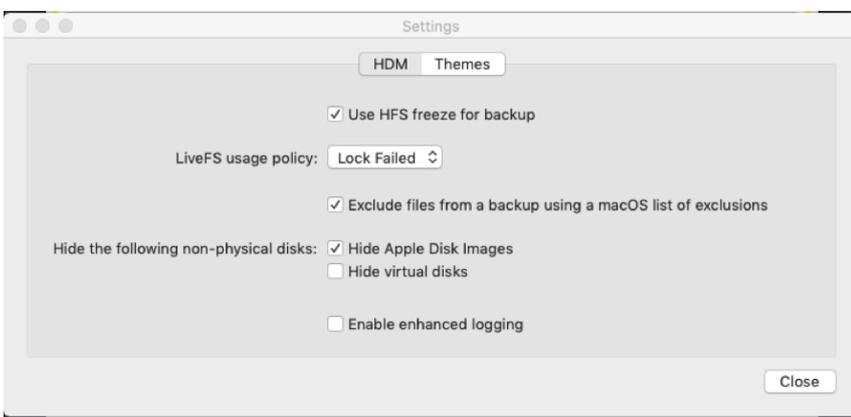
Configuring the Program

HDM for Mac is very flexible and can be easily configured through the graphical interface.

1. In the main menu go to: **Paragon Hard Disk Manager > Preferences...**

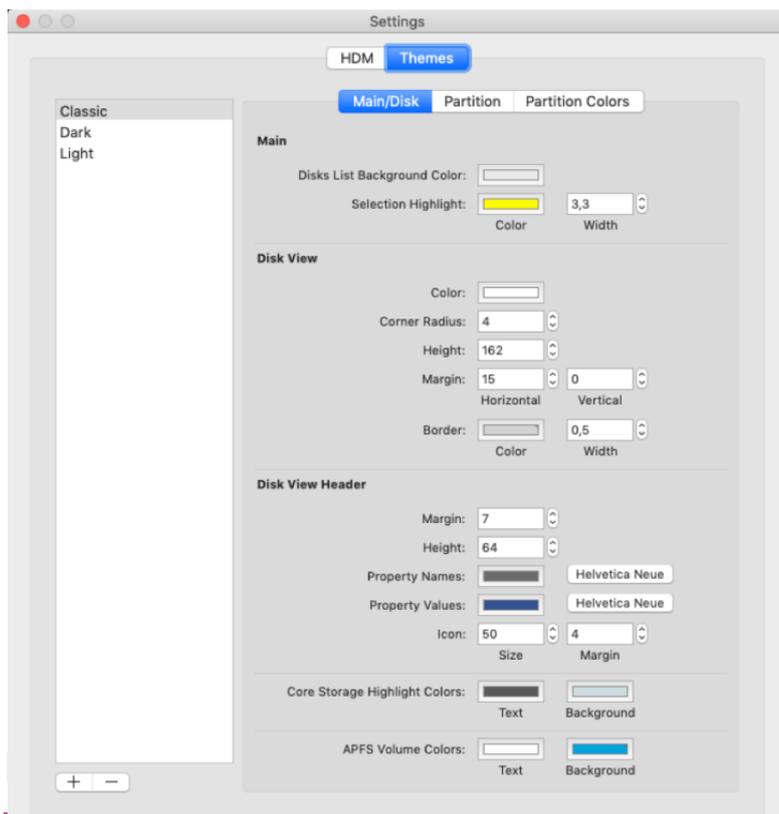


2. Click on the HDM tab to see the main program settings (opened by default).



- **Use HFS freeze for backup.** By default, if Paragon’s snapshot technology fails to back up one of your Mac OS X volumes, the problem HFS volume will be automatically “frozen for backup” (read-only access), which may take quite a while when processing a system volume. Unmark the checkbox, if you don’t need this option.
- **Exclude files from a backup...** By default, OS X temporary files are not backed up, which helps to reduce the operation time and the resulted size of backup images. Unmark the checkbox, if you need them in backup images.
- **Hide Apple Disk Images.** By default, mounted Apple disk images (.dmg files) are not displayed on the disk map. Unmark the checkbox, if you want them displayed.
- **Hide virtual disks.** Check this box if you want only physical devices displayed on the disk map.

3. Click on the **Themes** tab to customize the working environment. The program includes three predefined themes to choose from. Additionally, you can modify every single view.

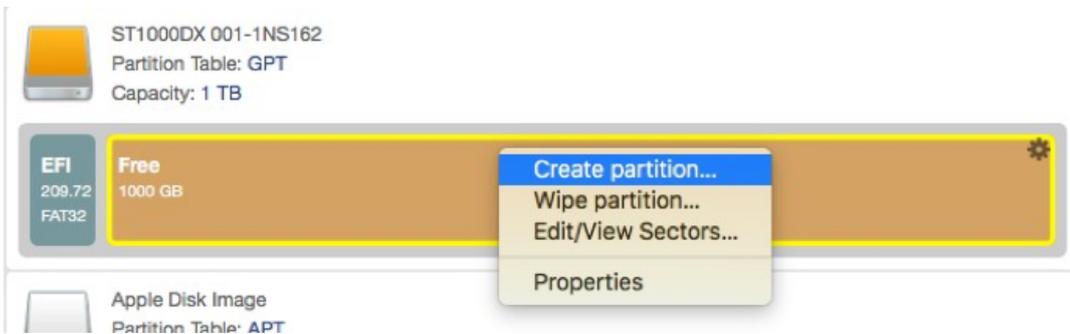


Partition a Disk

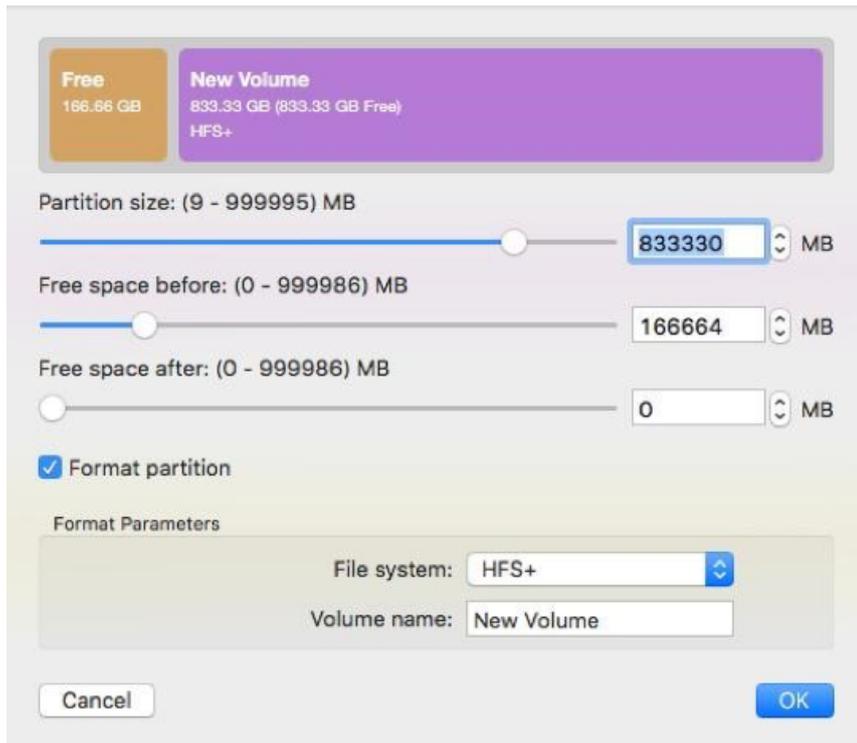
Partitioning lets you divide a single physical drive into a number of logical drives, serving as a container with own drive letter and volume label, thus enabling the operating system to process data more efficiently. Partitioning also makes it possible to organize data for easier search and management. By detaching the OS from the rest of the data you can tackle one more crucial issue – in case of a system malfunction, you can recover your system in minutes from a backup image located on another hard drive partition. Partitioning is also a necessity if you want to run several OSs on a single hard drive to effectively delineate the boundaries of each OS.

Create a Partition

1. Select **Disk and Partitions** in the upper area.
2. Right click a block of free space, select **Create partition...**



3. Define a partition size and its position in relation to the selected block beginning and the end, by manually entering desired values or through dragging the corresponding sliders.



4. To store data on the created partition you need to format it to one of the supported file systems. Mark the corresponding check box, then select the desired file system from the drop-down list and enter a volume label to easily identify the partition later (optional parameter).



- **APFS** – the primary file system for modern Mac OS X versions
- **HFS+** – the primary file system for previous Mac OS X versions, earlier than High Sierra
- **NTFS** – the primary Windows OS file system

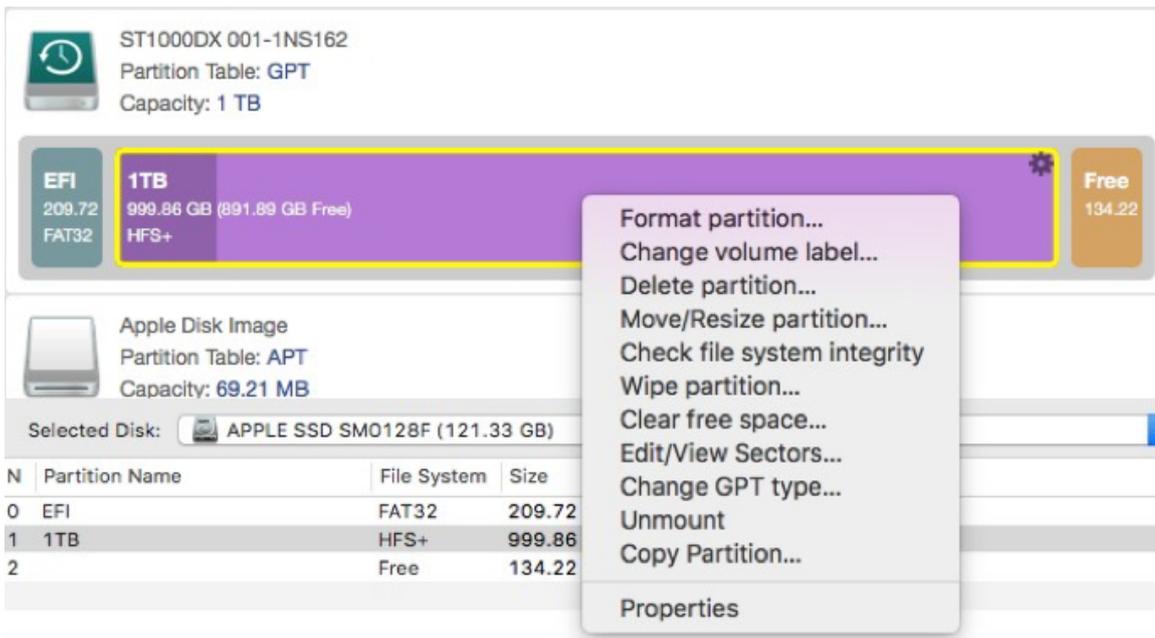
- **FAT32** – use for data disks that are 32GB or less
- **ExtFS 2/3/4** – Linux OS primary file system for
- **exFAT** - use for external storage devices that are over 32GB

5. Click **OK** when ready. All introduced changes to the disk layout will be pending until confirmed.

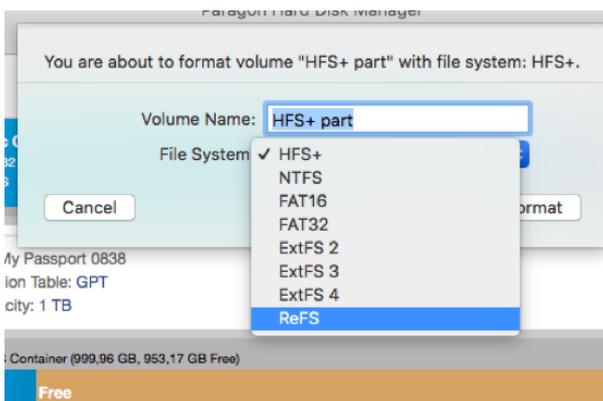
Format an Existing Partition

When you create a new partition, you will have to choose the desired file system format as described above. This section explains how to format an existing partition.

1. Select **Disk and Partitions** in the upper area.
2. Right click an existing partition, then select **Format partition...**



3. Select the desired file system from the drop-down list and enter a volume label to easily identify the partition later (optionally).

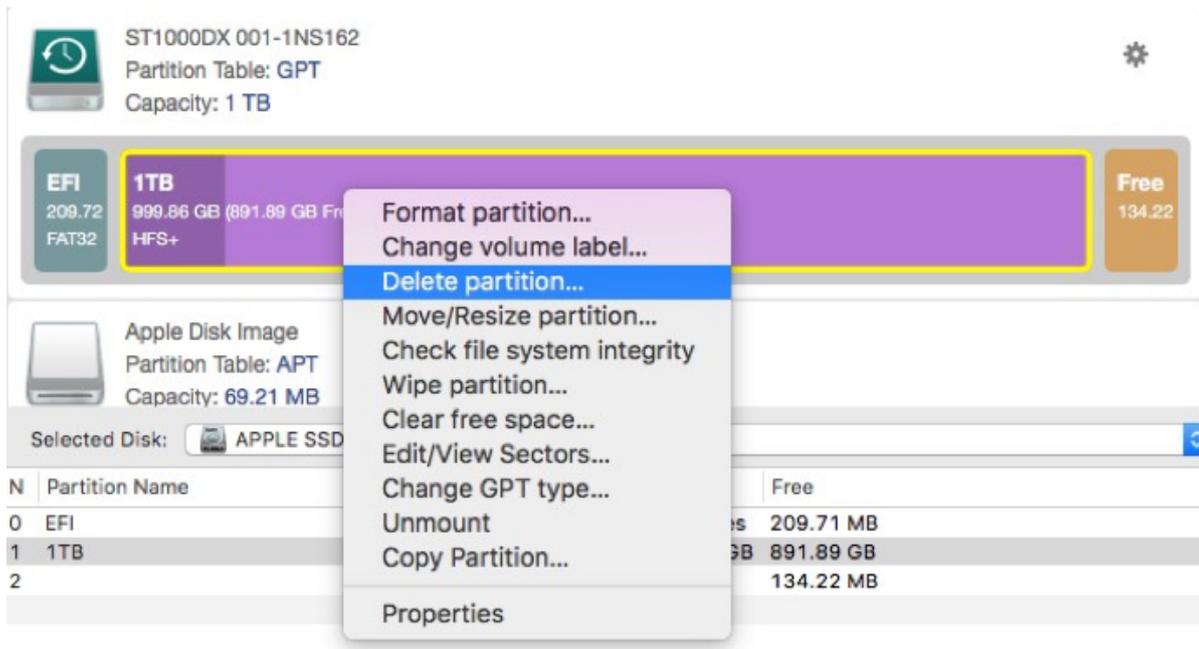


- **APFS** – the primary file system for modern Mac OS X versions
- **HFS+** – the primary file system for previous Mac OS X versions, earlier than High Sierra
- **NTFS** – the primary Windows OS file system
- **FAT32** – use for data disks that are 32GB or less
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- **exFAT** - use for external storage devices that are over 32GB

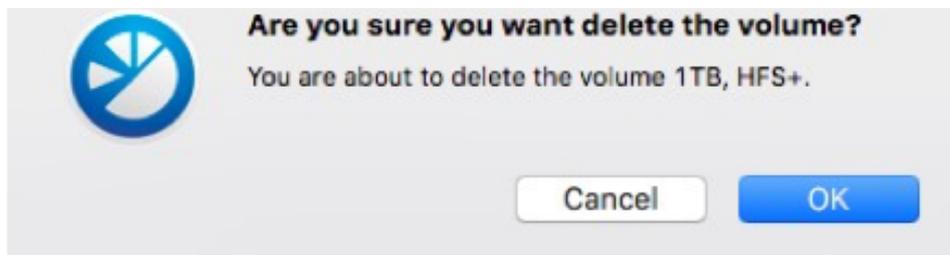
4. Click **Format** when ready. All introduced changes to the disk layout will be pending until confirmed.

Delete a Partition

1. Select **Disk and Partitions** in the upper area.
2. Right click an existing partition, then select **Delete partition...**



3. Confirm the operation.

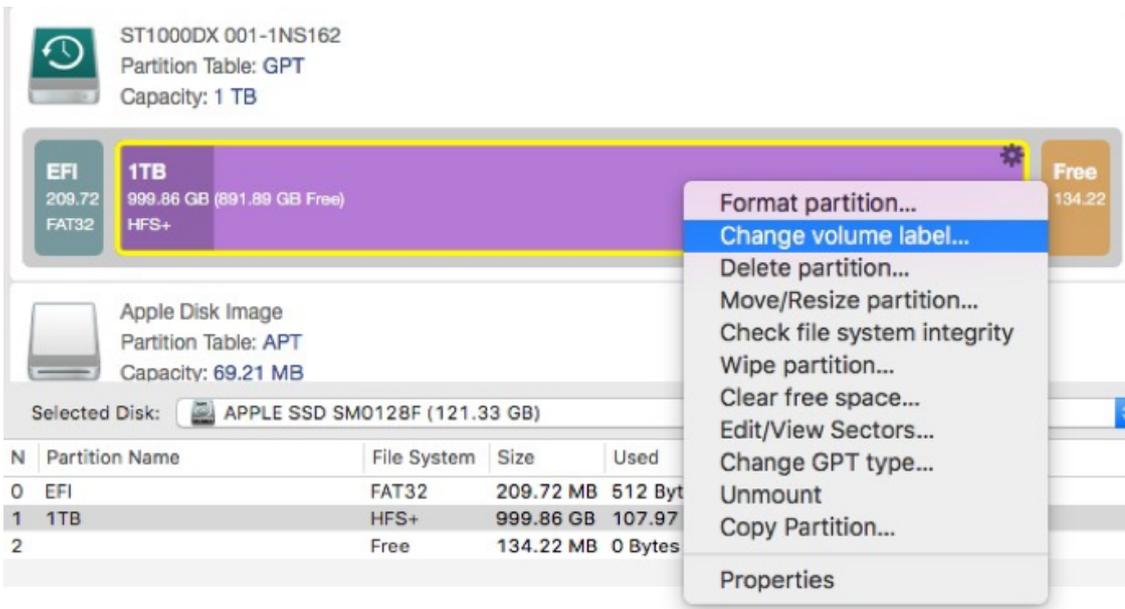


 As a result of this operation contents of the selected partition will be lost. You can recover the deleted partition however through the undelete operation.

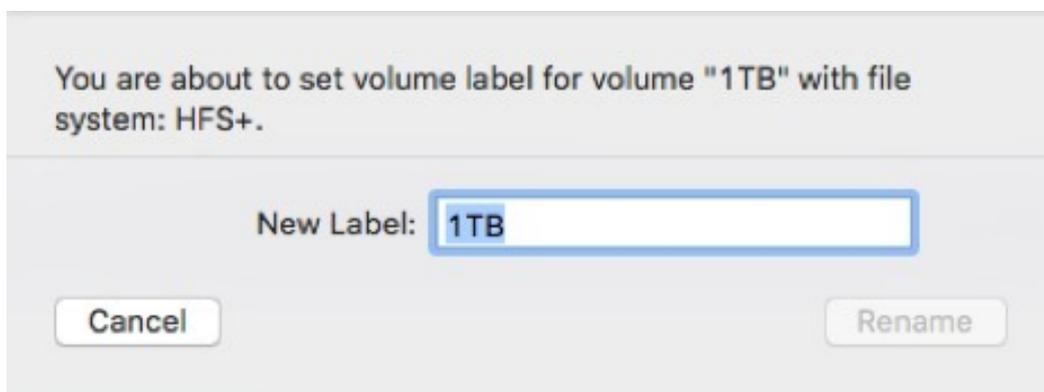
4. Click **OK** when ready. All introduced changes to the disk layout will be pending until confirmed.

Change a Volume Label

1. Select **Disk and Partitions** in the upper area.
2. Right click an existing partition, then select **Change Volume label...**



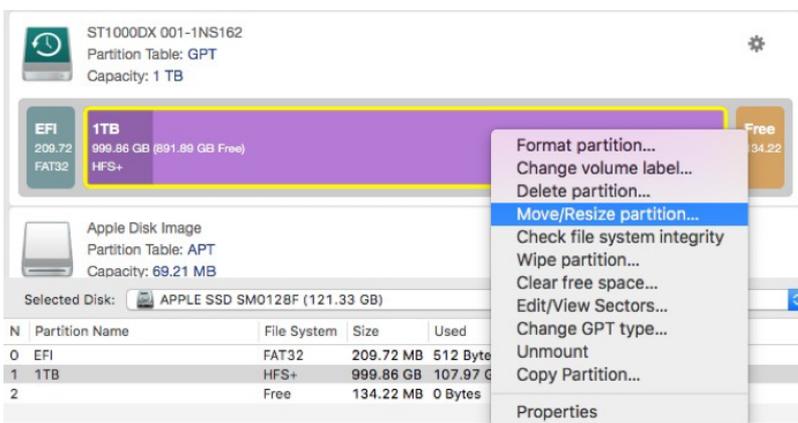
3. Enter a new volume label.



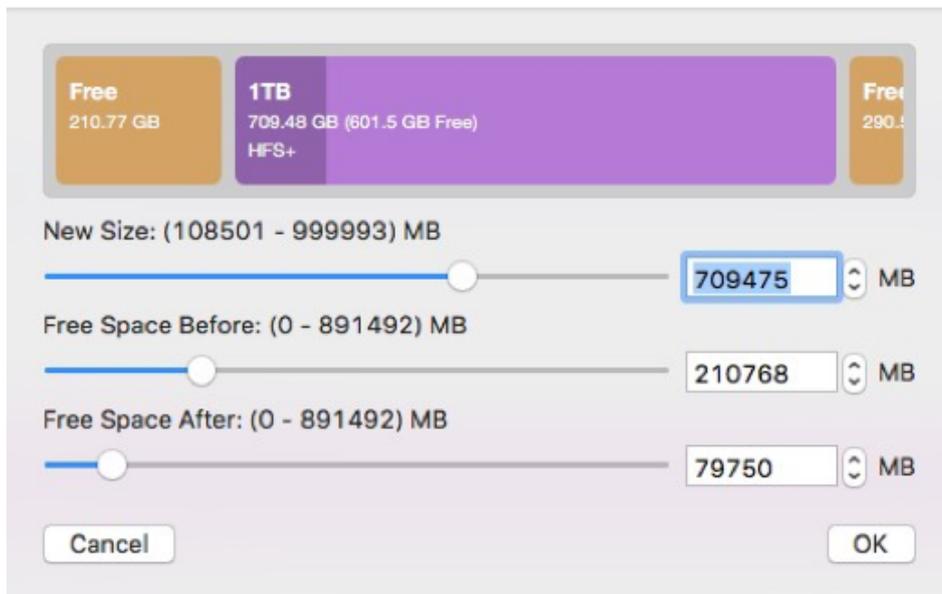
4. Click **Rename** when ready. All introduced changes to the disk layout will be pending until confirmed.

Move/Resize a Partition

1. Select **Disk and Partitions** in the upper area.
2. Right click an existing partition, then select **Move/Resize partition...**



3. Define a partition size and its position relative to the beginning and the end of the selected block of free space by manually entering desired values or by dragging the sliders.



4. Click **OK** when ready. All introduced changes to the disk layout will be pending until confirmed.

Redistribute Free Space

Until now redistribution of free space between BootCamp partitions has been a time-consuming and tedious procedure. It took hours for backup operations to finish, for volumes to move their borders and for images to be written back. With HDM for Mac this operation can be done in minutes without restarting your Mac.

The Redistribute Free Space Wizard helps to easily increase free space on one partition by uptaking the unused space of an adjacent partition of your disk.

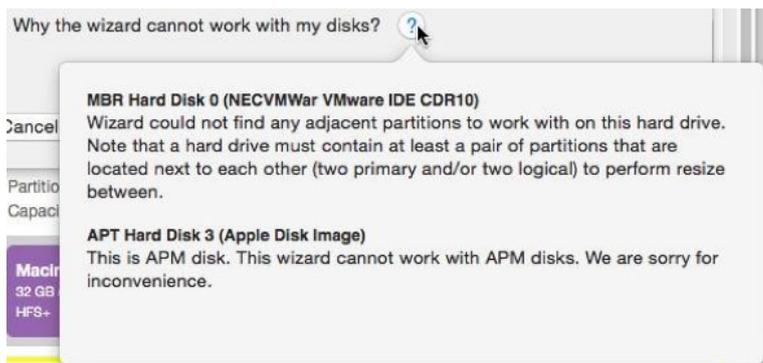
1. In the main menu go to **Wizards > Redistribute Free Space**.



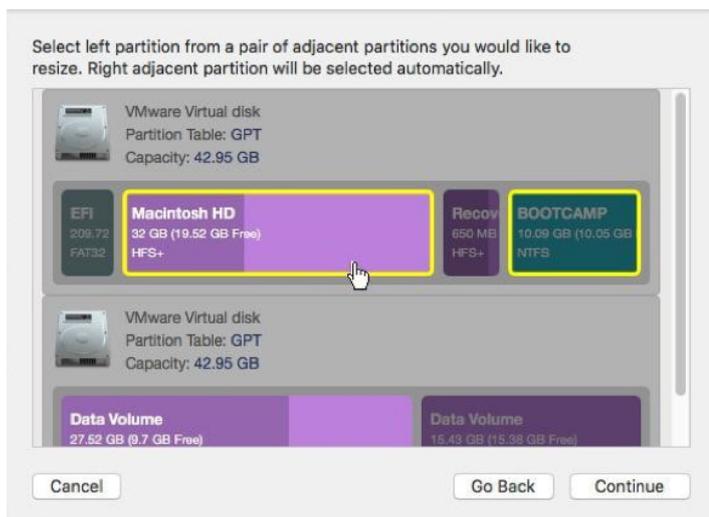
2. Once opened, the wizard detects all system storage devices.



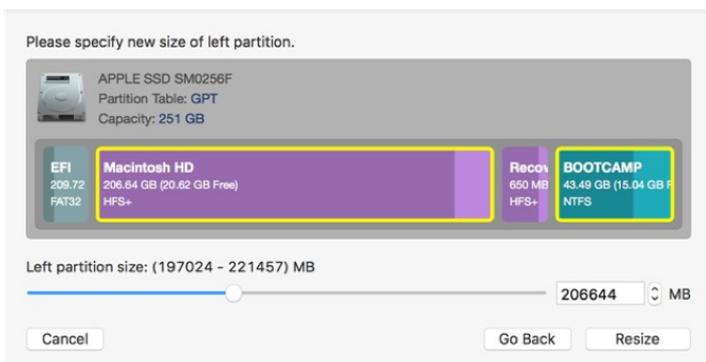
If a found disk(s) does not have two adjacent partitions or the disk type is not supported, the wizard notifies user and provides an additional information.



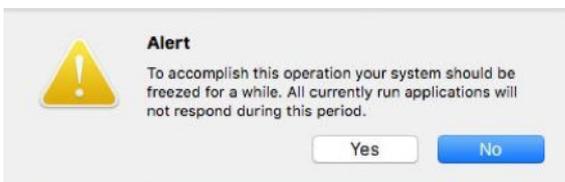
3. Click on the left one of the two partitions between which you are redistributing unused space, as the right one is selected automatically. It is acceptable to have a service partition in between them.



4. Redistribute unused space between the specified partitions with the slider or manually by entering the required size for the left partition. Click Resize when ready.



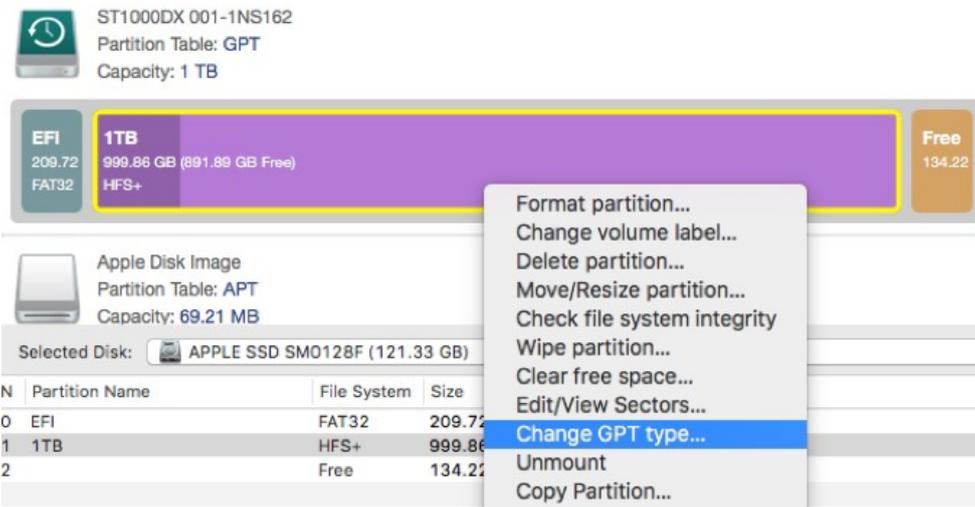
5. If one of the partitions you are resizing hosts Mac OS X, you will be warned about a system freeze (from a couple of seconds up to several minutes) during the upcoming operation. Press "Yes" to proceed.



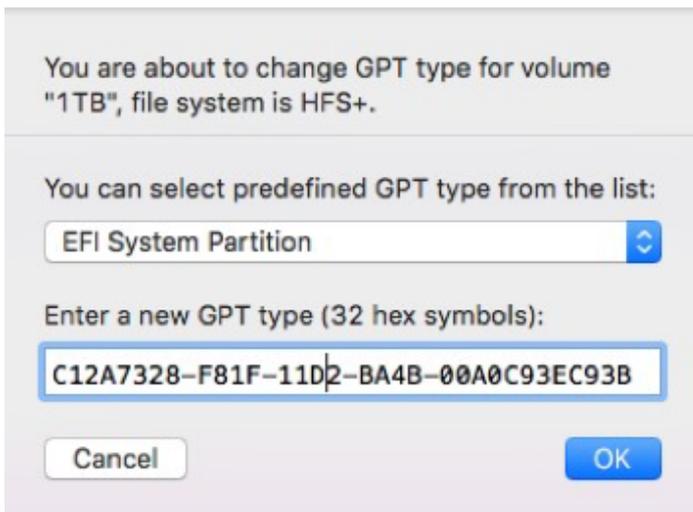
6. All introduced changes to the disk layout will be pending until confirmed.

Change a GPT Type

1. Select **Disk and Partitions** in the upper area.
2. Right click an existing partition, then select **Change GPT type...**



3. Manually enter a new GPT type or select the required type from the drop-down list.



- **Apple Boot Partition**
- **Apple Core Storage Physical Volume**
- **Apple Offline RAID**
- **Apple RAID**
- **EFI System Partition** – ESP includes boot loader programs for installed operating systems contained in other partitions on the same or other storage devices, drivers for computer devices used by the firmware at boot time, system utility programs to run before OS is booted, and error logs.
- **APFS Container** – the primary partition type for modern Mac volumes.
- **HFS Data Partition** – the primary partition type for older Mac volumes.
- **Microsoft Basic Data Partition** – the primary partition type for Windows volumes.
- **Microsoft Reserved Partition** – MSR reserves space on each disk drive for subsequent use by OS. Though MSR does not store user data, its chunks may be taken for creation of new partitions. Its standard size is 128MB (32MB for partitions under 16GB).

- **Microsoft Recovery Partition** – stores OS system files to refresh Windows installation when necessary.

4. Click **OK** when ready. All introduced changes to the disk layout will be pending until confirmed.

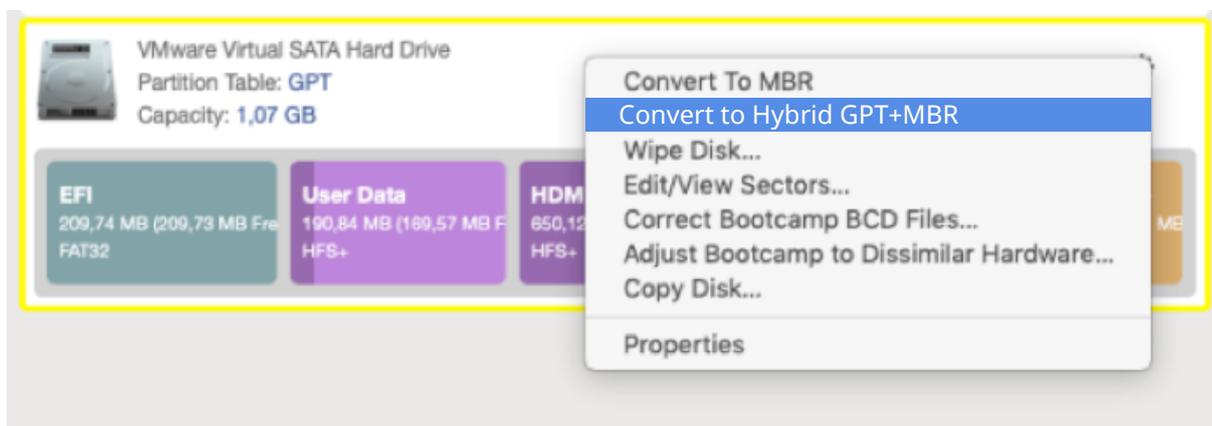
Convert a Partition Table

Your storage device may have GPT (GUID Partition Table), MBR (Master Boot Record), or a hybrid GPT+MBR partition table:

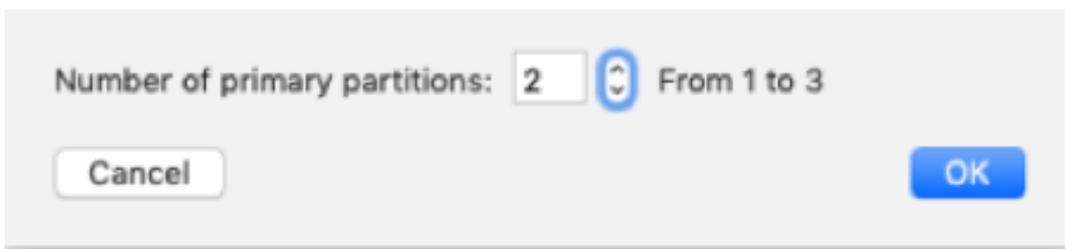
- GPT is a primary partition scheme on Windows and Mac computers today.
- MBR used to be the main and only partition scheme for Windows computers up to Vista.
- A hybrid GPT+MBR partition scheme is a necessity for BootCamp users.

HDM offers an easy non-destructive conversion between these three partition schemes.

1. Select **Disk and Partitions** in the upper area.
2. Right click on existing disk, then select **Convert to MBR** or **Convert to Hybrid GPT+MBR** or **Convert to GPT** (available options depend on selected storage device).



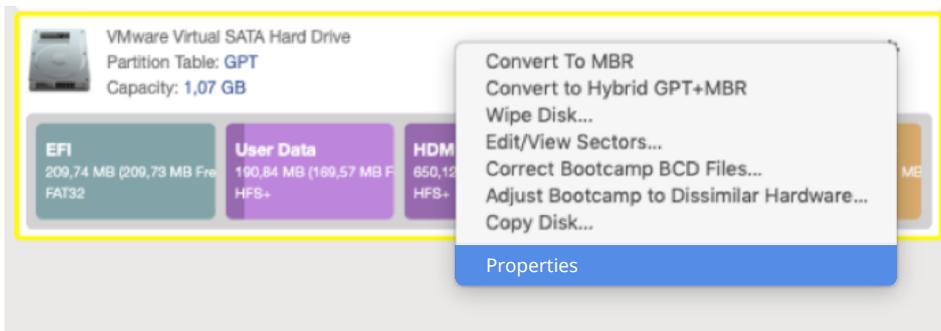
3. If selecting MBR as the destination partition table, you will need to define additionally the desired number of primary partitions.



4. Click **OK** when ready. All introduced changes to the disk layout will be pending until confirmed.

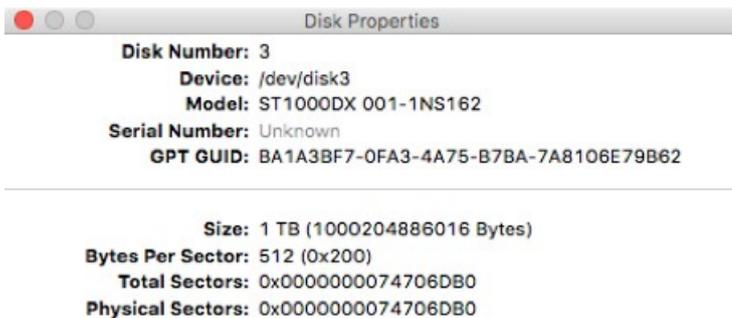
Get Disk/Partition Properties

1. Select **Disk and Partitions** in the upper area.
2. Right click an existing partition or entire disk, then select **Properties** or just double click the required object.

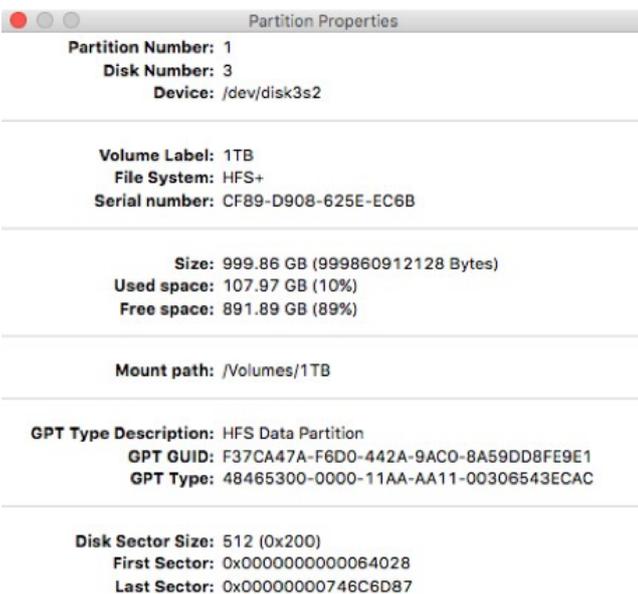


3. The program displays detailed information on the properties of entire storage device or individual partition. Besides the general information, such as capacity, used space or file system type it provides the info on hard disk geometry, cluster size, exact partition location, etc.

Disk Properties:



Partition Properties:



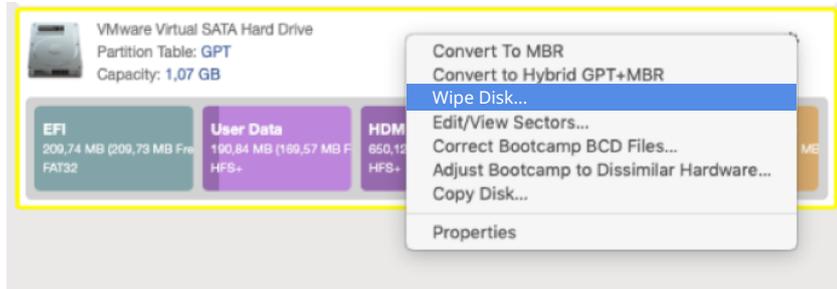
Wipe Data

Data confidentiality implies not only right information storage, but also to its proper destruction. To make sure your private data does not fall into wrong hands together with your old hard drive,

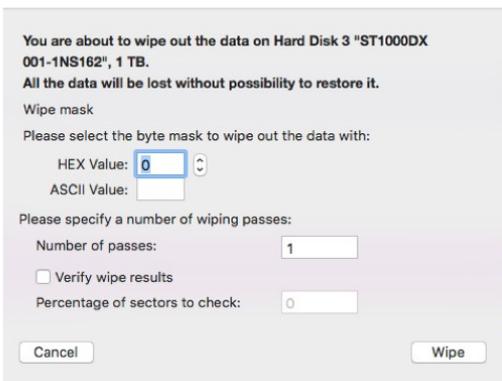
you can physically shred your disk (a bit too extreme) or use a specialized data erasure tool. HDM for Mac provides reliable data erasure tool.

Wipe a Disk or Partition

1. Select **Disk and Partitions** in the upper area.
2. Right click an existing disk, then select **Wipe Disk...** or right click an existing partition, then select **Wipe Partition...**



3. Define a wipe mask as a HEX or ASCII value and the required number of passes. Check the **Verify wipe results** box to initiate residual data verification and specify the percentage of sectors to check. If you attempt to wipe an SSD, the program will automatically enable the SSD TRIM command to remove all traces of your personal data without shortening the storage lifespan.

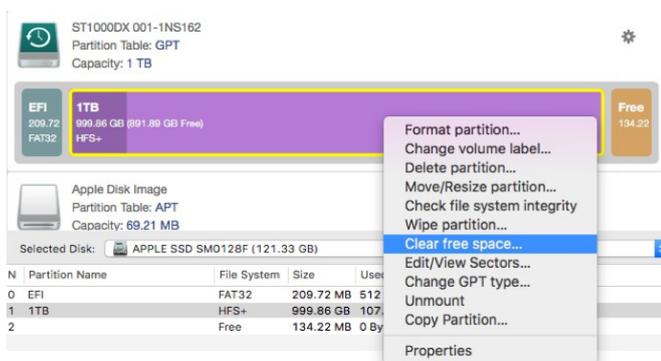


As a result of this operation contents of the selected partition will irreversibly deleted.

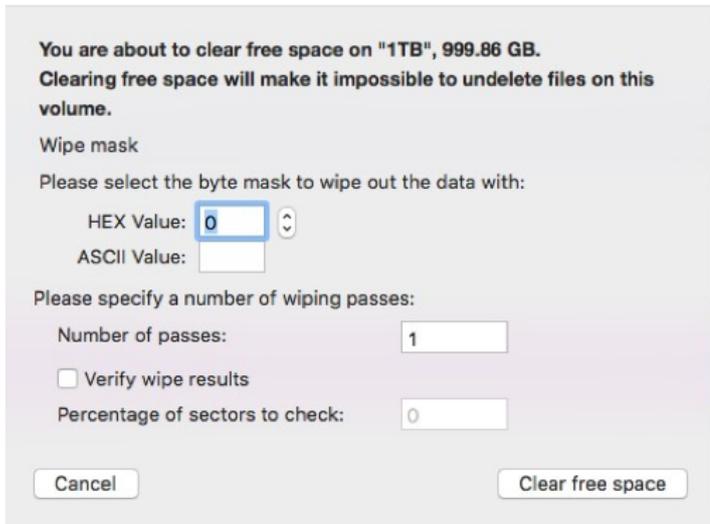
4. Click Wipe when ready. All introduced changes to the disk layout will be pending until confirmed.

Clear Free Space

1. Select **Disk and Partitions** in the upper area.
2. Right click an existing partition, then select **Clear free space...**



3. Define a wipe mask as a HEX or ASCII value and the required number of passes. Mark the **Verify wipe results** checkbox to initiate residual data verification specifying the percentage of sectors to check. If you attempt to clear free space on SSD, the program will automatically enable the SSD TRIM command to remove all traces of your personal data without shortening the storage lifespan.



As a result of this operation contents of the selected partition will remain intact, while any remnants of previously deleted files will be irreversibly deleted.

4. Click **Clear free space** when ready. All introduced changes to the disk layout will be pending until confirmed.

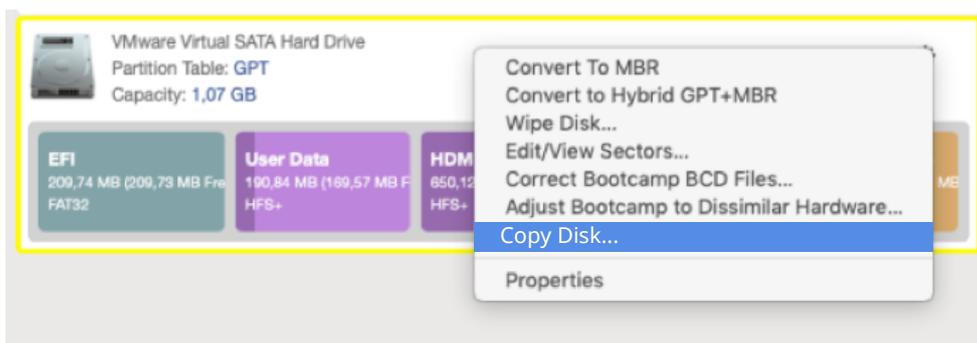
Copy Data

When there is not enough space on the internal disk to install a new application or store files, or when the system drive starts to deteriorate – an urgent need to transfer the OS to a new larger storage device, arises.

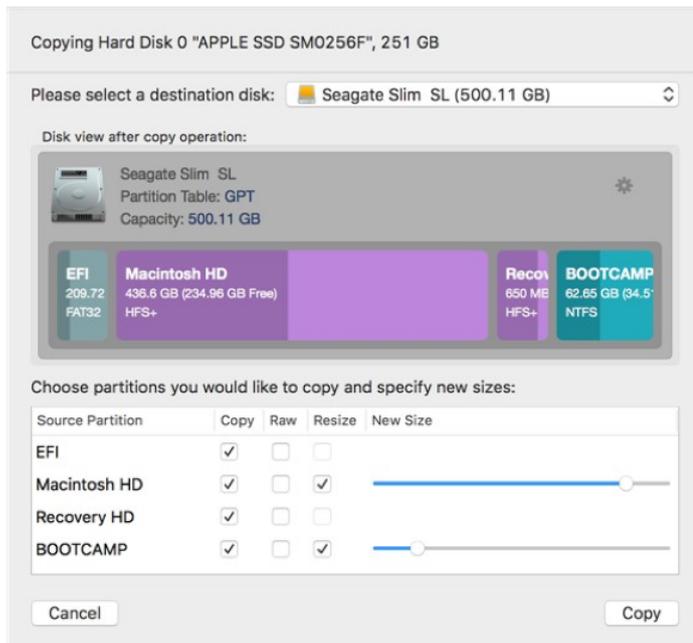
HDM for Mac has to offer the technology that straightforwardly disk migration, including standard bootstrap code and other system service structures, to another storage device without having to re-install the OS and applications. Unlike competitive solutions, HDM for Mac enables you to transfer not only OS X, but BootCamp Windows as well, resizing partitions while copying, proportionally to the size of the target disk, or however you need it.

Copy a Disk

1. Select **Disk and Partitions** in the upper area.
2. Right click an existing disk, then select **Copy Disk**



3. The program automatically selects the most suitable destination disk from those available in the system. You are free to choose another disk from the drop-down menu if necessary.



The screenshot shows, that the wizard detects all of the source disk partitions and prompts to use the most efficient copy modes. In addition, it proportionally enlarges all found data partitions (in our example these are Mac OS X and BootCamp Windows) to let them occupy all available space of the target disk. By dragging the sliders and checking the boxes, you can change any default parameter, e.g.:

- remove the BootCamp Windows partition from copying,
 - leave a certain block of free space in the end of the disk,
 - enable copying in the sector-by-sector mode to process unknown or corrupted file systems.
- This is not recommended to use for supported file systems as it takes more time to accomplish the operation.

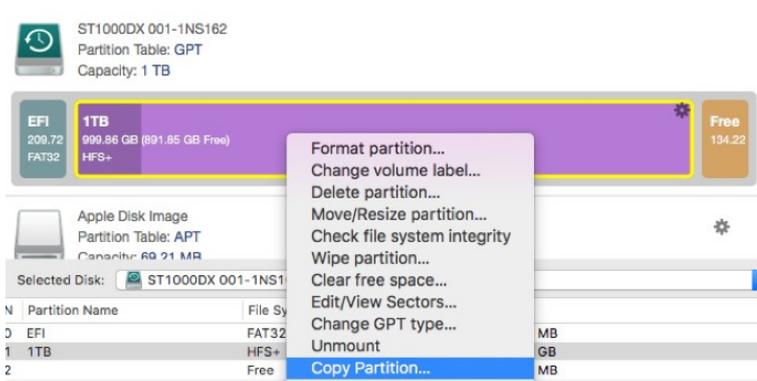


As a result of this operation contents of the destination disk will be lost.

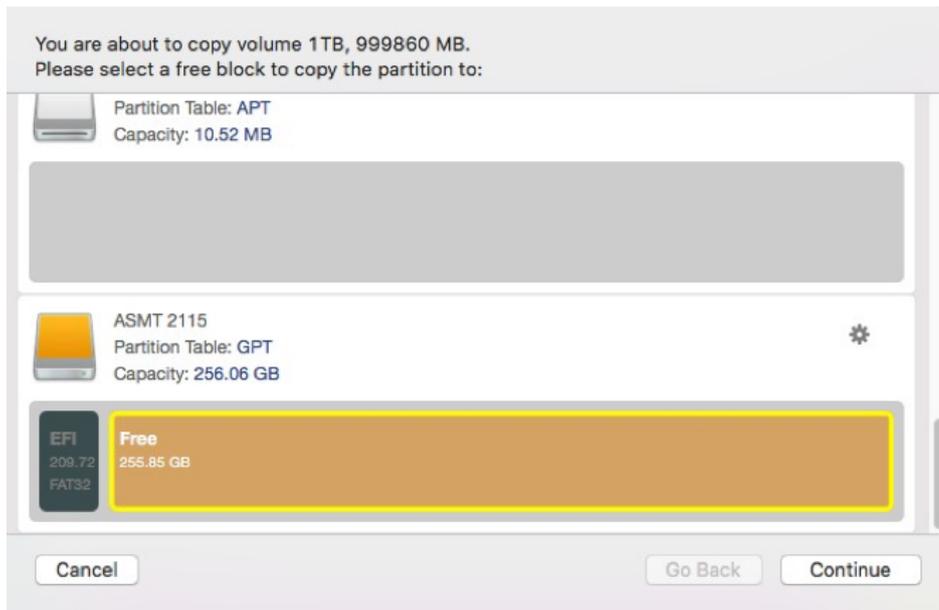
4. Click Copy when ready. All introduced changes to the disk layout will be pending until confirmed.

Copy a Partition

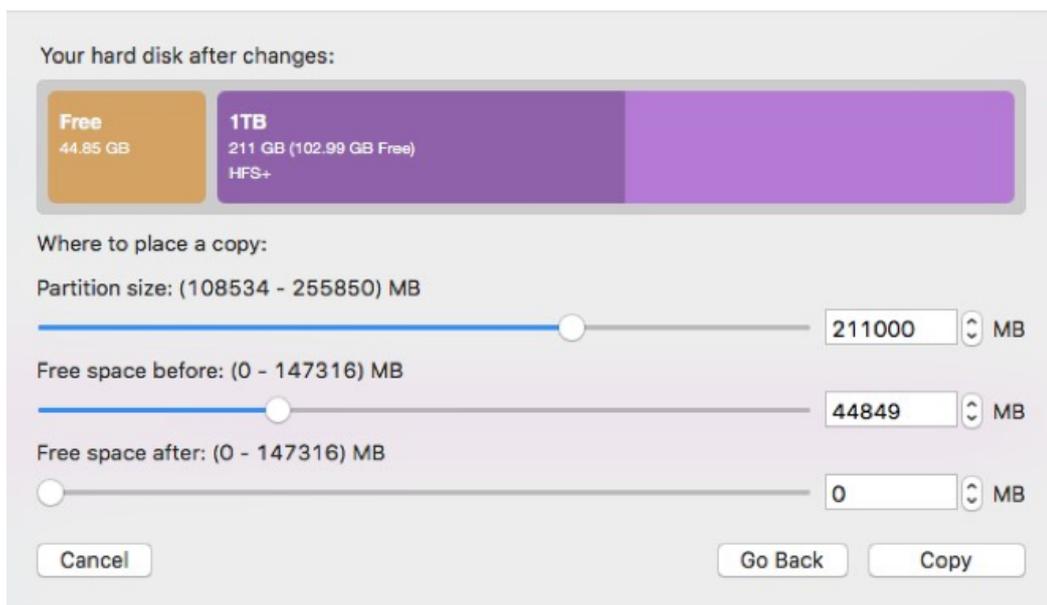
1. Select **Disk and Partitions** in the upper area.
2. Right click an existing partition, then select **Copy Partition...**



3. Select a block of free space enough in capacity to host the copied partition.



4. By default, the program prompts you to occupy the entire free block. If necessary, define a partition size and its position in relation to the beginning and end of the selected block of free space by manually entering desired values or through dragging the corresponding sliders. You can observe all modifications to the disk layout on the disk map.

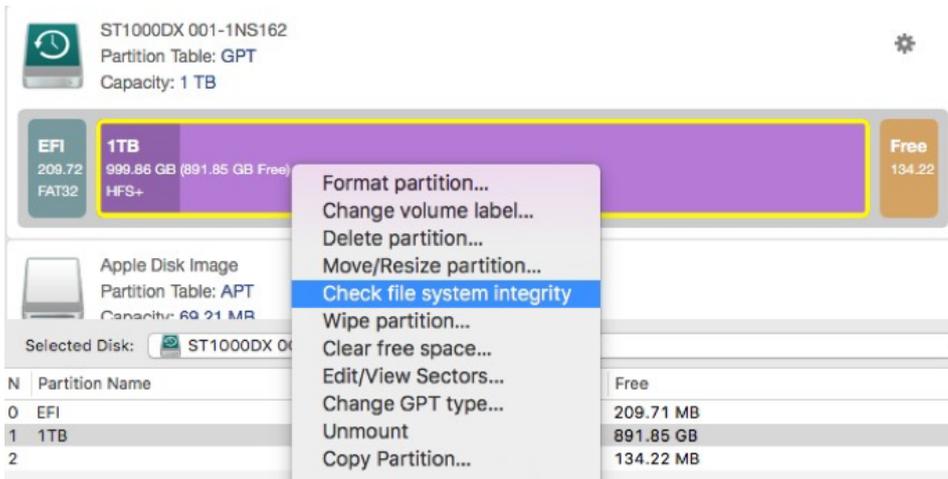


5. Click **Copy** when ready. All introduced changes to the disk layout will be pending until confirmed.

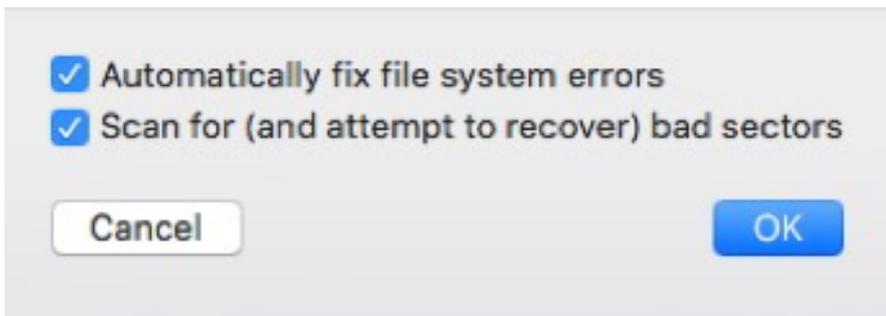
Check a Partition for Problems

You can check the integrity of a file system to detect and repair errors before copying data or performing drive partitioning.

1. Select **Disk and Partitions** in the upper area.
2. Right click an existing partition, select **Check file system integrity**.



3. If you would like the program to fix the file system errors automatically, and/or find and repair bad sectors, just enable the corresponding options

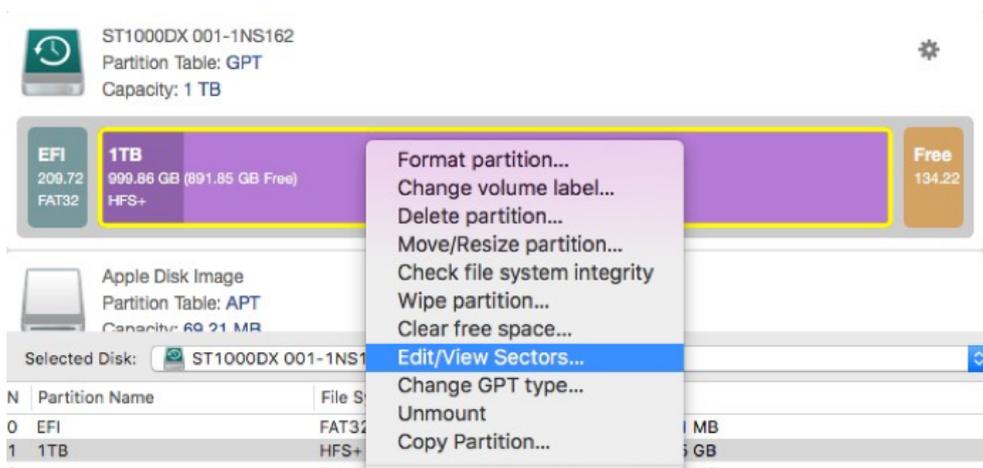


4. Click **OK** when ready. The operation will be performed immediately.

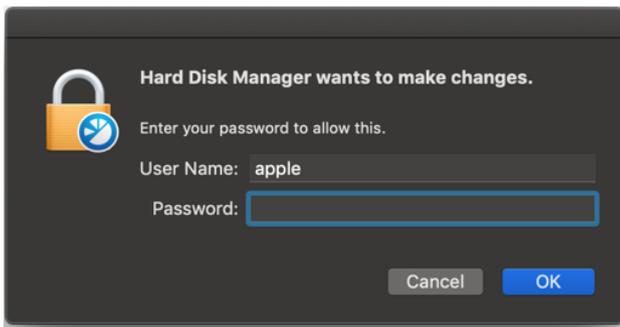
Edit/View Sectors

You can directly access and modify sectors of entire disk drive or individual partition, save and restore sectors from specified files as well as navigate through the system metadata.

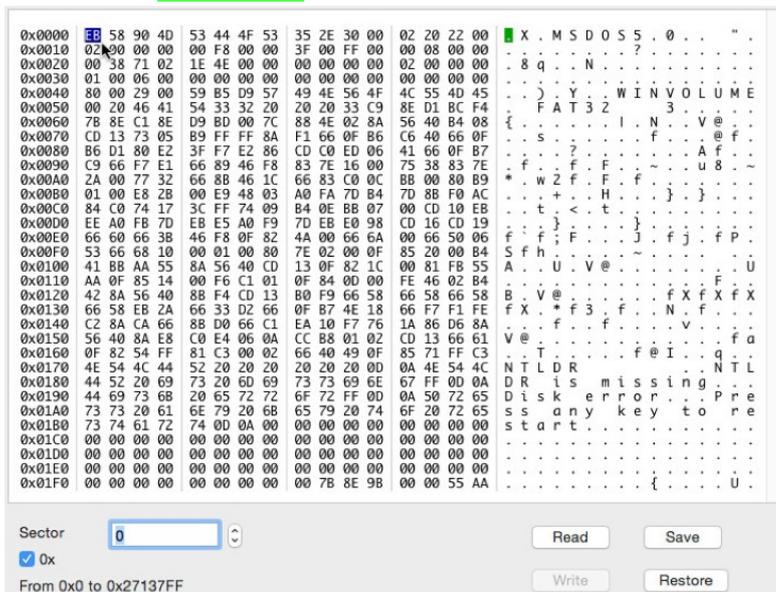
1. Select **Disk and Partitions** in the upper area.
2. Right click an existing disk, then select **Edit/View Sectors...** or right click an existing partition, then select **Edit/View Sectors...**



3. Before you proceed with the operation, you are required to provide the user password with the administrator privileges.



4. Navigate to the required sector to do mods.



Careless use of this function may result in irreversible data corrupti

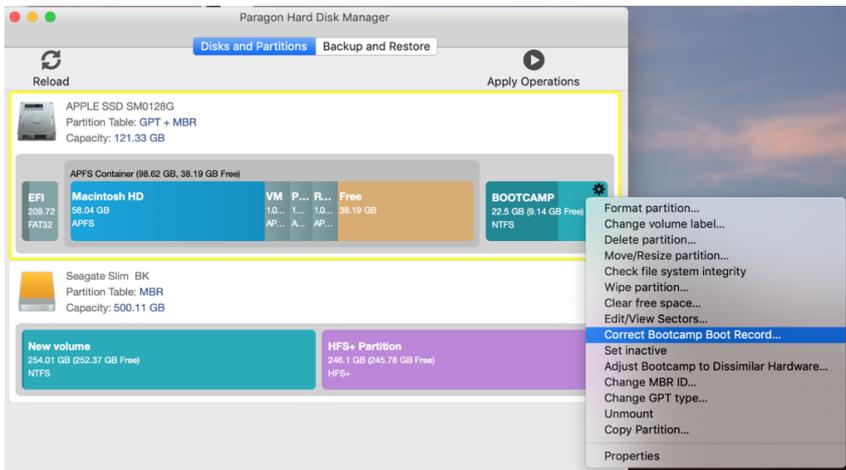
5. Click **Write** when ready. All introduced changes to the disk layout will be pending until confirmed.

Fix BootCamp Boot Problems

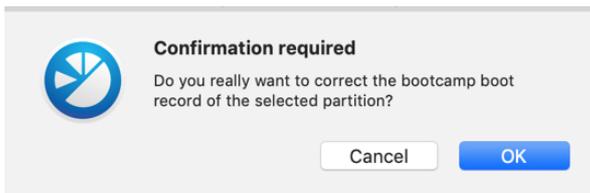
If a Windows OS does not boot after replacing a failed hardware device or if you have any other boot issues resulting from a human or program error, boot virus activity – first try our boot repair tools before taking any more radical actions.

Correct BootCamp Boot Record

1. Select **Disk and Partitions** in the upper area.
2. Right click an existing MBR-type active partition, then select **Correct BootCamp Boot Record...**



3. Confirm the operation

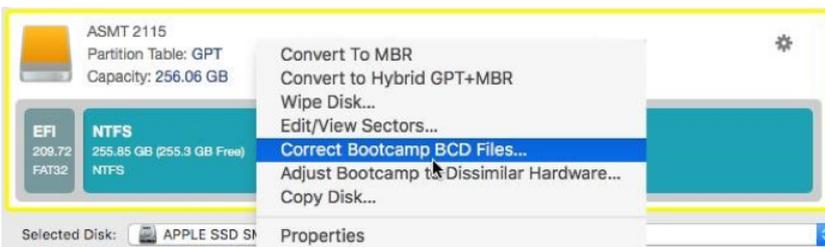


4. Click OK when ready. All introduced changes to the disk layout will be pending until confirmed.

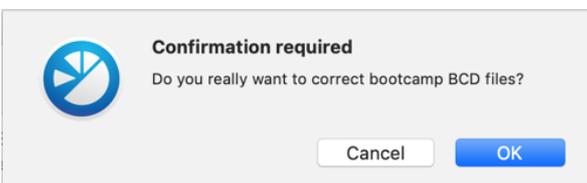
Correct BootCamp BCD Files

If you have several operating systems on your disk (Windows Vista and later) after copying a system partition for instance, update their BCD (Boot Configuration Data) files to be able to choose an OS to start up.

1. Select **Disk and Partitions** in the upper area.
2. Right click an existing disk, then select **Correct BootCamp BCD Files...**



3. Confirm the operation.



4. Click **OK** when ready. All introduced changes to the disk layout will be pended until confirmed.

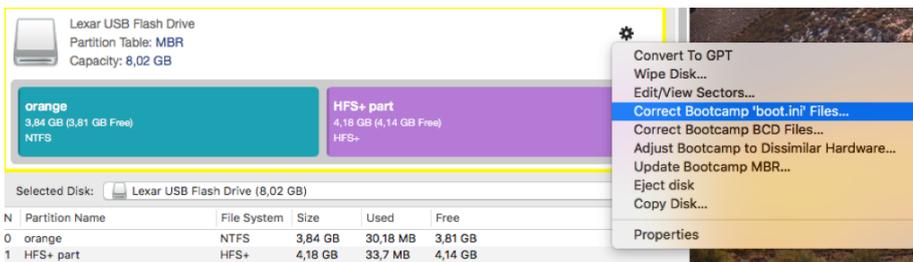
Correct BootCamp 'boot.ini' Files

If you have several operating systems on your disk (up to Windows XP) after copying a system partition for instance, update their boot.ini files to be able to choose an OS to start up.

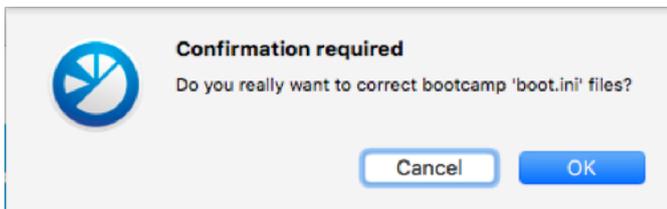
1. Select **Disk and Partitions** in the upper area.

30

2. Right click an existing disk, then select **Correct 'boot.ini' files...**



3. Confirm the operation



4. Click **OK** when ready. All introduced changes to the disk layout will be pending until confirmed.

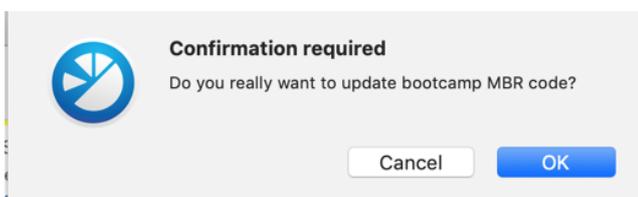
Update BootCamp MBR

The program enables you to overwrite the current bootable code in the MBR (Master Boot Record) by the standard bootstrap code. This can help to repair a corrupted bootable code of a hard disk resulting from a boot virus attack or a malfunction of boot management software.

1. Select **Disk and Partitions** in the upper area.
2. Right click an existing MBR-type disk, then select **Update BootCamp MBR...**



3. Confirm the operation

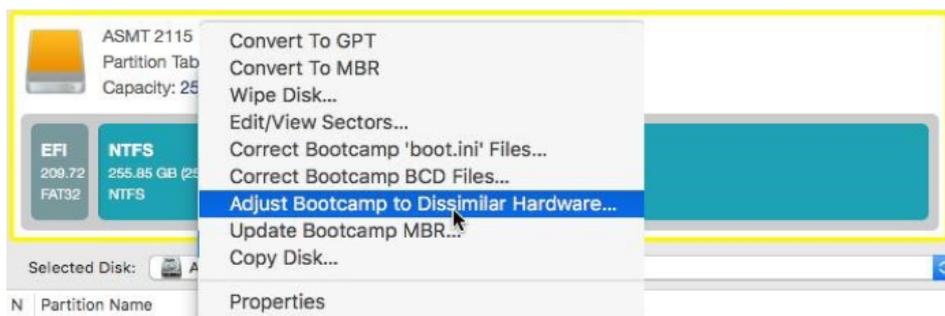


4. Click **OK** when ready. All introduced changes to the disk layout will be pending until confirmed.

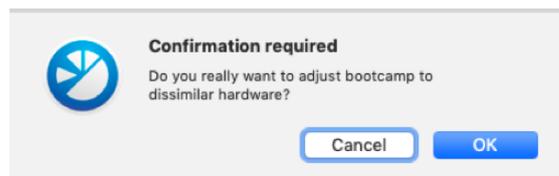
Adjust BootCamp to Dissimilar Hardware

Windows operating systems are notorious for their sensibility to hardware, especially when it turns to replacement of HDD controller or motherboard – most likely, Windows will fail to boot as a result of this operation. Thus if you need to replace a failed hardware device and cannot find an exact match for your original system specifications, use this option to successfully start up Windows OS on dissimilar hardware.

1. Select **Disk and Partitions** in the upper area.
2. Right click a disk containing Windows OS, then select **Adjust Bootcamp to Dissimilar Hardware...**



3. Confirm the operation

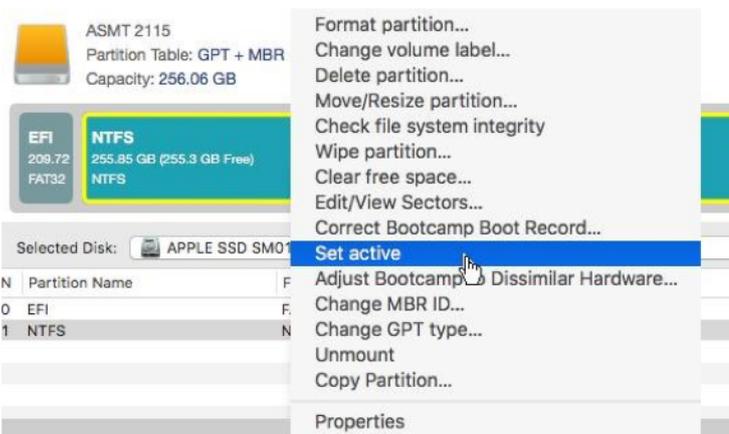


4. Click **OK** when ready. All introduced changes to the disk layout will be pending until confirmed.

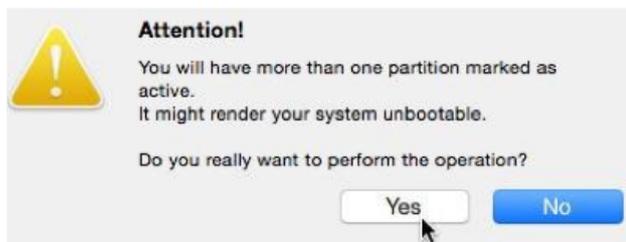
Set Active/Inactive

You can set an active/inactive flag for primary partitions on an MBR-type hard disk. By default, an operating system starts up only if its partition is active or bootable.

1. Select **Disk and Partitions** in the upper area.
2. Right click an MBR-type system partition, then select **Set Active/Inactive...**



3. Confirm the operation

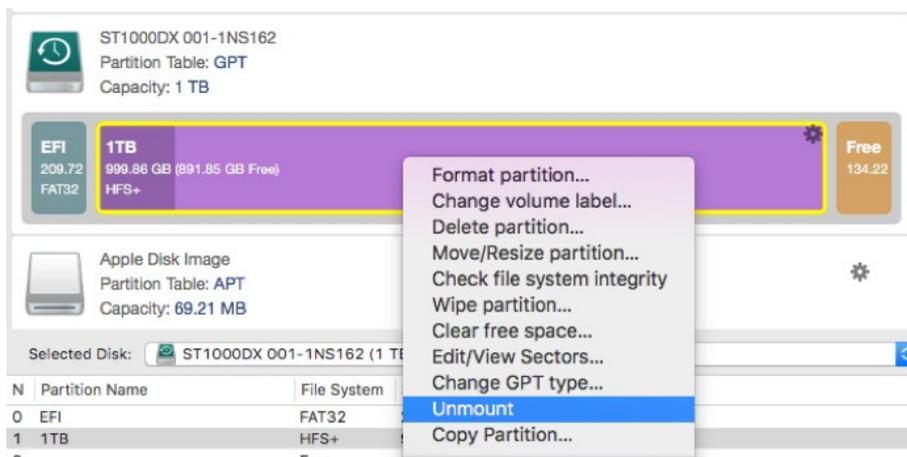


 There can only be one active partition on a MBR hard disk, otherwise an operating system will fail to boot.

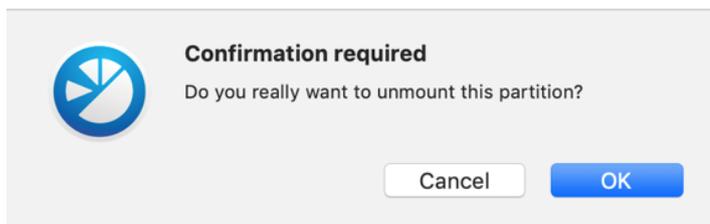
4. Click **OK** when ready. All introduced changes to the disk layout will be pending until confirmed.

Mount/Unmount a Partition

1. Select **Disk and Partitions** in the upper area.
2. Right click a partition, then select **Mount/Unmount**.



3. Confirm the operation

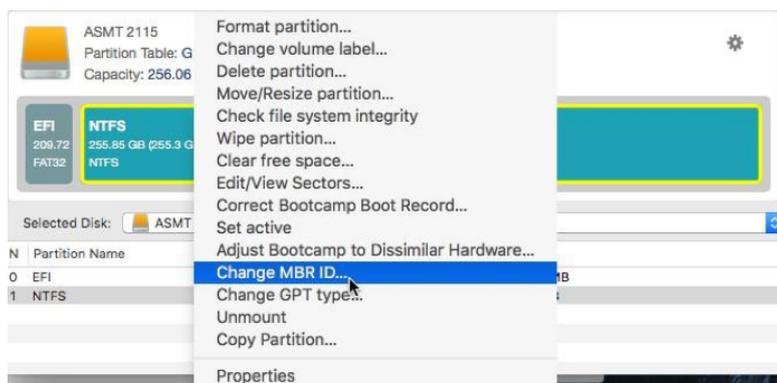


4. Click **OK** when ready. All introduced changes to the disk layout will be pending until confirmed.

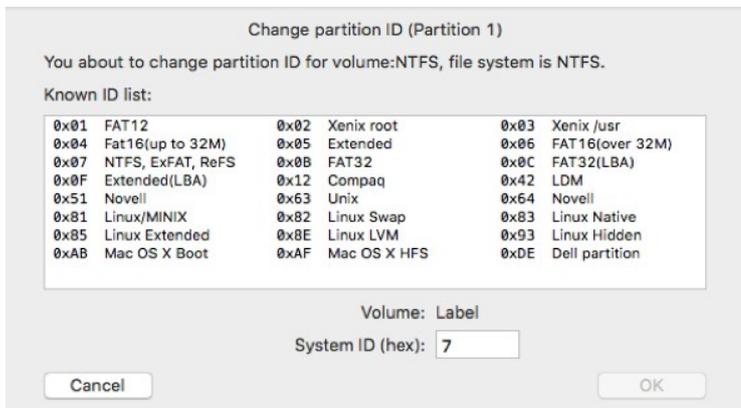
Change Partition ID

Partition ID is a file system identifier. It is saved in the Partition Table and used to quickly detect a partition of supported type. By manually changing its value, you can manipulate accessibility of partitions.

1. Select **Disk and Partitions** in the upper area.
2. Right click an MBR-type partition, then select **Change MBR ID...**



3. Set the required ID value. It has to be a 1-2 digit hexadecimal number. Use the list of known ID values as an example.



4. Click **OK** when ready. All introduced changes to the disk layout will be pending until confirmed.

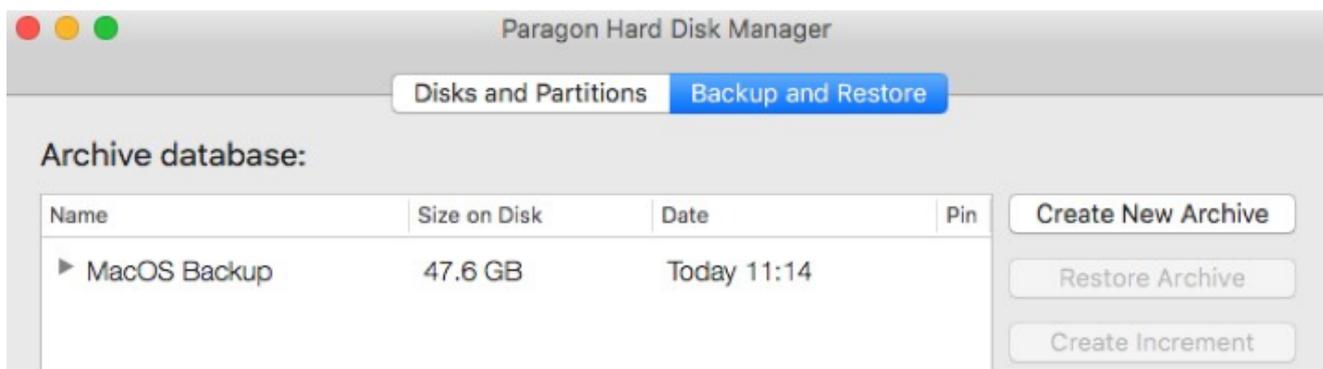
Protect System and Data

Unlike Mac-native backup apps, HDM for Mac operates at a sector-level, which provides much better backup and recovery times and general performance. In order to minimize backup storage footprint, the program supports incremental imaging. Regular backup routines can be automated through the embedded scheduler (coming soon). OS X system volumes can be restored from the bootable recovery media, while data or Windows system volumes directly under OS X. If required, you can mount a backup image to retrieve individual files without accomplishing a full restore operation.

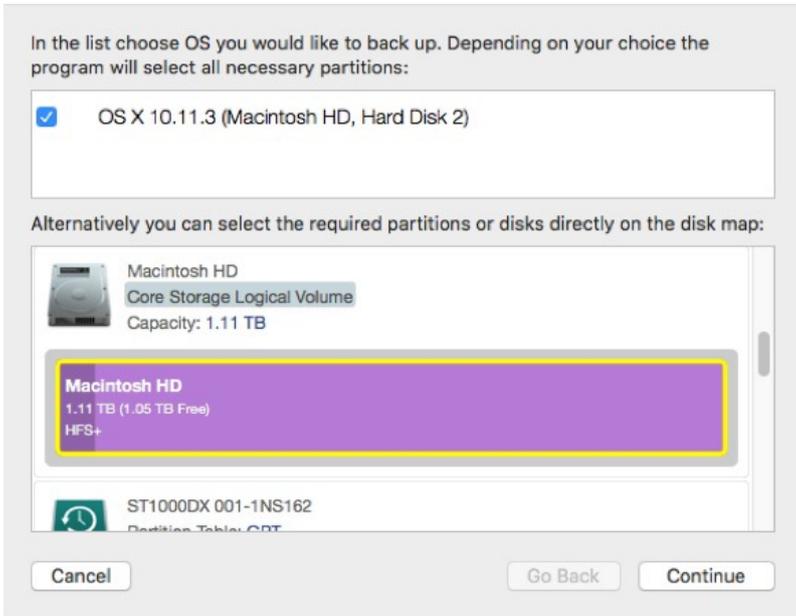
Create a Full Backup Image

A full or base sector-level backup image may include contents of individual partitions or entire disks at the moment of backup creation. This type of backup secures your software environment, including the OS, applications, and data. Full copies of disks and partitions enable to recover your system to a working state within minutes.

1. Select **Backup and Restore** in the upper area.
2. Click **Create New Archive**.



3. The wizard detects operating systems residing on your disks (all editions of Windows and Mac OS X are currently supported), prompting to choose what you need to protect. Note: when you make your choice, the program not only selects the main OS partition, but also one or several service partitions (Boot OS X, EFI, Recovery) with boot system files to ensure successful OS startup after restore. You can observe it on the disk map. Alternatively, you may manually pick one or several partitions you would like to back up. Click **Continue to proceed**.

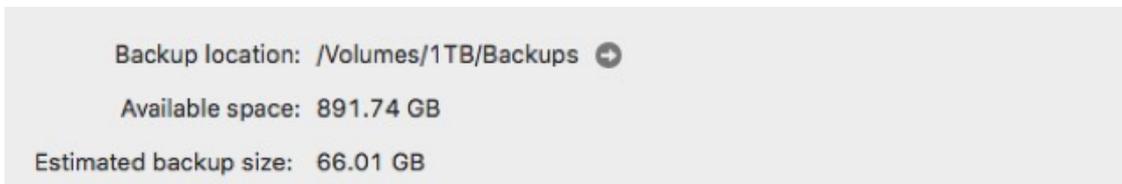


If you're planning to back up an OS X system volume the Snapshot component will be automatically invoked.



Apple Core Storage configurations require a specific backup approach. For more details, please read an article on this issue in our Knowledge Base at <https://kb.paragon-software.com/article/1144>

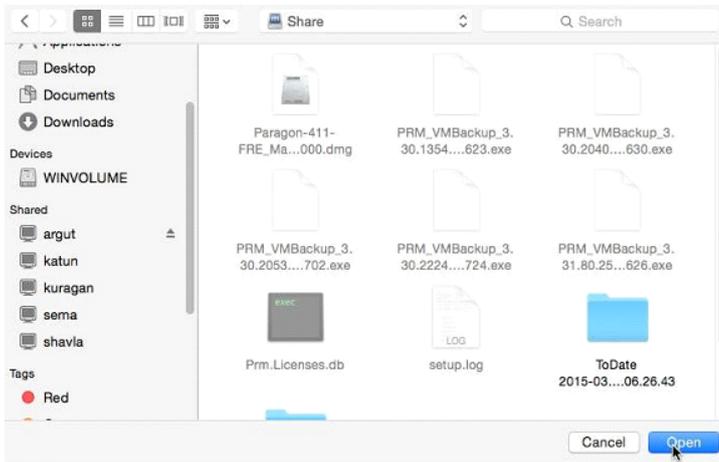
4. Click the arrow icon to set a backup location. Backup images can be placed to a local volume, external storage, or a network share. We highly recommend using either an external disk (USB, ThunderBolt, FireWire) or a network share (our choice) to increase chances of success in emergency. Please take into account values of the "Available space" and "Estimated backup size" parameters - if the backup size exceeds the available storage space, the operation will not proceed.



Providing credentials for a remote machine:

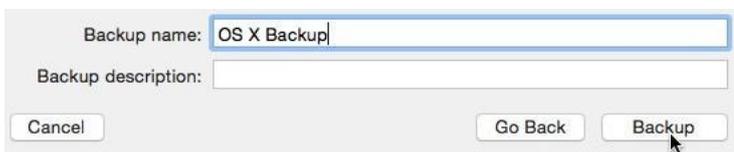


Browsing the remote machine:

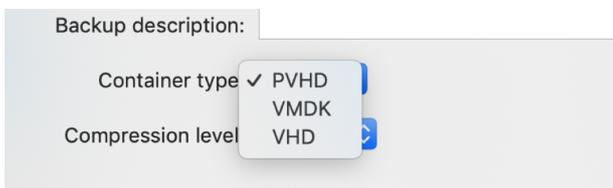


You're not allowed to place backup images to volumes these images are made out of. It's done for safety reasons.

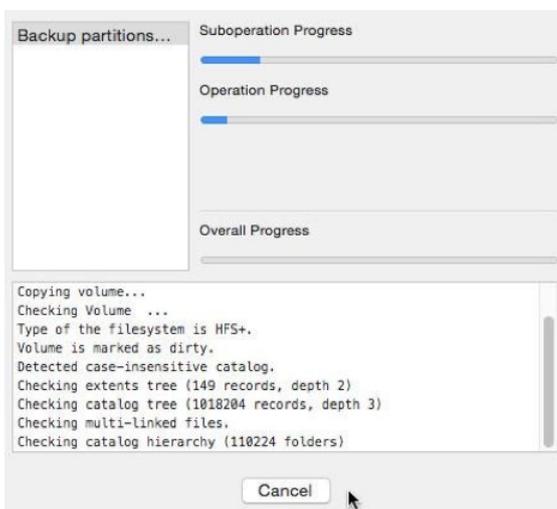
5. By providing a catchy file name and backup image description, you will be able to differentiate it from other items.



6. By default, HDM for Mac stores backup data in pVHD (Paragon Virtual Hard Drive) – a special VHD image, optimized for virtual and physical machine backup. pVHD does away with all limitations of a standard virtual drive format, such as a poor compression ratio, integrity control, and encryption capabilities. As a result, it creates backups that are up to four times smaller than original backup objects. The program also supports all popular containers, such as VMDK, VDI, VHD or HDD.



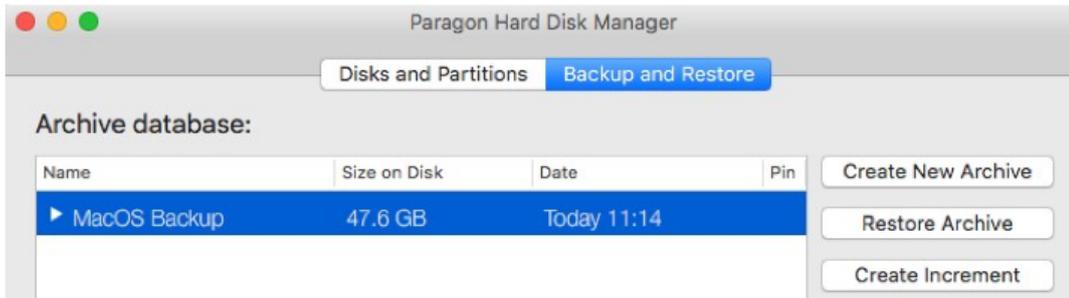
7. Click Backup to initiate the operation, it may take quite a while (depending on the amount of data to process).



Create an Incremental Update

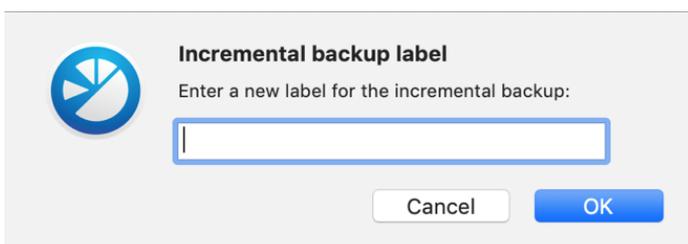
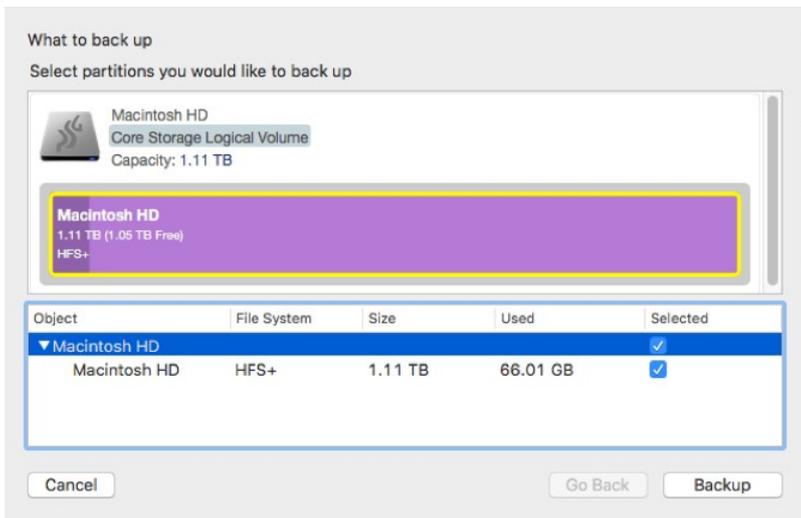
After you get the first full backup image, we recommend making regular incremental updates to keep the backup data relevant. An incremental backup only includes data changes since the last image in a chain was created, so it does not include data duplicates, which minimizes the backup storage footprint. Besides, incremental imaging allows having different time stamps of the same data.

1. Select **Backup and Restore** in the upper area.
2. Choose a backup image you would like to update. Since all earlier created images get to the "Archive Database", you will not have problems finding it. If you do not have the required image in the database, please use the plus button to find it. Click **Create Increment**.



If you have a backup image(s) located on a network share, please make sure this share is mapped in the system. Otherwise the image won't be available to work with.

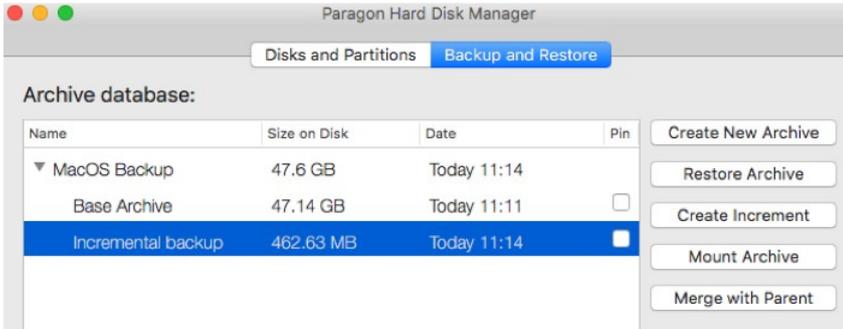
3. If the specified backup image contains several objects, you can update either the entire image or just individual partitions, containing valuable information that changes constantly. For example: some project, document, or a financial report you are working on every day. Click Backup to give a name for the future increment and initiate the backup operation, this may take quite a while, depending on the amount of data to process.



Mount a Backup Image

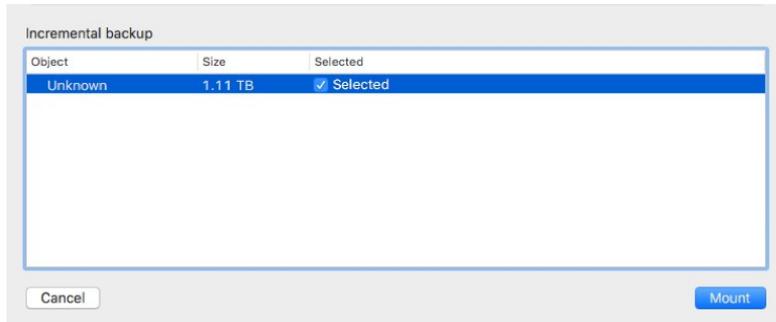
You can mount an existing backup image in read-only mode, thus you will get an access to its contents through the Finder. This option can help to retrieve individual files quickly without accomplishing a full restore operation.

1. Select **Backup and Restore** in the upper area.
2. Choose a full or incremental image you would like to mount. Since all earlier created images get to the "Archive Database", you will not have problems finding it. If you do not have the required image in the database, please use the plus button to find it. Click **Mount Archive**.

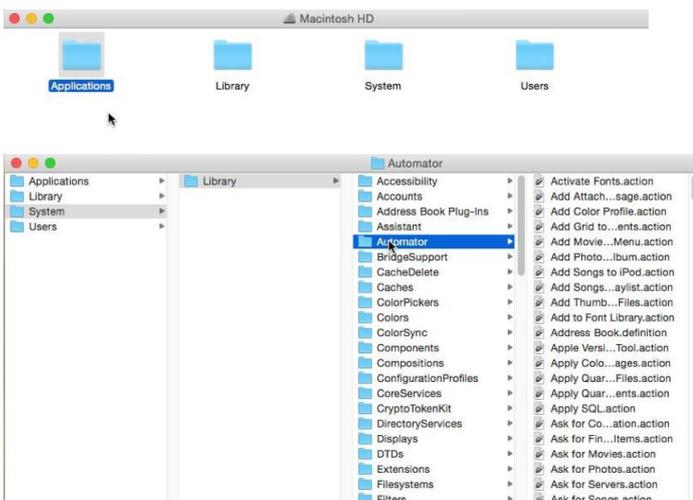


If you have a backup image(s) located on a network share, please make sure this share is mapped in the system. Otherwise the image won't be available to work with.

3. Mark a checkbox next to the desired backup object, then click **Mount**.



4. Browse the mounted backup image to retrieve files you need.



Restore a Backup Image

If your Mac fails to start up because of a software glitch or after you accidentally deleted the entire OS X partition or system files, you can get it back on track by utilizing the previously prepared recovery media and one of available backup images. When it is a data volume or BootCamp Windows that fails, you can initiate restore directly under OS X.



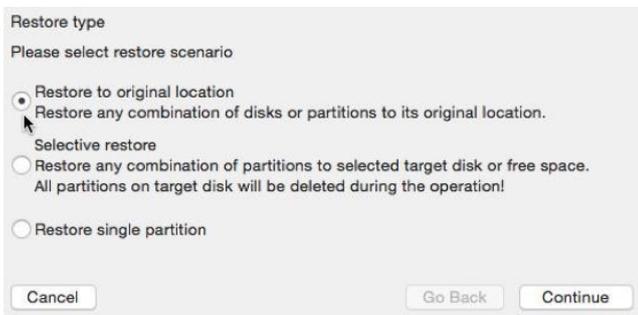
Apple Core Storage configurations require a specific backup approach. For more details, please read an article on this issue in our Knowledge Base at <https://kb.paragon-software.com/article/1144>.

1. Select **Backup and Restore** in the upper area.
2. Choose a backup image you'd like to restore. Click **Restore Archive**.

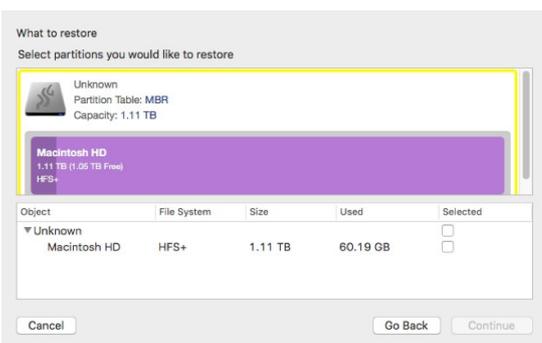


If you have a backup image(s) located on a network share, please make sure this share is mapped in the system. Otherwise the image won't be available to work with.

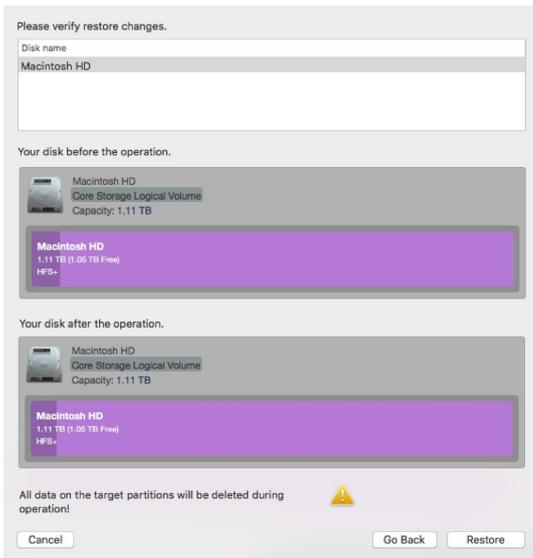
3. If the partition structure on the source disk has not been changed, you can restore to the original location. If it was changed, e.g. you're attempting to restore to another Mac computer having a Fusion Drive configuration, then you can use one of the remaining options. Choose the appropriate restore mode, then click **Continue to proceed**.



4. The program displays the selected backup image contents. If you have several partitions in the backup, select those you need to restore.



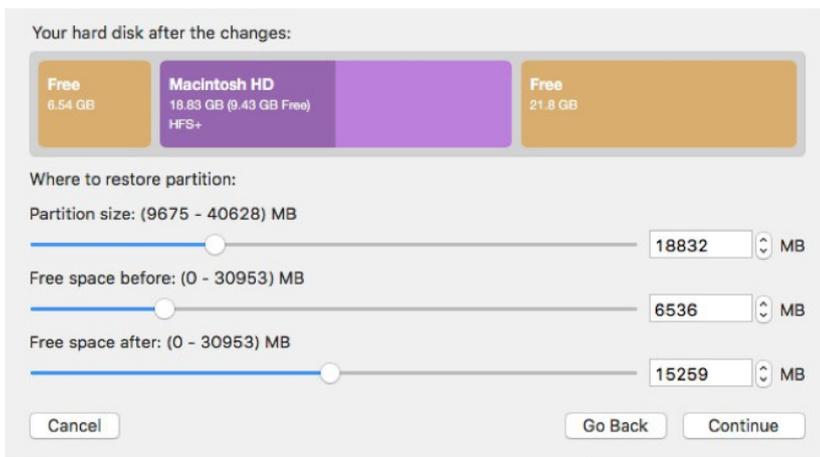
5. Check the resulting disk layout. Click **Restore** to initiate the operation, it may take quite a while, depending on the amount of data to process.



Depending on the backup object(s) you are dealing with, you have the options:

- to enlarge the restored volume to occupy the entire target disk,
- to remove existing free blocks,
- to restore as is.

Any changes to the disk layout will be displayed on the disk map.

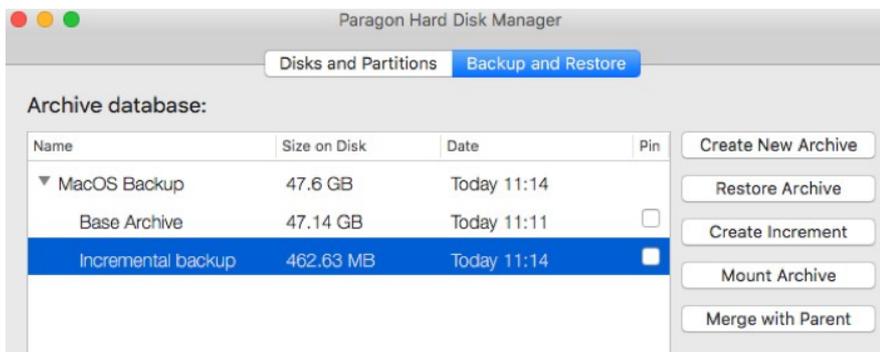


All contents on the partition selected for restoring purposes will be deleted during the operation.

Merge an Incremental Image with Parent

By merging contents of an increment with its parental image you can optimize existing backup chains, as processing many increments in a chain during restoration takes extra time. This option can also help to save the backup storage space by getting rid of obsolete time stamps.

1. Select **Backup and Restore** in the upper area.
2. Choose an incremental image you would like to merge with the parent. Click **Merge with Parent**.



3. The operation might take a while, depending on the amount of data to process.

Auxiliary

HDM for Mac and Snapshot

Hard Disk Manager for Mac utilizes a Paragon’s patent-pending snapshot technology that enables user to take consistent snapshots of both inactive and in-use partitions. The Time Machine, for instance, waits until user applications are closed and locked files become available to process, while ignoring system files, that is why Mac OS X has a two-step restore procedure: first the user reinstalls the operating system and then rolls in-app and user files from a backup image. During the installation of HDM for Mac, a special filter driver is embedded into input-output (I/O) stack between a block device and a file system. It is aimed at saving initial (at the moment of taking a snapshot) state of data blocks on a disk to provide backup data consistency, while OS or applications keep modifying data on this disk.

So, when attempting to write something to a block device, snapshot of which has been taken, the filter driver first copies existing data from the targeted blocks to a special temporary file called the backstore and only then allows the writing operation. This way HDM for Mac does not prohibit re-writing data on the “snapshotted” block device, but only postpone it until the old data is copied to the backstore. This scheme ensures consistency of backup data at a specific point-in-time, while allowing standard read/write operations for target storage devices during a backup process. With the snapshot technology, HDM for Mac is able live image or migrate the entire Mac including OS, applications and files in a way that the user does not feel any discomfort. Beside OS X, it can help to protect BootCamp Windows or any data volume of OS X, Windows or Linux. For more details about technology specifics, please go to our website .

HDM for Mac and SIP

OS X 10.11 El Capitan includes a serious hurdle against malware called the System Integrity Protection or just SIP. SIP literally kills root for /usr, /bin, /sbin, and /System, preventing ANY user or application, except for Mac-native installer software, from writing to these locations or debugging protected processes. This is the first time Apple decided to reject one of the Unix principles that lie in the almighty superuser access privileges.

SIP is enabled by default, preventing 3rd party processes from modifying system processes, files and folders whether they are launched by the root user or not. The system disk layout cannot be modify either, that is why HDM for Mac is not able, for instance, to redistribute free space between OS X and BootCamp partitions unless SIP is deactivated. The same restriction goes for the Paragon Snapshot component that makes consistent backup images of in-use files, running applications and OS.

You can choose to either accomplish otherwise prohibited operations from the recovery media or to switch off SIP and do all operations directly in Mac OS X. For more details, please consult Preparing Bootable Recovery Media and Managing SIP.

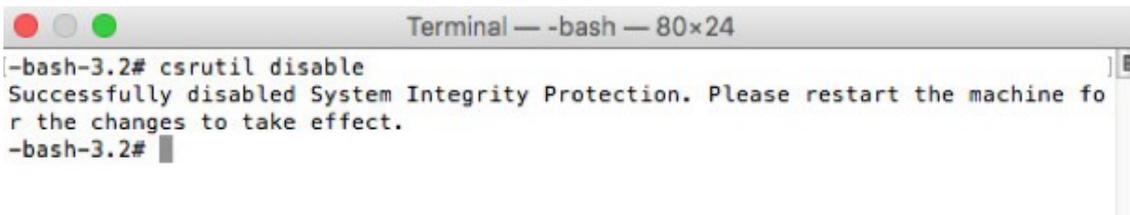
Managing SIP

You can disable or enable System Integrity Protection with the `csrutil` command line utility or through the Paragon's dialog in the Startup Manager of the prepared recovery media.

1. Hold the **Option** (alt) key during the system restart until the Startup Manager appears, then launch the terminal utility.

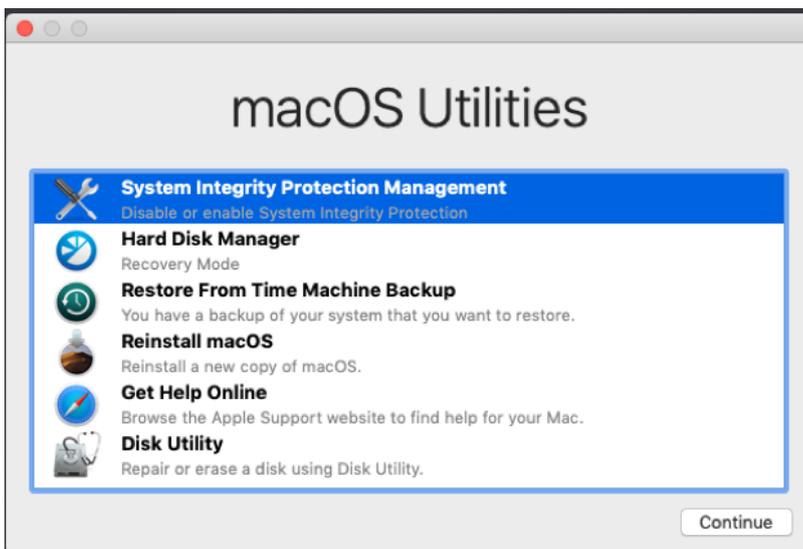


2. Use the `csrutil disable` command to switch off or `csrutil enable` to switch on SIP.



3. That is it. Restart the computer into regular mode.

Alternatively, you can do the same actions by selecting **System Integrity Protection Management** in the Startup Manager of the recovery media.





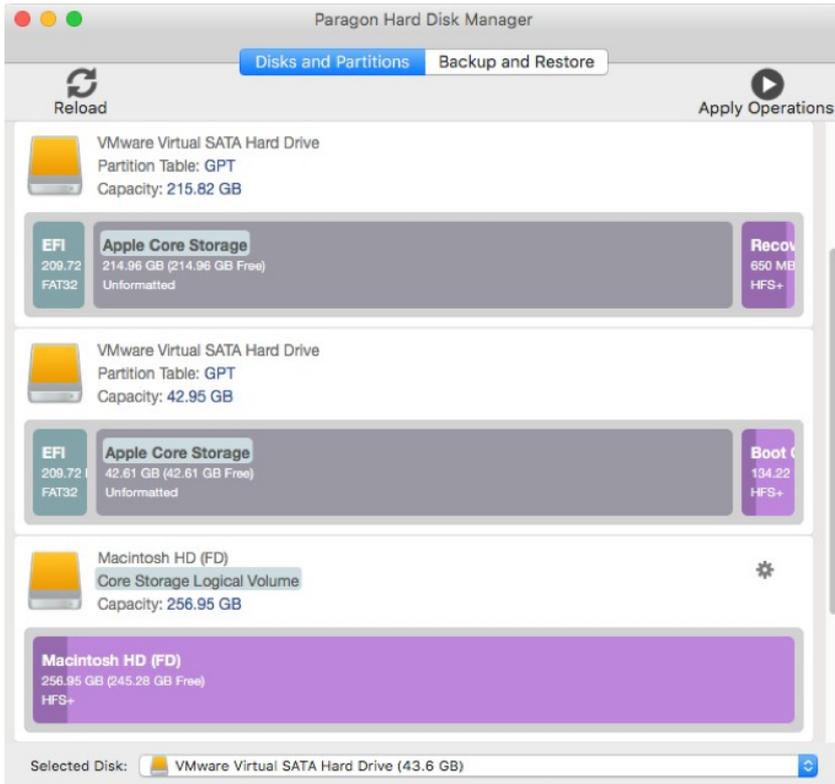
HDM for Mac and Apple Core Storage

Core Storage is a logical volume format introduced by Apple that serves the basis for FileVault (Full Disk Encryption) and Fusion Drive technologies. In short, the Core Storage is a layer between the disk partition scheme and the file system. It works by including one or several physical volumes into a logical volume group with one or more logical volumes. It is important to note that data from physical volumes that join a logical volume group cannot be retrieved directly, because they do not have a standard file system. It is a logical volume standard file system (such as HFS+), where all data is organized in a traditional way, so it can be easily accessed and read.

In order not to confuse regular users, Disk Utility only displays Core Storage logical volumes. For a typical Fusion Drive configuration, for instance, it is one mounted drive in the system, which capacity is a total of the SSD and HDD.



Hard Disk Manager for Mac does not hide anything, providing detailed information on all physical and logical volumes mounted in the system.



As you may guess already, unlike traditional configurations, Apple Core Storage requires a different backup approach. For more details, please read an article on this issue in our [Knowledge Base](#). Please note, Fusion Drives based on APFS are not supported.