

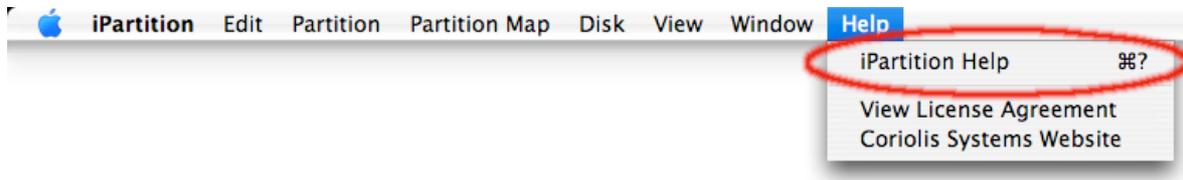
iPartition

Getting Started Guide



Introduction

This guide provides a brief overview of iPartition but does not cover every feature of iPartition. The help within iPartition provides a more comprehensive reference guide.



If, having read this guide and looked in the help, you still can't figure out how to use the product to achieve a particular goal, please contact technical support who will be happy to assist.

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Why do we need partitioning?

Before explaining partitioning, you need to understand a bit about file-systems.

A *file-system* is a method of organising data on a block storage device (usually but not always a hard disk). Common examples of file-systems are: NTFS and FAT, typically used by Microsoft operating systems; HFS and HFS+, used by Apple's operating systems; and Ext2, used by Linux operating systems. Not all operating systems use and understand the same file-systems. Some file-systems are designed for special purposes, such as long term archival or suitability for particular types of devices —e.g. tapes, floppy disks or memory sticks.

On most other systems, the word “file-system” is also used to describe a particular collection of data on a storage device. Using the same word for two distinct purposes is somewhat confusing, so Apple very sensibly opted to call a particular collection of data a *volume*. Volumes are the things you see icons for on the Desktop or in Finder. You only see disks and partitions in programs like Disk Utility or iPartition.

Sometimes you may not wish to dedicate a particular storage device to a single volume. Historically this often happened because file-systems could only cope with so many files or folders, or because they were only able to manage a relatively small amount of space. As a result, storage devices were routinely *partitioned* in order to divide them up into more manageable chunks. As file-systems have evolved, partitioning has become less of a necessity, but there are still many reasons you may wish to divide a storage device into discreet partitions; for instance:

- You may wish to use a device with different operating systems, some of which may work better with their own native file-systems than they do with more widely supported alternatives.
- You may wish to limit the total amount of space set aside for data on a particular volume, for instance to prevent temporary files from taking up more than their fair share of a disk.
- You may wish to install more than one version of an operating system, or even more than one operating system. Modern operating systems typically require their own dedicated volume from which to run.
- You may wish to hold data on a separate partition from your operating system, then you can easily re-install without having to back up and restore all of your data.

Technically speaking a partition doesn't have to contain a volume; it could be just a raw piece of disk that is used in a specific way, but the point is that each partition contains data that is isolated from the data in any other partition.

How are disks partitioned?

As well as there being numerous different file-systems, there are a number of different ways of storing partition information on your disk. Obviously there needs to be a description somewhere about how the disk is divided. That information generally includes the location and sizes of partitions, the type of the partition and in some cases the name of the partition. There are three common partitioning schemes:

1. Apple partition scheme (aka Apple Partition Map)

The Apple partition scheme is understood by Apple's operating systems. It records partition layout at the beginning of the disk, in a structure known as an Apple Partition Map. It was introduced before OS X and is still used on PowerPC Macs.

2. PC/MBR partition scheme

This is the format most commonly used on PCs. It also stores partition information at the beginning of the disk, this time in a small *partition table* in the MBR (Master Boot Record). If the table in the MBR overflows, additional "extended partitions" can be created which have their own nested partition tables.

Due to the fact that there was little standardisation of the PC partition table, there are many variations on this scheme, some of which are mutually incompatible. iPartition does not aim to support every possible variant of PC partition table, but should have sufficient support for most Mac users.

3. GUID partition scheme (aka GUID Partition Table or GPT)

This is a relatively modern partition scheme that is used on the latest Intel Apple Macs and will probably be the scheme used on the majority of PCs in the future.

Note that it is also possible to not have a partition scheme or map at all and dedicate the entire disk to one particular file-system. If Mac OS X cannot find a partition map on a disk it will check to see if any file-system recognises the data on the disk.

It is also worth remembering that some partition schemes track free space as well as used space. As a result, if you e.g. add another disk to a RAID, you may need to expand your partition map to encompass the additional space.

Interoperability

The table below shows which partition schemes are supported by OS X and Windows, and whether or not booting from a disk with such a scheme is supported in each case.

	PowerPC OS X	Intel OS X	Windows ³
Apple	UB	UB ¹	– ²
MBR	U	U	UB
GPT	U	UB	UB

Key: U—Understands, B—Can boot from

1. Apple doesn't officially support booting from Apple partition maps on Intel Macs and doesn't allow you to install OS X on drives with them. However, they do support reading and writing disks partitioned in this way.
2. Existing Microsoft operating systems do not understand Apple partition maps by default but it is possible to purchase third party software that enables Apple partition maps.
3. Whilst Windows can boot from both MBR and GPT schemes, it usually boots using the MBR scheme on Macs even though the disk might have a GPT scheme. This is because the disk is made to look like it has *both* MBR and GPT schemes. iPartition fully supports this unusual configuration. Not all the partitions in the GPT scheme will necessarily be visible in the MBR scheme but you can choose which ones are by adjusting iPartition's "Visible in Windows" property.



Warning: Older partitioning tools may erroneously treat a disk partitioned using GPT as if it was an MBR-partitioned disk. We recommend that you do not manipulate GPT disks with partitioning software unless that software (like iPartition) supports GPTs.



Warning: Moving disks partitioned using an MBR to a PC may not work as expected in all cases. This can happen if the BIOS in the PC is using unusual "disk geometry", and is particularly a hazard with SCSI disks as SCSI ROM BIOS implementations typically allow the end user to choose between a number of alternative fake geometries.

Power-on/Start-up

At power on, modern computers are generally not running the operating system, but instead run some type of *firmware*. On PCs this typically means BIOS, but on Macs and other Unix systems it is usually a more recent (and better designed) special-purpose firmware, such as OpenFirmware on PowerPC Macs (and Sun workstations) or Intel's EFI (Extensible Firmware Interface) on Intel Macs.

In order to start the operating system, the firmware needs to be able to read and execute a *bootloader* from the disk on which the system is installed. In the case of the PC, the firmware itself is too simplistic to load a file from the disk, so it loads an intermediate program from the Master Boot Record. Most other systems, the Mac included, have sufficient support in the firmware itself to load the first stage of the operating system directly, *provided that the partition scheme and file-system are known to the firmware in the machine*.

The firmware on PowerPC Macs—OpenFirmware—can only understand Apple partition maps so they can only boot from disks with Apple partition maps. Additionally, booting from USB disks is not officially supported on PowerPC machines.

The firmware on Intel Macs will allow you to boot from GUID or Apple partition maps although only the GUID scheme is officially supported by Apple.

Why do I need a partitioning tool?

Making changes to partition maps is superficially quite straightforward, however there a lot of complicating factors, not least the fact that you will often want to move or resize existing partitions and the volumes they contain. Even where you do not need to do that, some partition schemes have unusual rules that even experienced users may only be dimly aware of, and all of them have different ways to describe the types of partitions.

iPartition makes all of these tasks much simpler.

Running iPartition

After downloading iPartition simply run the downloaded file and you will be given the option of having it automatically installed in your Applications folder. If you would prefer to install it elsewhere, simply drag it to the folder you wish to keep it in.

Note: It is not possible to use iPartition to manipulate the disk that you booted from; iPartition needs exclusive access to any *disk* that you want to manipulate which means you cannot use *any* volumes that are on the disk whilst iPartition is working.

If you want to manipulate your start-up drive, you have a number of options:

Booting from an External Disk

If you have an external disk, you can boot from that. You will need to ensure OS X is installed on the drive, which you can do by running the OS X installer. The OS X installer will not let you install on drives if they are not of the correct type or format (e.g. on PowerPC machines, it will not let you install to USB connected drives). If the installer complains that it is not the correct type you can use iPartition to fix it.

Using Target Disk Mode

If you have another Mac, you can use Target Disk Mode which involves connecting your machines with a FireWire cable. You can find out more about Target Disk Mode in the Mac Help (which you can access via the Help menu in Finder). Once you have connected the machines and started the target computer as a FireWire hard disk, iPartition should recognise the disk and allow you to make modifications.

Creating a Recovery Partition

If you are using OS X Lion or Mountain Lion, you can create a recovery partition containing iPartition (and iDefrag if you have it). The recovery partition will be a clone of the recovery partition that comes with OS X so it will also include options for reinstalling OS X. You will need an external disk which doesn't have to be very large; a small (e.g. 1 GB) USB flash drive will suffice.

To create a recovery partition, simply select Create Boot Disk from the iPartition menu and follow the instructions.

Creating a Bootable DVD

If you have an older machine (one that shipped with OS X 10.6 or earlier) you can create a bootable DVD.

To create a bootable DVD, select Create Boot Disk from the iPartition menu and follow the instructions.

During the process, you will be asked to choose a template from which to create your bootable disc. You can either insert an OS X install disc (e.g. the one that came with your machine) and choose that from the list, or you can choose a template to download from our servers.

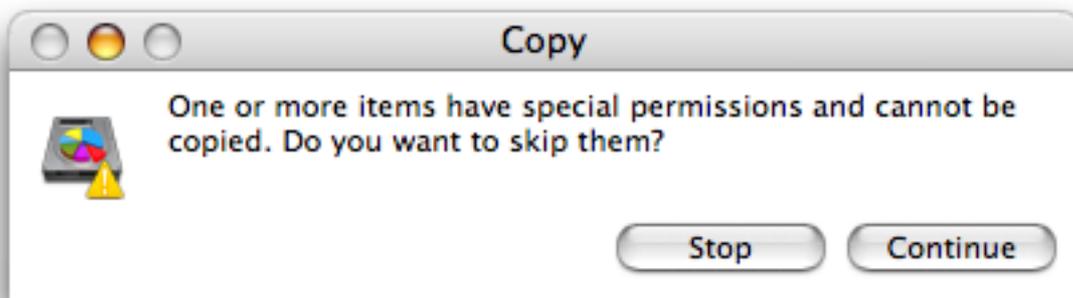
Once you have created a bootable DVD you can boot from it by holding down the C key¹ as you power on your machine.



Warning: Do not set the DVD as your boot disk in System Preferences. If holding the C key does not work, please contact technical support for assistance.

Copying iPartition to Another Disk

If you need to copy iPartition to another disk, you can just drag it to the required disk. If you have run iPartition you might see the following warning:



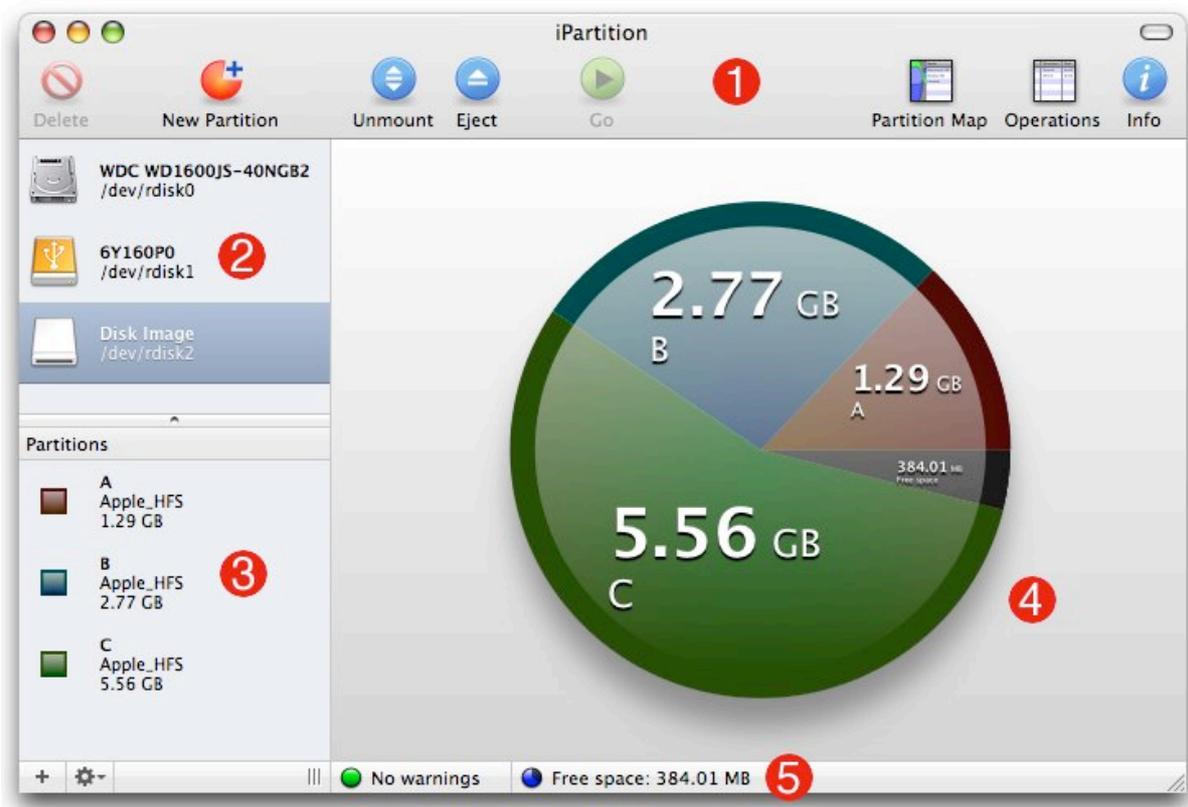
You can safely continue at this point.

Note that this will not copy any preferences you might have set and so when you run it whilst booted from a different disk, the preferences will be at their defaults.

Note that if you install iPartition on another computer or volume, iPartition may need to check your license and in that case it will need to connect to the Internet to do so.

¹ If you have set a firmware password, holding C will not work. In this case you should hold down the Option key, enter your firmware password and then select the CD/DVD when it is displayed. If you have forgotten your firmware password **please do not use our products until your machine has been unlocked**. An Apple store or Approved Service Center should be able to do this for you.

The Main Display



1. Along the top you will see the toolbar (customisable). There are three buttons: “Partition Map”, “Operations” and “Info” allow you to show or hide additional utility views.
2. In the top-left corner you will see a list of disks you can select.
3. Below the list of disks you will see a list of partitions for the currently selected disk.
4. Occupying the main section you will see a pie chart representing the currently selected disk.
5. At the bottom, a status bar tells you if there are any warnings regarding the disk such as whether any inconsistencies are detected. Note that these warnings differ from those that might appear as you add operations.

Basic Usage

It is safe to get comfortable with iPartition's features and not damage your disk. iPartition will give you plenty of warning before it makes any changes; nothing gets changed until you click the Go button (or select the equivalent menu option) and even then, you will be presented with another sheet asking for confirmation to continue.

iPartition should be self-explanatory to use (if not, let us know what you're finding difficult as we may be able to help). Let's say you wanted to resize a partition: first, select the disk you are interested in, then select the partition. You should see a resize handle appear which you can drag with the mouse button. You can follow this step in detail below but you may prefer just to experiment (which is perfectly safe so long as you don't commit the operations).

Occasionally there is more than one way to do what you need. You can type sizes into the Info panel for example, or you use the mouse to change the size. You can select a partition anywhere that you see one. You can change the partition scheme via the Info panel or via the menu. You can add a new partition by clicking the button on the toolbar, the plus button in the bottom left hand corner or there's a menu option.

Before committing we recommend that you study the operations window (use the option in the View menu or the toolbar button to display the window) as that will list the operations that iPartition will perform should you choose to go ahead with your changes. iPartition will automatically arrange your operations in the optimum order which may differ from the order that you made them. iPartition is also clever enough to realise that if you adjust the size of a partition and then change your mind later and change it to a different size, that you only want it changed once.

Within the operations window you can delete an operation if you decide you don't want it. Note that deleting it might have an effect on subsequent operations and may even cause them to be deleted also (e.g. if you delete a "Create Partition" operation it will cause any subsequent operations on that partition to be deleted). If you delete an operation and then realise you made a mistake, you can use the Undo option from the Edit menu.

Remember: Whatever happens, iPartition will not make any changes to your disk until you click the "Go" button, and it will *always* ask for confirmation before proceeding.

Moving Partitions

iPartition uses an efficient algorithm for moving partitions and for calculating what move operations to perform. It will automatically add move operations as it needs to. The move operations that iPartition adds will be such that iPartition has to move the minimum amount of data.

Moving partitions is the most risky and time-consuming operation that iPartition can perform. It's time-consuming because of the sheer amount of data that needs to be moved whereas most other operations require relatively minor access to the disk and can be completed in no more than a few seconds.

It's risky because it takes so long and also because it can be difficult to recover data if things go wrong (e.g. a power failure). Having said that, iPartition has a feature where it can recover when things go wrong (we don't know of any other partitioning tool that has this advanced feature). In most cases this feature won't significantly affect how long the move operation will take but there are some cases, such as when you are moving a partition by a small distance, when it will take longer to complete. In these cases, you have the option of disabling safety which should speed things up at the expense of being able to recover should things go wrong.



Warning: If you disable the safety option, you cannot then re-enable it for the move operation that is in progress. Any equipment or power failure during a move operation with safety disabled will cause data loss.

Note: To recover from an interruption, simply run iPartition again and point it at the disk it was working on. It will detect that it was working on the disk and offer to recover it for you. Please note that *recovery can take a lot longer than normal operation*. Interrupting recovery is also recoverable, but if your disk gets into this state you will need to either wipe it and start again, or allow iPartition to finish its recovery procedure.

Fast partition movement

By default, for file-systems that iPartition understands (HFS+, NTFS and FAT), only data that is marked as in use will be moved. This option is very useful since it is often the case that there are significant amounts of free space within partitions that are being moved. However, if the volume being moved is damaged or inconsistent in some way, it is possible that this option might make things worse. We therefore strongly recommend that users check their volumes for errors (e.g. using Disk Utility or a third-party alternative) *before using iPartition on them*.

You can disable fast partition movement in iPartition's preferences in which case iPartition will move the entire partition including any free space regions. This typically takes significantly longer.

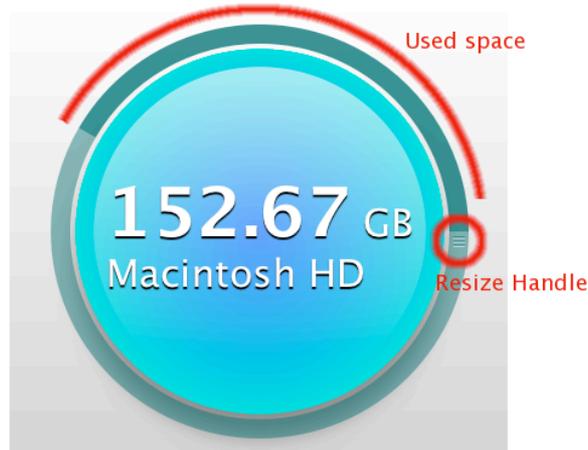
If iPartition does not understand the contents of a partition, it will always move the entire partition, and will give warnings about data loss if you attempt to resize the partition.

Examples

Creating Separate Data Partition

You can shrink an existing partition to make room for a new data partition. To do this:

1. Select the partition you want to shrink.



When selected, the pie will show you how much of the disk is used (the darker region of the outer ring).

2. Using the resize handle, drag to the required size. You can also specify the size in the Inspector.
3. Create a new partition by clicking the toolbar button “New Partition”.
4. Enter the name of the new partition. For Apple and GUID partition schemes the type will default to HFS+.
5. By default, iPartition will assume that you want to format the new partition. You can leave the format parameters at their defaults. You may wonder why you can enter a name for the volume in the format parameters. This is because a name is stored within the file-system as well as (in some cases) within the partition map.
6. You can review the operations that iPartition has queued by bringing up the Operations window.

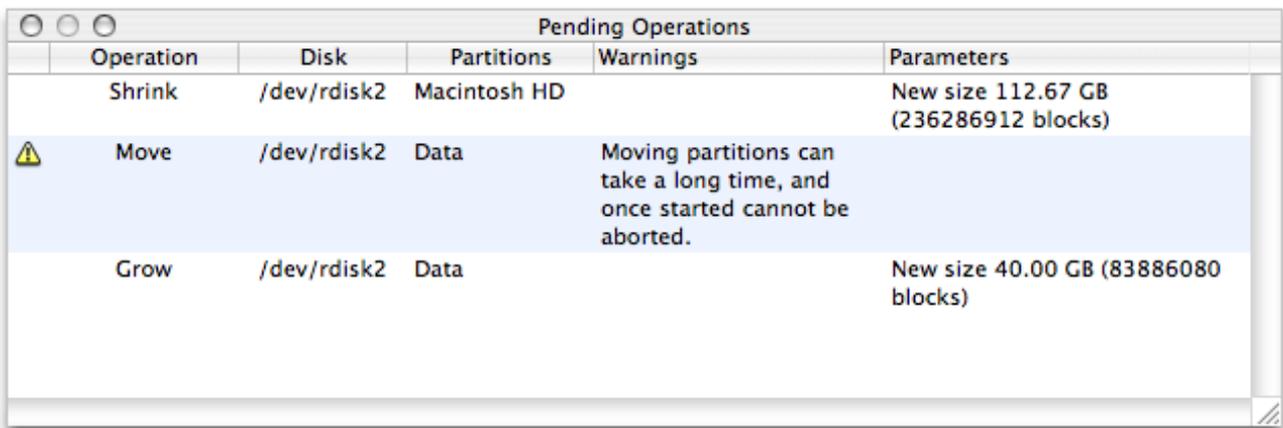
Pending Operations					
	Operation	Disk	Partitions	Warnings	Parameters
	Shrink	/dev/rdisk2	Macintosh HD		New size 103.05 GB (216110768 blocks)
	Create	/dev/rdisk2	Data		Size 49.62 GB (104062224 blocks), name "Data", type "HFS (Mac OS/Mac OS Extended)" ("Apple_HFS"), start block 216110832
⚠	Format	/dev/rdisk2	Data	Partition will be formatted.	Journaled, Volume Name "Data"

7. When you're ready, click the "Go" button. You will be presented with a dialog box asking you to confirm you want to proceed.

Adjusting Boot Camp Allocation

Let's say you allocated 30 GB to Windows and the remaining space to your HFS+ partition. Now you've decided you want to allocate another 10 GB to Windows. So...

1. First pick your HFS+ partition and shrink it by 10GB as in steps 1 and 2 above.
2. Now select your Windows partition and grow it so that it uses all the free space.
3. Have a look at the operations and you should see something like:



Pending Operations					
Operation	Disk	Partitions	Warnings	Parameters	
Shrink	/dev/rdisk2	Macintosh HD		New size 112.67 GB (236286912 blocks)	
 Move	/dev/rdisk2	Data	Moving partitions can take a long time, and once started cannot be aborted.		
Grow	/dev/rdisk2	Data		New size 40.00 GB (83886080 blocks)	

Note that iPartition has automatically added a move operation since the Windows partition has to be moved before you can grow it. Moving partitions can take a long time (as the warning informs you).

Note that if you have a more complicated Windows installation (such as multiple Windows partitions on different disks) we suggest that you read the Windows section in iPartition's help.

Changing Partition Scheme

External disks, particularly those purchased from retail stores, are often partitioned and formatted for use with PCs. Whilst they will work with Macs, unless you need PC compatibility you may find it best to change them to a different partition scheme, for instance so that you can install OS X on the disk somewhere.

iPartition is able to change partition scheme without losing any data, which provides considerable flexibility in cases like this. To do so, select the "Change Partition Scheme..." option from the "Partition Map" menu, or change the scheme directly from the Info panel.

iPartition might complain that there isn't enough space to change the scheme. This happens because partition schemes use different amounts of space to store the disk layout. If this happens you can shrink a partition to make some room. iPartition, as with other operations, will work out automatically how to shuffle your partitions around if necessary.

Troubleshooting

If you are having problems with iPartition, check the help within iPartition, particularly the “Common Problems” and the “Troubleshooting” sections. A copy of this help can also be found here:

<http://www.coriolis-systems.com/help/iPartition-3>

Also, check the frequently asked questions page for iPartition:

<http://www.coriolis-systems.com/iPartition-faq.php>

If you still cannot find an answer to your question you can contact our support team:

support@coriolis-systems.com

If you want to report a bug or request a feature in iPartition you can do so via the option within iPartition or you can do it on-line here:

<http://www.coriolis-systems.com/bugreport.php>