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Subject: Re: Partitions corrupted on a drive  
Posted by [Mac User #330250](#) on Fri, 30 Dec 2016 23:00:03 GMT  
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Hello Neal!

On 2016-12-30 19:34, W. Neal Lewis wrote:  
> Machine Name: Power Mac G4 (AGP graphics)  
> Machine Model: PowerMac3,1

Okay, there you go. The Open Firmware of this Mac doesn't support LBA48 addressing, hence it doesn't support more than 128GB HDDs.

Actually, the real limit is that the boot partitions must be below the 128 GB barrier (in total: start+end below the limit). The OS (like Mac OS X) has the capability to overcome this limit once it has taken control (booted up). And as far as I know, there is only one way to do it right.

#### SOLUTION 1:

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Warning: This is not what I would do, it is too complicated for me. I choose solution 2!

Okay, the limit is LBA28, which means Logical Block Addressing of  $2^{28}$  blocks. My calculator says,  $2^{28}$  equals 268,435,456 blocks.

This is the theory. So, WHAT YOU ABSOLUTELY NEED TO MAKE SURE:

- 1) make as many partitions as you like, but
- 2) KEEP THEM INSIDE THE  $2^{28}$  BLOCKS!

Note that only those partitions will be accessible for boot. If you install another OS on a partition past this limit, it won't be bootable on this Mac model!

Then, add partitions THAT START PAST the  $2^{28}$  block number! This makes it safe for LBA28 access, because if a partition starts before the last LBA28 block, it is accessible but will wrap around when accessed by LBA28 disk access and WILL OVERWRITE the beginning of your drive!

Why? The explanation is simple: when 28 bits are used to access a block, and the partition starts at  $2^{28} - 1$ , the disk IO will see this partition (because it starts below the  $2^{28}$  barrier). It will then try to access this partition. The partition table (Apple Partition Map) will tell the software, that performs the disk IO, that the partition has a specific size, but this software normally doesn't check if  $2^{28} - 1$  (block 268,435,455) + the partition size (which is most likely greater than 1) remains in the address space of 28 bits.

Wrapping occurs. The software locates the partition, adds the size and the 28 bits get wrapped around and start at 0.

Example: say, the partition is 10 MB, that is 10,485,760 bytes. Now, we want to access the first block of this partition, that would be 268,435,455, which shows only the first block of the file system. This will try to load the second block,  $268,435,455 + 1 = 268,435,456$ . And this will tell the software to look for offset 3 inside the partition. BUT  $268,435,455 + 3$  doesn't fit into 28 bits. So, after 268,435,455 comes (+1) 268,435,456, thereafter (+2) 0, and thereafter (+3) 1. So the software will read block 1 instead of block  $268,435,455 + 3 = 268,435,458$ . So far, only an error occurs. But let's assume, for whatever reason, the software thinks it has to WRITE to a block - IT WILL OVERWRITE what is written in the first blocks (starting from 0) of that hard drive. And software often thinks it has to write something, e.g. access times.

SO: MAKE SURE THERE IS NO PARTITION CROSSING BLOCK 268,435,456!

You /could/ use pdisk to make partitions below block 268,435,456--that start and end there--and partitions that start past block 268,435,456 and you should be safe.

My problem with this is as follows: pdisk and Disk Utility doesn't give block numbers, it gives partition sizes in MB or GB. Or, it could round those numbers, who knows...

## SOLUTION 2:

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Take advantage of your Mac being limited to LBA28. Boot with a Mac OS X installation disc and make your partitions, you may even install Mac OS X. Note that only 128 GB will be visible in Disk Utility and that is because of LBA28.

Then, apply the Open Firmware hack to add LBA48. NOTE: This doesn't really make the firmware LBA48--the Open Firmware will still be limited to LBA28, hence all boot partitions (i.e. Mac OS 9, Mac OS X) MUST be below the  $2^{28}$  block barrier! BUT the hack will fool Mac OS X into thinking that the firmware is LBA48 aware and now Disk Utility will show the full >128 GB capacity.

The hack is shown there:

<https://4thcode.blogspot.co.at/2007/12/using-128-gib-or-larger-ata-hard-drives.html>

Use the enable-lba48 script: copy&paste it in TextEdit and save it where you can find it in Terminal. In Terminal, make the script executable:

1) Go to the folder where you saved enable-lba48, e.g. "cd

/Users/Neal/Desktop"

2) Make the script executable: "sudo chmod ug+x enable-lba48" (chmod means "change mode" and "ug+x" means "user and group: +x", and "x" means executable)

3) Run the script: "./enable-lba48" -- the script acquires root privileges automatically when needed.

4) JUST FOR INFO: To remove the hack, simply reset the PRAM. Hold Option+Alt+P+R at the chime. See:

<https://support.apple.com/en-us/HT204063> (I know, this is for Intel Macs, but the keys to press haven't changed.)

Afterwards, every Mac OS X you boot will think that the Open Firmware (abbr. OF) of this Mac is capable of LBA48 (even though we know it's not!).

Now comes the second part: add partitions. For this you really require a Mac OS X 10.5 Leopard installation disc. Before Leopard, Disk Utility was not able to extend partitions. So, if you boot Tiger, you cannot add partitions behind the first already partitioned 128 GB.

Leopard on the other hand will find the >128 GB capacity of the HDD (because of the OF hack) AND is able to extend the existing Apple Partition Map (abbr. APM). What you now have to do is simply add partitions to your liking, BUT KEEP the existing partitioning within the first 128 GB.

DONE. You successfully partitioned without crossing the  $2^{28}$  block!

<http://lowendmac.com/2007/fooling-the-os-x-10-5-leopard-installer-with-open-firmware/>

> CPU Type: PowerPC G4 (2.1)

> Number Of CPUs: 1

> CPU Speed: 1 GHz

>> My advice is that you boot up with an installation disc of Mac OS X

>> 10.5 Leopard, use its Disk Utility (it can be started from the menu).

> I have been booting from a 10.4.11 CD and that is the disk utility

> that cannot fix things. Will a 10.5 disk even work?

Yes, since your Mac has >867 MHz. Otherwise you would have to use another hack to get the installer to continue. Note that if your Mac isn't supported by Leopard (Mac OS X 10.5) then it will show a message and it WILL NOT let you start Disk Utility. That is very unfortunate.

But with your Mac it should work.

This would be a hack to fool Leopard to continue:

<http://lowendmac.com/2007/fooling-the-os-x-10-5-leopard-installer-with-open-firmware/>

BTW, Leopard will run nicely on your Mac:

<http://lowendmac.com/2007/unsupported-os-x-10-5-leopard-installation/>

On 2016-12-30 22:53, W. Neal Lewis wrote:

```
> $ diskutil list
> /dev/disk0
> #:          type name          size identifier
> 0: Apple_partition_scheme      *279.5 GB disk0
> 1:  Apple_partition_map        31.5 KB  disk0s1
> 2:  Apple_Driver_ATA           50.0 KB  disk0s2
> 3:  Apple_HFS 23 GB Disk       19.1 GB  disk0s3
> 4:  Apple_HFS eDrive           4.0 GB   disk0s4
> 5:  Apple_HFS Art Hard Drive   104.9 GB disk0s5
> 6:  Apple_HFS 128 GB Disk 3    128.2 GB disk0s6
> /dev/disk1
> #:          type name          size identifier
> 0: Apple_partition_scheme      *465.8 GB disk1
> 1:  Apple_partition_map        31.5 KB  disk1s1
> 2:  Apple_Driver_ATA           50.0 KB  disk1s2
> 3:  Apple_HFS OS X             64.0 GB  disk1s3
> 4:  Apple_HFS OS 9             64.0 GB  disk1s4
> 5:  Apple_HFS 128 GB Disk 1    128.0 GB disk1s5
> 6:  Apple_HFS 128 GB Disk 2    128.0 GB disk1s6
> 7:  Apple_HFS 82 GB Disk       81.8 GB  disk1s7
```

That is dangerous: I cannot see for sure on the first HDD (disk0), you might be lucky and your 105 GB partition "Art Hard Drive" is as a whole below the 128 GB limit, but I am not sure.

**BUT TAKE A LOOK AT YOUR SECOND DRIVE:** you have OS X and OS 9 on 64 GB partitions each, totalling 128 GB. But there are a couple of smaller partitions in front, so my guess is that your OS 9 partition crosses the  $2^{28}$  block!

**THIS IS VERY DANGEROUS.** Why? Because during early Open Firmware supported boot, some files MAY be located past the  $2^{28}$  block limit, wrapping will occur, and the boot will fail OR CORRUPT your partition!

Sorry to say it, but there is no easy way out. You will have to backup + repartition your whole internal HDDs!

You can use Disk Utility to backup Mac OS 9 and Mac OS X into images. They can easily be restored from a booted Mac OS X from another HDD

(i.e. an external FireWire HDD that you booted Mac OS X from).

Two more things to consider:

- 1) The LBA28 limit is only on the internal IDE ports. If you have a PCI IDE controller card installed, this may well support LBA48. If your drives are SCSI drives, there is also no LBA28 limit. If you put the HDD into an external FireWire drive case, there is also no LBA28 limit and everything should boot fine!
- 2) Your Mac OS X can access the partitions past the  $2^{28}$  block. Why? Is the KeyLargoATA.kext of this installation already LBA28->LBA48 patched? And which driver to you use on your Mac OS 9 for  $>2^{28}$  block access? (There have been a few commercial drivers to allow LBA48 disk access on those Macs, but they did cost quite a few bucks.)

So, I know this has been quite too much.

Again, I would go with solution #2. Use trial+error for understanding the LBA28 vs. LBA48 problem.

I hope this isn't too much,  
Mac User #330250 aka Andreas

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