

如何转存GPT SD卡镜像 (Android O SDCard Mirror)

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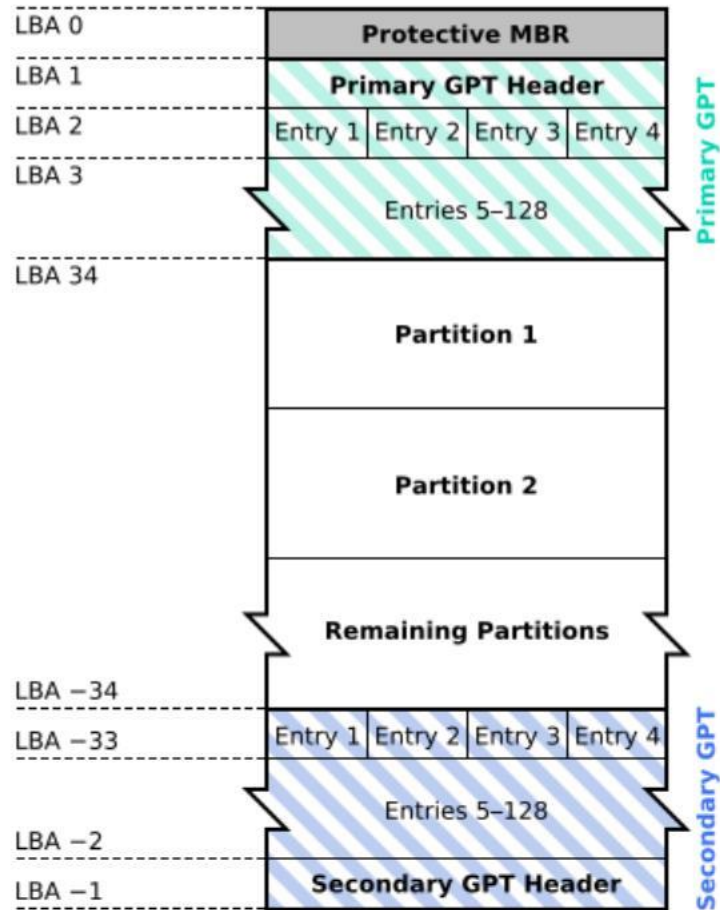
EXTERNAL USE



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GUID Partition Table(GPT) 布局 and 面临的问题

GUID Partition Table Scheme



- 如果使用常规方式创建GPT，则二级GPT目录和头文件位于磁盘/ SD卡的末尾。
- 磁盘和SD卡的扇区容量不完全相同
- 转存较小的SD卡镜像将会丢失二级GPT目录和头文件

Note: GUID - Globally Unique Identifiers
全局唯一标识符

GPT 头文件格式

GPT header format

Offset	Length	Contents
0 (0x00)	8 bytes	Signature ("EFI PART", 45h 46h 49h 20h 50h 41h 52h 54h or 0x5452415020494645ULL ^[a] on little-endian machines)
8 (0x08)	4 bytes	Revision (for GPT version 1.0 (through at least UEFI version 2.7 (May 2017)), the value is 00h 00h 01h 00h)
12 (0x0C)	4 bytes	Header size in little endian (in bytes, usually 5ch 00h 00h 00h or 92 bytes)
16 (0x10)	4 bytes	CRC32/zlib of header (offset +0 up to header size) in little endian, with this field zeroed during calculation
20 (0x14)	4 bytes	Reserved; must be zero
24 (0x18)	8 bytes	Current LBA (location of this header copy)
32 (0x20)	8 bytes	Backup LBA (location of the other header copy)
40 (0x28)	8 bytes	First usable LBA for partitions (primary partition table last LBA + 1)
48 (0x30)	8 bytes	Last usable LBA (secondary partition table first LBA - 1)
56 (0x38)	16 bytes	Disk GUID (also referred as UUID on UNIXes)
72 (0x48)	8 bytes	Starting LBA of array of partition entries (always 2 in primary copy)
80 (0x50)	4 bytes	Number of partition entries in array
84 (0x54)	4 bytes	Size of a single partition entry (usually 80h or 128)
88 (0x58)	4 bytes	CRC32/zlib of partition array in little endian
92 (0x5C)	*	Reserved; must be zeroes for the rest of the block (420 bytes for a sector size of 512 bytes; but can be more with larger sector sizes)

GPT头文件中用于二级分区表的LBA – 1没有固定在磁盘/SD卡的最后一个扇区。



解决方法

转存较小尺寸的SD卡镜像并重新获得二级GPT和头文件

转存较小尺寸的SD卡镜像

gdisk Android_O.sdcard

Command (? for help): p

Disk /dev/sdc: 15523840 sectors, 7.4 GiB

Logical sector size: 512 bytes

Disk identifier (GUID): C0D0656E-012E-493C-8ECD-5CAE8027572F

Partition table holds up to 128 entries

First usable sector is 34, last usable sector is 15523806

Partitions will be aligned on 2048-sector boundaries

Total free space is 855997 sectors (418.0 MiB)

注意: 需要**34**个扇区用于二级GPT和头文件
再多提供**10**个扇区。

dd if=/dev/sdc of=Android_O.sdcard bs=512 count=**14673963**

14673963 = 14673919 + 34 + 10

Number	Start (sector)	End (sector)	Size	Code	Name
1	4096	69631	32.0 MiB	FFFF	boot
2	69632	135167	32.0 MiB	8300	recovery
3	135168	3280895	1.5 GiB	FFFF	system
4	3280896	4329471	512.0 MiB	FFFF	cache
5	4329472	4337663	4.0 MiB	FFFF	misc
6	4337664	4341759	2.0 MiB	FFFF	datafooter
7	4341760	4345855	2.0 MiB	FFFF	metadata
8	4345856	4347903	1024.0 KiB	FFFF	presistdata
9	4349952	4579327	112.0 MiB	FFFF	vendor
10 ⁴	EXTERNAL USE 4579328	14671871	4.8 GiB	FFFF	userdata
11		14673919	1024.0 KiB	0700	fbmisc



重新获得二级GPT和头文件

gdisk Android_O.sdcard

Partition table scan:

MBR: protective
BSD: not present
APM: not present
GPT: **damaged**

Command (? for help): p

Disk Android_O.sdcard: 14673963 sectors, 7.0 GiB

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分区表最多可容纳128个目录

第一个可以使用的扇区为34, 最后一个可以使用的扇区为**15523806**

各分区在2048个扇区的边界上整齐排列。

总可用空间为855997个扇区 (418.0 MiB)

最后一个可以使用的扇区仍旧是物理磁盘的 **15523806** 。

sgdisk -e Android_O.sdcard

gdisk Android_O.sdcard

Partition table scan:

MBR: protective
BSD: not present
APM: not present
GPT: **present**

Command (? for help): p

Disk Android_O.sdcard: 14673963 sectors, 7.0 GiB

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分区表最多可容纳128个目录

第一个可以使用的扇区为34, 最后一个可以使用的扇区为**14673929**

各分区在2048个扇区的边界上整齐排列。

总可用空间为6120个扇区 (3.0 MiB)

Sgdisk将最后一个可用扇区修正为 **14673929 = 14673929 + 10**

写入SD卡

Linux : dd command

Windows: Win32DiskImager.exe

Partiton Guru 清理SD卡

写入镜像后，窗口上可能看不到磁盘。
可以使用Partition guru清理并再次查看磁盘。

Partiton Guru <http://www.eassos.com/>

可免费使用基本功能

Partiton Guru 清理SD卡(Cont.)

Warning: After erased, all data on the sectors will be lost and could NOT be recovered by any software. Please make sure that there is no important data on these sectors.
The disk may required to be repartitioned or the partition may required to be reformatted before it can be used again.

Erase Disk RD2:MassStorageDevice(7GB) - boot(0) recover...

From Sector: 0 To Sector: 30 **3.**

Fill Sectors with: 00 (hex)

When Finished: Power Off Reboot Suspend Hibernate

4. Erase Cancel

30 sectors are enough

Free 415.0MB

File System	ID	S
Unknown		
Unknown		
EXT4		
EXT4		
Unknown		
Unknown		

USB ID: 012E-493C-8ECD-5CAE
StorageDevice Partition
movable Disk

966
255
63
7.4GB
15523840

Total Bytes: 7948206080
Sector Size: 512 Bytes
Physical Sector Size: 512 Bytes

原文链接: <https://community.nxp.com/docs/DOC-343079>

由Biyong Sun于2019-4-4上传的文件





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