

GNU Parted User Manual

GNU Parted, version 3.4, 25 January 2021

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1 Introduction

1.1 Overview of GNU Parted

GNU Parted is a program for creating and manipulating partition tables.

This documentation is written with the assumption that the reader has some understanding of partitioning and file systems.

GNU Parted was designed to minimize the chance of data loss. For example, it was designed to avoid data loss during interruptions (like power failure) and performs many safety checks. However, there could be bugs in GNU Parted, so you should back up your important files before running Parted.

The GNU Parted homepage is <http://www.gnu.org/software/parted>. The library and frontend themselves can be downloaded from <ftp://ftp.gnu.org/gnu/parted>. You can also find a listing of mailing lists, notes for contributing and more useful information on the web site.

Please send bug reports to bug-parted@gnu.org. When sending bug reports, please include the version of GNU Parted. Please include the output from these commands (for disk `/dev/hda`):

```
# parted /dev/hda print unit s print unit chs print
```

Feel free to ask for help on this list — just check that your question isn't answered here first. If you don't understand the documentation, please tell us, so we can explain it better. General philosophy is: if you need to ask for help, then something needs to be fixed so you (and others) don't need to ask for help.

Also, we'd love to hear your ideas :-)

1.2 Software Required for the use of Parted

If you're installing or compiling Parted yourself, you'll need to have some other programs installed. If you are compiling Parted, you will need both the normal and devel packages of these programs installed:

- libuuid, part of the e2fsprogs package. If you don't have this, you can get it from:

```
http://web.mit.edu/tytso/www/linux/e2fsprogs.html
```

If you want to compile Parted and e2fsprogs, note that you will need to *make install* and *make install-libs* e2fsprogs.

- GNU Readline (optional), available from

```
ftp://ftp.gnu.org/gnu/readline
```

If you are compiling Parted, and you don't have readline, you can disable Parted's readline support with the *--disable-readline* option for *configure*.

- GNU gettext (or compatible software) for compilation, if internationalisation support is desired.

```
ftp://ftp.gnu.org/gnu/gettext
```

1.3 Platforms on which GNU Parted runs

Hopefully, this list will grow a lot. If you do not have one of these platforms, then you can use a rescue disk and a static binary of GNU Parted.

GNU/Linux

Linux versions 2.0 and up, on Alpha, x86 PCs, PC98, Macintosh PowerPC, Sun hardware.

GNU/Hurd

1.4 Terms of distribution for GNU Parted

GNU Parted is free software, covered by the GNU General Public License Version 3, or (at your option) any later version. This should have been included with the Parted distribution, in the COPYING file. If not, see <http://www.gnu.org/licenses/>.

Libparted is considered part of GNU Parted. It is covered by the GNU General Public License. It is NOT released under the GNU Lesser General Public License (LGPL).

1.5 Building GNU Parted

If you want to compile GNU Parted, this is generally done with:

```
$ ./configure
$ make
```

However, there are a few options for `configure`:

- `--without-readline`
turns off use of readline. This is useful for making rescue disks, etc., where few libraries are available.
- `--disable-debug`
don't include assertions
- `--disable-nls`
turns off native language support. This is useful for use with old versions of glibc, or a trimmed down version of glibc suitable for rescue disks.
- `--disable-shared`
turns off shared libraries. This may be necessary for use with old versions of GNU libc, if you get a compile error about a "spilled register". Also useful for boot/rescue disks.
- `--enable-discover-only`
support only reading/probing (reduces size considerably)
- `--enable-mtrace`
enable malloc() debugging
- `--enable-read-only`
disable writing (for debugging)

1.5.1 Introduction

If you want to run GNU Parted on a machine without GNU/Linux installed, or you want to modify a root or boot partition, use GParted Live: <http://gparted.sourceforge.net/livecd.php>.

2 Using Parted

2.1 Introduction to Partitioning

Partitioning is the process of dividing a storage device into local sections, called partitions, which help organize multiple filesystems and their associated operating systems.

A storage device presents itself as a sequence of bytes, numbered starting from zero and increasing until the maximum capacity of the device is reached. Bytes are normally read and written a sector at a time, rather than individually. Each sector contains a fixed number of bytes, with the number determined by the device.

```

+-----+
|                storage device with no partitions                |
+-----+
0 start                                                    end

```

In order to store multiple filesystems, a storage device can be divided up into multiple partitions. Each partition can be thought of as an area which contains a real filesystem inside of it. To show where these partitions are on the device a small table is written at the start, shown as PT in the diagram below. This table is called a partition table, or disklabel, and also stores the type of each partition and some flags.

```

+---+-----+-----+-----+
|PT| Partition 1 | Partition 2 | Partition 3 |
+---+-----+-----+-----+
0 start                                                    end

```

2.2 Using GNU Parted

Parted has two modes: command line and interactive. Parted should always be started with:

```
# parted device
```

where *device* is the hard disk device to edit. (If you're lazy and omit the `DEVICE` argument, Parted will attempt to guess which device you want.)

In command line mode, this is followed by one or more commands. For example:

```
# parted /dev/sda mklabel gpt mkpart P1 ext3 1MiB 8MiB
```

Options (like `--help`) can only be specified on the command line.

In interactive mode, commands are entered one at a time at a prompt, and modify the disk immediately. For example:

```
(parted) mklabel gpt
(parted) mkpart P1 ext3 1MiB 8MiB
```

Unambiguous abbreviations are allowed. For example, you can type “p” instead of “print”, and “u” instead of “units”. Commands can be typed either in English, or your native language (if your language has been translated). This may create ambiguities. Commands are case-insensitive.

Numbers indicating partition locations can be whole numbers or decimals. The suffix selects the unit, which may be one of those described in Section 2.4.14 [unit], page 12,

except CHS and compact. If no suffix is given, then the default unit is assumed. Negative numbers count back from the end of the disk, with “-1s” indicating the sector at the end of the disk. Parted will compute sensible ranges for the locations you specify (e.g. a range of +/- 500 MB when you specify the location in “G”). Use the sector unit “s” to specify exact locations. With parted-2.4 and newer, IEC binary units like “MiB”, “GiB”, “TiB”, etc., specify exact locations as well. See [IEC binary units], page 12.

If you don’t give a parameter to a command, Parted will prompt you for it. For example:

```
(parted) mklabel
New disk label type? gpt
```

Parted will always warn you before doing something that is potentially dangerous, unless the command is one of those that is inherently dangerous (viz., *rm*, *mklabel* and *mkpart*). Since many partitioning systems have complicated constraints, Parted will usually do something slightly different to what you asked. (For example, create a partition starting at 10.352Mb, not 10.4Mb) If the calculated values differ too much, Parted will ask you for confirmation.

2.3 Command Line Options

When invoked from the command line, Parted supports the following syntax:

```
# parted [option] device [command [argument]]
```

Available options and commands follow. For detailed explanations of the use of Parted commands, see Section 2.4 [Command explanations], page 5. Options begin with a hyphen, commands do not:

Options:

```
‘-h’
‘--help’    display a help message

‘-s’
‘--script’
            never prompt the user

‘-a alignment-type’
‘--align alignment-type’
            Set alignment for newly created partitions, valid alignment types are: none,
            cylinder, minimal and optimal.

‘-v’
‘--version’
            display the version
```

2.4 Parted Session Commands

GNU Parted provides the following commands:

Note that after version 2.4, the following commands were removed: *check*, *cp*, *mkfs*, *mkpartfs*, *move*, *resize*.

2.4.1 align-check

`align-check align-type n` [Command]

Determine whether the starting sector of partition *n* meets the disk's selected alignment criteria. *align-type* must be 'minimal', 'optimal' or an abbreviation. When in script mode, if the partition does not meet the alignment requirement, exit with status 1; otherwise (including on older kernels for which alignment data is not available), continue processing any remaining commands. Without `--script`, print either '*N* aligned' or '*N* not aligned'.

Example:

```
(parted) align-check minimal 1
1 aligned
```

2.4.2 disk_set

`disk_set flag state` [Command]

Changes a flag on the disk. A flag can be either "on" or "off". Some or all of these flags will be available, depending on what disk label you are using:

```
'pmbr_boot'
(GPT) - this flag enables the boot flag on the GPT's protective MBR
partition.
```

The disk's flags are displayed by the `print` command on the "Disk Flags:" line. They are also output as the last field of the disk information in machine mode.

```
(parted) disk_set pmbr_boot on
```

Set the PMBR's boot flag.

2.4.3 help

`help [command]` [Command]

Prints general help, or help on *command*.

Example:

```
(parted) help mklabel
```

Print help for the `mklabel` command.

2.4.4 mklabel

`mklabel label-type` [Command]

Creates a new disk label, of type *label-type*. The new disk label will have no partitions. This command (normally) won't technically destroy your data, but it will make it basically unusable, and you will need to use the rescue command (see Chapter 3 [Related information], page 14) to recover any partitions. Parted works on all partition tables.¹

label-type must be one of these supported disk labels:

- `bsd`

¹ Everyone seems to have a different word for "disk label" — these are all the same thing: partition table, partition map.

- loop (raw disk access)
- gpt
- mac
- msdos
- pc98
- sun

Example:

```
(parted) mklabel msdos
```

Create an MS-DOS disk label. This is still the most common disk label for PCs.

2.4.5 mkpart

mkpart [*part-type name fs-type*] *start end* [Command]

Creates a new partition, *without* creating a new file system on that partition. This is useful for creating partitions for file systems (or LVM, etc.) that Parted doesn't support. You may specify a file system type, to set the appropriate partition code in the partition table for the new partition. *fs-type* is required for data partitions (i.e., non-extended partitions). *start* and *end* are the offset from the beginning of the disk, that is, the “distance” from the start of the disk.

part-type is one of ‘primary’, ‘extended’ or ‘logical’, and may be specified only with ‘msdos’ or ‘dvh’ partition tables. A *name* must be specified for a ‘gpt’ partition table. Neither *part-type* nor *name* may be used with a ‘sun’ partition table.

fs-type must be one of these supported file systems:

- ext2
- fat16, fat32
- hfs, hfs+, hfsx
- linux-swaps
- NTFS
- reiserfs
- ufs
- btrfs

For example, the following creates a logical partition that will contain an ext2 file system. The partition will start at the beginning of the disk, and end 692.1 megabytes into the disk.

```
(parted) mkpart logical 0.0 692.1
```

Now, we will show how to partition a low-end flash device (“low-end”, as of 2011/2012). For such devices, you should use 4MiB-aligned partitions². This

² Cheap flash drives will be with us for a long time to come, and, for them, 1MiB alignment is not enough. Use at least 4MiB-aligned partitions. For details, see Arnd Bergman's article, <http://lwn.net/Articles/428584/> and its many comments.

command creates a tiny place-holder partition at the beginning, and then uses all remaining space to create the partition you'll actually use:

```
$ parted -s /dev/sdX -- mklabel msdos \
    mkpart primary fat32 64s 4MiB \
    mkpart primary fat32 4MiB -1s
```

Note the use of '--', to prevent the following '-1s' last-sector indicator from being interpreted as an invalid command-line option. The above creates two empty partitions. The first is unaligned and tiny, with length less than 4MiB. The second partition starts precisely at the 4MiB mark and extends to the end of the device.

The next step is typically to create a file system in the second partition:

```
$ mkfs.vfat /dev/sdX2
```

2.4.6 name

name *number name* [Command]

Sets the name for the partition *number* (GPT, Mac, MIPS and PC98 only). The name can be placed in quotes. And depending on the shell may need to also be wrapped in single quotes so that the shell doesn't strip off the double quotes.

Example:

```
(parted) name 2 'Secret Documents'
```

Set the name of partition 2 to 'Secret Documents'.

2.4.7 print

print [*number*] [Command]

Displays the partition table on the device parted is editing, or detailed information about a particular partition.

Example:

```
(parted) print
Disk geometry for /dev/hda: 0.000-2445.679 megabytes
Disk label type: msdos
Minor    Start      End        Type       Filesystem  Flags
 1         0.031     945.000   primary    fat32       boot, lba
 2        945.000   2358.562   primary    ext2
 3       2358.562   2445.187   primary    linux-swap
(parted) print 1
Minor: 1
Flags: boot, lba
File System: fat32
Size:          945.000Mb (0%)
Minimum size:  84.361Mb (0%)
Maximum size: 2445.679Mb (100%)
```

2.4.8 quit

quit [Command]

Quits Parted.

It is only after Parted exits that the Linux kernel knows about the changes Parted has made to the disks. However, the changes caused by typing your commands will *probably* be made to the disk immediately after typing a command. However, the operating system's cache and the disk's hardware cache may delay this.

2.4.9 rescue

`rescue start end` [Command]

Rescue a lost partition that used to be located approximately between *start* and *end*. If such a partition is found, Parted will ask you if you want to create a partition for it. This is useful if you accidentally deleted a partition with parted's `rm` command, for example.

Example:

```
(parted) print
Disk geometry for /dev/hdc: 0.000-8063.507 megabytes
Disk label type: msdos
Minor   Start      End      Type      Filesystem  Flags
1       0.031     8056.032 primary    ext3
(parted) rm
Partition number? 1
(parted) print
Disk geometry for /dev/hdc: 0.000-8063.507 megabytes
Disk label type: msdos
Minor   Start      End      Type      Filesystem  Flags
```

OUCH! We deleted our ext3 partition!!! Parted comes to the rescue...

```
(parted) rescue
Start? 0
End? 8056
Information: A ext3 primary partition was found at 0.031MB ->
8056.030MB. Do you want to add it to the partition table?
Yes/No/Cancel? y
(parted) print
Disk geometry for /dev/hdc: 0.000-8063.507 megabytes
Disk label type: msdos
Minor   Start      End      Type      Filesystem  Flags
1       0.031     8056.032 primary    ext3
```

It's back! :)

2.4.10 resizepart

`resizepart number end` [Command]

Moves the *end* position of partition *number*. Note that this does not modify any filesystem present in the partition. If you wish to do this, you will need to use external tools, such as `resize2fs`.

When growing a partition you will want to grow the filesystem afterwards, but when shrinking, you need to shrink the filesystem before the partition.

2.4.11 rm

rm *number* [Command]

Removes the partition with number *number*. If you accidentally delete a partition with this command, use `mkpart` to recover it. Also, you can use the `gpart` program (see Chapter 3 [Related information], page 14) to recover damaged disk labels.

Note for msdos disk labels: if you delete a logical partition, all logical partitions with a larger partition number will be renumbered. For example, if you delete a logical partition with a partition number of 6, then logical partitions that were number 7, 8 and 9 would be renumbered to 6, 7 and 8 respectively. This means, for example, that you have to update `/etc/fstab` on GNU/Linux systems.

Example:

```
(parted) rm 3
```

Remove partition 3.

2.4.12 select

select *device* [Command]

Selects the device, *device*, for Parted to edit. The device can be a Linux hard disk device, a partition, a software RAID device or LVM logical volume.

Example:

```
(parted) select /dev/hdb
```

Select `/dev/hdb` (the slave device on the first ide controller on Linux) as the device to edit.

2.4.13 set

set *number flag state* [Command]

Changes a flag on the partition with number *number*. A flag can be either “on” or “off”. Some or all of these flags will be available, depending on what disk label you are using:

‘bios_grub’

(GPT) - Enable this to record that the selected partition is a GRUB BIOS partition.

‘legacy_boot’

(GPT) - this flag is used to tell special purpose software that the GPT partition may be bootable.

‘bls_boot’

(MS-DOS, GPT) - Enable this to indicate that the selected partition is a Linux Boot Loader Specification compatible /boot partition.

‘boot’

(Mac, MS-DOS, PC98) - should be enabled if you want to boot off the partition. The semantics vary between disk labels. For MS-DOS disk labels, only one partition can be bootable. If you are installing LILO on a partition that partition must be bootable. For PC98 disk labels, all ext2 partitions must be bootable (this is enforced by Parted).

<code>'msftdata'</code>	(GPT) - This flag identifies partitions that contain Microsoft filesystems (NTFS or FAT). It may optionally be set on Linux filesystems to mimic the type of configuration created by parted 3.0 and earlier, in which a separate Linux filesystem type code was not available on GPT disks. This flag can only be removed within parted by replacing it with a competing flag, such as <code>boot</code> or <code>msftres</code> .
<code>'msftres'</code>	(MS-DOS,GPT) - This flag identifies a "Microsoft Reserved" partition, which is used by Windows. Note that this flag should not normally be set on Windows filesystem partitions (those that contain NTFS or FAT filesystems).
<code>'irst'</code>	(MS-DOS, GPT) - this flag identifies an Intel Rapid Start Technology partition.
<code>'esp'</code>	(MS-DOS, GPT) - this flag identifies a UEFI System Partition. On GPT it is an alias for <code>boot</code> .
<code>'chromeos_kernel'</code>	(GPT) - this flag indicates a partition that can be used with the Chrome OS bootloader and verified boot implementation.
<code>'lba'</code>	(MS-DOS) - this flag can be enabled to tell MS DOS, MS Windows 9x and MS Windows ME based operating systems to use Linear (LBA) mode.
<code>'root'</code>	(Mac) - this flag should be enabled if the partition is the root device to be used by Linux.
<code>'swap'</code>	(Mac) - this flag should be enabled if the partition is the swap device to be used by Linux.
<code>'hidden'</code>	(MS-DOS, PC98) - this flag can be enabled to hide partitions from Microsoft operating systems.
<code>'raid'</code>	(MS-DOS) - this flag can be enabled to tell linux the partition is a software RAID partition.
<code>'LVM'</code>	(MS-DOS) - this flag can be enabled to tell linux the partition is a physical volume.
<code>'PALO'</code>	(MS-DOS) - this flag can be enabled so that the partition can be used by the Linux/PA-RISC boot loader, <code>palo</code> .
<code>'PREP'</code>	(MS-DOS, GPT) - this flag can be enabled so that the partition can be used as a PReP boot partition on PowerPC PReP or IBM RS6K/CHRP hardware.
<code>'DIAG'</code>	(MS-DOS) - Enable this to indicate that a partition can be used as a diagnostics / recovery partition.

The `print` command displays all enabled flags for each partition.

Example:

```
(parted) set 1 boot on
```

Set the `'boot'` flag on partition 1.

2.4.14 unit

`unit unit` [Command]

Selects the current default unit that Parted will use to display locations and capacities on the disk and to interpret those given by the user if they are not suffixed by an *unit*.

unit may be one of:

‘s’	sector (n bytes depending on the sector size, often 512)
‘B’	byte
‘KiB’	kibibyte (1024 bytes)
‘MiB’	mebibyte (1048576 bytes)
‘GiB’	gibibyte (1073741824 bytes)
‘TiB’	tebibyte (1099511627776 bytes)
‘kB’	kilobyte (1000 bytes)
‘MB’	megabyte (1000000 bytes)
‘GB’	gigabyte (1000000000 bytes)
‘TB’	terabyte (1000000000000 bytes)
‘%’	percentage of the device (between 0 and 100)
‘cyl’	cylinders (related to the BIOS CHS geometry)
‘chs’	cylinders, heads, sectors addressing (related to the BIOS CHS geometry)
‘compact’	This is a special unit that defaults to megabytes for input, and picks a unit that gives a compact human readable representation for output.

The default unit apply only for the output and when no unit is specified after an input number. Input numbers can be followed by an unit (without any space or other character between them), in which case this unit apply instead of the default unit for this particular number, but CHS and cylinder units are not supported as a suffix. If no suffix is given, then the default unit is assumed. Parted will compute sensible ranges for the locations you specify (e.g., a range of +/- 500 MB when you specify the location in “G”, and a range of +/- 500 KB when you specify the location in “M”) and will select the nearest location in this range from the one you wrote that satisfies constraints from both the operation, the filesystem being worked on, the disk label, other partitions and so on. Use the sector unit “s” to specify exact locations (if they do not satisfy all constraints, Parted will ask you for the nearest solution). Note that negative numbers count back from the end of the disk, with “-1s” pointing to the last sector of the disk.

Note that as of parted-2.4, when you specify start and/or end values using IEC binary units like “MiB”, “GiB”, “TiB”, etc., parted treats those values as exact, and equivalent to the same number specified in bytes (i.e., with the “B” suffix), in that it provides *no* “helpful” range of sloppiness. Contrast that with a partition start request of “4GB”, which may actually resolve to some sector up to 500MB before or

after that point. Thus, when creating a partition, you should prefer to specify units of bytes (“B”), sectors (“s”), or IEC binary units like “MiB”, but not “MB”, “GB”, etc.

Example:

```
(parted) unit compact
(parted) print
Disk geometry for /dev/hda: 0kB - 123GB
Disk label type: msdos
Number  Start   End     Size    Type     File system  Flags
1       32kB    1078MB  1077MB  primary  reiserfs     boot
2       1078MB  2155MB  1078MB  primary  linux-swap
3       2155MB  123GB   121GB   extended
5       2155MB  7452MB  5297MB  logical  reiserfs
(parted) unit chs print
Disk geometry for /dev/hda: 0,0,0 - 14946,225,62
BIOS cylinder,head,sector geometry: 14946,255,63.  Each cylinder
is 8225kB.
Disk label type: msdos
Number  Start      End           Type     File system  Flags
1       0,1,0      130,254,62   primary  reiserfs     boot
2       131,0,0    261,254,62   primary  linux-swap
3       262,0,0    14945,254,62 extended
5       262,2,0    905,254,62   logical  reiserfs
(parted) unit mb print
Disk geometry for /dev/hda: 0MB - 122942MB
Disk label type: msdos
Number  Start   End     Size    Type     File system  Flags
1       0MB     1078MB  1077MB  primary  reiserfs     boot
2       1078MB  2155MB  1078MB  primary  linux-swap
3       2155MB  122935MB 120780MB extended
5       2155MB  7452MB  5297MB  logical  reiserfs
```

3 Related information

If you want to find out more information, please see the GNU Parted web site.

These files in the Parted distribution contain further information:

- *ABOUT-NLS* - information about using Native Language Support, and the Free Translation Project.
- *AUTHORS* - who wrote what.
- *ChangeLog* - record of changes made to Parted.
- *COPYING* - the GNU General Public License, the terms under which GNU Parted may be distributed.
- *COPYING.DOC* - the GNU Free Documentation Licence, the term under which Parted's documentation may be distributed.
- *INSTALL* — how to compile and install Parted, and most other free software

Appendix A Copying This Manual

A.1 GNU Free Documentation License

Version 1.3, 3 November 2008

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