

NAME

`sg_readcap` – send SCSI READ CAPACITY command

SYNOPSIS

`sg_readcap` [`--l6`] [`--brief`] [`--help`] [`--hex`] [`--lba=LBA`] [`--long`] [`--pmi`] [`--raw`] [`--read-only`] [`--verbose`] [`--version`] *DEVICE*

`sg_readcap` [`-l6`] [`-b`] [`-h`] [`-H`] [`-lba=LBA`] [`-pmi`] [`-r`] [`-R`] [`-v`] [`-V`] *DEVICE*

DESCRIPTION

The normal action of the SCSI READ CAPACITY command is to fetch the number of blocks (and block size) from the *DEVICE*.

The SCSI READ CAPACITY command (both 10 and 16 byte cdb) actually yield the block address of the last block and the block size. The number of blocks is thus one plus the block address of the last block (as blocks are counted origin zero (i.e. starting at block zero)). This is the source of many "off by one" errors.

The READ CAPACITY(16) response provides additional information not found in the READ CAPACITY(10) response. This includes protection and logical block provisioning information, plus the number of logical blocks per physical block. So even though the media size may not exceed what READ CAPACITY(10) can show, it may still be useful to examine the response to READ CAPACITY(16). Sadly there are horrible SCSI command set implementations in the wild that crash when the READ CAPACITY(16) command is sent to them.

Device capacity is the product of the number of blocks by the block size. This utility outputs this figure in bytes, MiB (1048576 bytes per MiB), GB (1000000000 bytes per GB) and, if large enough, TB (1000 GB).

If `sg_readcap` is called without the `--long` option then the 10 byte cdb version (i.e. READ CAPACITY (10)) is sent to the *DEVICE*. If the number of blocks in the response is reported as 0xffffffff (i.e. $(2^{32} - 1)$) and the `--hex` option has not been given, then READ CAPACITY (16) is called and its response is output.

This utility supports two command line syntaxes, the preferred one is shown first in the synopsis and explained in this section. A later section on the old command line syntax outlines the second group of options.

OPTIONS

Arguments to long options are mandatory for short options as well. The options are arranged in alphabetical order based on the long option name.

--l6 Use the 16 byte cdb variant of the READ CAPACITY command. See the '`--long`' option. **-b**, **--brief** outputs two hex numbers (prefixed with '0x' and space separated) to stdout. The first number is the maximum number of blocks on the device (which is one plus the lba of the last accessible block). The second number is the size in bytes of each block. If the operation fails then "0x0 0x0" is written to stdout.

-h, **--help**
print out the usage message then exit.

-H, **--hex**
output the response to the READ CAPACITY command (either the 10 or 16 byte cdb variant) in ASCII hexadecimal on stdout.

-L, **--lba=LBA**
used in conjunction with `--pmi` option. This variant of READ CAPACITY will yield the last block address after *LBA* prior to a delay. For a disk, given a *LBA* it yields the highest numbered block on the same cylinder (i.e. before the heads need to move). *LBA* is assumed to be decimal unless prefixed by "0x" or it has a trailing "h". Defaults to 0. This option was made obsolete in SBC-3 revision 26.

-l, **--long**
Use the 16 byte cdb variant of the READ CAPACITY command. The default action is to use the 10 byte cdb variant which limits the maximum block address to $(2^{32} - 2)$. When a 10 byte cdb READ CAPACITY command is used on a device whose size is too large then a last block address

of 0xffffffff is returned (if the device complies with SBC-2 or later).

-O, --old

Switch to older style options. Please use as first option.

-p, --pmi

partial medium indicator: for finding the next block address prior to some delay (e.g. head movement). In the absence of this option, the total number of blocks and the block size of the device are output. Used in conjunction with the `--lba=LBA` option. This option was made obsolete in SBC-3 revision 26.

-r, --raw

output response in binary to stdout.

-R, --readonly

open the *DEVICE* read-only (e.g. in Unix with the `O_RDONLY` flag). The default for `READ CAPACITY(16)` is to open it read-write. The default for `READ CAPACITY(10)` is to open it read-only so this option does not change anything for this case.

-v, --verbose

increase level of verbosity. Can be used multiple times.

-V, --version

outputs version string then exits.

NOTES

The response to `READ CAPACITY(16)` contains a LBPRZ bit in the SBC-3 standard (ANSI INCITS 514-2014). There was also a LBPRZ bit with the same meaning in the Logical block provisioning VPD page (0xb2). Then somewhat confusingly T10 expanded the LBPRZ bit to a 3 bit field in SBC-4 draft revision 7, but only in the LB provisioning VPD page. The reason for the expansion was to report a new "provisioning initialization pattern" state (when an unmapped logical block is read). The new state has been assigned LBPRZ=2 in the VPD page and it re-uses LBPRZ=0 in the `READ CAPACITY(16)` response. LBPRZ=1 retains the same meaning for both variants, namely that a block of zeroes will be returned when an unmapped logical block is read.

EXIT STATUS

The exit status of `sg_readcap` is 0 when it is successful. Otherwise see the `sg3_utils(8)` man page.

OLDER COMMAND LINE OPTIONS

The options in this section were the only ones available prior to `sg3_utils` version 1.23 . Since then this utility defaults to the newer command line options which can be overridden by using `--old` (or `-O`) as the first option. See the ENVIRONMENT VARIABLES section for another way to force the use of these older command line options.

-16 Use the 16 byte cdb variant of the `READ CAPACITY` command. Equivalent to `--long` in the main description.

-b utility outputs two hex numbers (prefixed with '0x' and space separated) to stdout. The first number is the maximum number of blocks on the device (which is one plus the lba of the last accessible block). The second number is the size of each block. If the operation fails then "0x0 0x0" is written to stdout. Equivalent to `--brief` in the main description.

-h output the usage message then exit. Giving the `-?` option also outputs the usage message then exits.

-H output the response to the `READ CAPACITY` command (either the 10 or 16 byte cdb variant) in ASCII hexadecimal on stdout.

-lba=LBA

used in conjunction with `-pmi` option. This variant of `READ CAPACITY` will yield the last block address after *LBA* prior to a delay. Equivalent to `--lba=LBA` in the main description.

- N, --new** Switch to the newer style options.
- pmi** partial medium indicator: for finding the next block address prior to some delay (e.g. head movement). In the absence of this switch, the total number of blocks and the block size of the device are output. Equivalent to `--pmi` in the main description.
- r** output response in binary (to stdout).
- R** Equivalent to `--readonly` in the main description.
- v** verbose: print out cdb of issued commands prior to execution. `'-vv'` and `'-vvv'` are also accepted yielding greater verbosity.
- V** outputs version string then exits.

ENVIRONMENT VARIABLES

Since `sg3_utils` version 1.23 the environment variable `SG3_UTILS_OLD_OPTS` can be given. When it is present this utility will expect the older command line options. So the presence of this environment variable is equivalent to using `--old` (or `-O`) as the first command line option.

AUTHORS

Written by Douglas Gilbert

COPYRIGHT

Copyright © 1999–2018 Douglas Gilbert

This software is distributed under the GPL version 2. There is NO warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.

SEE ALSO

`sg_inq(sg3_utils)`