Red Hat Enterprise Linux Release 9.2 Manual Pages on 'sg_vpd.8' command

$ man sg_vpd.8

SG_VPD(8)   SG3_UTILS   SG_VPD(8)

NAME

    sg_vpd - fetch SCSI VPD page and/or decode its response

SYNOPSIS

    sg_vpd [--all] [--enumerate] [--examine] [--force] [--help] [--hex]

    [--ident] [--inhex=FN] [--long] [--maxlen=LEN] [--page=PG] [--quiet]

    [--raw] [--vendor=VP] [--verbose] [--version] [DEVICE]

DESCRIPTION

    This utility, when DEVICE is given, fetches a Vital Product Data (VPD)

    page and decodes it or outputs it in ASCII hexadecimal or binary. VPD

    pages are fetched with a SCSI INQUIRY command.

    Alternatively the --inhex=FN option can be given. In this case FN is

    assumed to be a file name ('-' for stdin) containing ASCII hexadecimal

    representing a VPD page response. If the --raw option is also given

    then binary input is assumed (rather than ASCII hexadecimal).

    Probably the most important page is the Device Identification VPD page

    (page number: 0x83). Since SPC-3, support for this page has been

    flagged as mandatory. This page can be fetched by using the --ident op?

    tion.

    The reference document used for interpreting VPD pages (and the INQUIRY

    standard response) is T10/BSR INCITS 502 Revision 22 which is draft

    SPC-5 revision 19, 22 April 2019. It can be found at

    https://www.t10.org .

When no options are given, other than a DEVICE, then the "Supported VPD pages" (0x0) VPD page is fetched and decoded.

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.

-a, --all

decode all VPD pages. When used with DEVICE the pages to be de?
coded are found in the "Supported VPD pages" VPD page. Pages
that cannot be decoded are displayed in hex; add the --long op?
tion to have ASCII displayed to the right of each line of hex.
If this option is used with the --inhex=FN option then the file
FN is assumed to contain 1 or more VPD pages (in ASCII hex or
binary). Decoding continues until the file is exhausted (or an
error occurs). Sanity checks are applied on each VPD page's
length and the ascending order of VPD page numbers (required by
SPC-4) so bad data may be detected.
If the --page=PG option is also given then no VPD page whose
page number is greater than PG (or its numeric equivalent) is
decoded.

-e, --enumerate

list the names of the known VPD pages, first the standard pages
(i.e. those defined by T10), then the vendor specific pages.
Each group is sorted in abbreviation order. The DEVICE and most
other options are ignored and this utility exits after listing
the VPD page names. May be used together with --page=PG where PG
is numeric. If so, it searches for the summary lines of all VPD
pages whose number matches PG. May be used with --vendor=VP to
restrict output to known vendor specific pages for vendor/prod?
uct VP.

-E, --examine

scan part of all of the VPD space (from 0x0 to 0xff) and output
any pages found. This option ignores the contents of VPD page

0x0 which should contain a list of all supported VPD pages. How?
ever some vendors either forget to list some standard pages or
perhaps purposely don't list vendor specific pages which are in
the range 0xc0 to 0xff.

If the --page=PG option is not given and this option is given
once then the scan is from VPD page number 0x80 to 0xff inclu?
sive. If the --page=PG option is given then the scan is from
0x80 to PG inclusive. If this option is given twice then the
scan starts at VPD page 0x0.

The sdparm utility which lists mode and VPD pages also has a
--examine option will similar functionility.

-f, --force

As a sanity check, the normal action when fetching VPD pages
other than page 0x0 (the "Supported VPD pages" VPD page), is to
first fetch page 0x0 and only if the requested page is one of
the supported pages, to go ahead and fetch the requested page.
When this option is given, skip checking of VPD page 0x0 before
accessing the requested VPD page. The prior check of VPD page
0x0 is known to crash certain USB devices, so use with care.

-h, --help

outputs the usage message summarizing command line options then
exits. Ignores DEVICE if given.

-H, --hex

outputs the requested VPD page in ASCII hexadecimal. Can be used
multiple times, see section on the ATA information vpd page.
To generate output suitable for placing in a file that can be
used by a later invocation with the --inhex=FN option, use the
'-HHHH' option (e.g. 'sg_vpd -p di -HHHH /dev/sg3 >
dev_id.hex'). The reason '-HHHH' is used is to flag that un?
adorned hexadecimal (without other text or address offsets) is
sent to stdout.

-i, --ident

decode the device identification (0x83) VPD page. When used once

this option has the same effect as '--page=di'. When use twice
then the short form of the device identification VPD page's log‐
ical unit designator is decoded. In the latter case this option
has the same effect as '--quiet --page=di_lu'.

-I, --inhex=FN

FN is expected to be a file name (or '-' for stdin) which con‐
tains ASCII hexadecimal or binary representing a VPD page (or a
standard INQUIRY) response. This utility will then decode that
response. It is preferable to also supply the --page=PG option,
if not this utility will attempt to guess which VPD page (or
standard INQUIRY) the response is associated with. The hexadeci‐
mal should be arranged as 1 or 2 digits representing a byte each
of which is whitespace or comma separated. Anything from and in‐
cluding a hash mark to the end of line is ignored. If the --raw
option is also given then FN is treated as binary.

-l, --long

when decoding some VPD pages, give a little more output. For ex‐
ample the ATA Information VPD page only shows the signature (in
hex) and the IDENTIFY (PACKET) DEVICE (in hex) when this option
is given.

-m, --maxlen=LEN

where LEN is the (maximum) response length in bytes. It is
placed in the cdb's "allocation length" field. If not given (or
LEN is zero) then 252 is used (apart from the ATA Information
VPD page which defaults to 572) and, if the response indicates
this value is insufficient, another INQUIRY command is sent with
a larger value in the cdb's "allocation length" field. If this
option is given and LEN is greater than 0 then only one INQUIRY
command is sent. Since many simple devices implement the INQUIRY
command badly (and do not support VPD pages) then the safest
value to use for LEN is 36. See the sg_inq man page for the more
information.

-p, --page=PG

where PG is the VPD page to be decoded or output. The PG argu‐
ment can either be an abbreviation, a number or a pair or num‐
bers/abbreviations separated by a comma. The VPD page abbrevia‐
tions can be seen by using the --enumerate option. If a number
is given it is assumed to be decimal unless it has a hexadecimal
indicator which is either a leading '0x' or a trailing 'h'. If
one number is given then it is assumed to be a VPD page number.
If two numbers (or abbreviations) are given then the second one
is the same as VP (see the --vendor=VP option). If this option
is not given (nor '-i', '-l' nor '-V') then the "Supported VPD
pages" (0x0) VPD page is fetched and decoded. If PG is '-1' or
'sinq' then the standard INQUIRY response is output. This option
may also be used with the --enumerate (see its description).
If PG is not found in the 'Supported VPD pages' VPD page (0x0)
then EDOM is returned. To bypass this check use the --force op‐
tion.

-q, --quiet

suppress the amount of decoding output.

-r, --raw

if not used with --inhex=FN then output requested VPD page in
binary. The output should be piped to a file or another utility
when this option is used. The binary is sent to stdout, and er‐
rors are sent to stderr.

if used with --inhex=FN then the contents of FN is treated as
binary.

-M, --vendor=VP

where VP is a vendor (e.g. "sea" for Seagate) or vendor/product
acronym (e.g. "hp3par" for the 3PAR array from HP). Many vendors
have re-used the numbers at the beginning of the vendor specific
VPD page range (e.g. page 0xc0) and this option is a way of se‐
lecting only those which are of interest. Using a VP of "xxx"
will list the available acronyms.

If this option is used with --page=PG and PG is an acronym then

this option is ignored. If PG is a number (e.g. 0xc0) then VP is

used to choose the which vendor specific page (e.g. sharing page

number 0xc0) to decode.

-v, --verbose

increases the level or verbosity.

-V, --version

print out version string then exit.

ATA INFORMATION VPD PAGE

This VPD page (0x89 or 'ai') is defined by the SCSI to ATA Translation

standard. It contains information about the SAT layer, the "signature"

of the ATA device and the response to the ATA IDENTIFY (PACKET) DEVICE

command. The latter part has 512 bytes of identity, capability and set?

tings data which the hdparm utility is capable of decoding (so this

utility doesn't decode it).

To unclutter the output for this page, the signature and the IDENTIFY

(PACKET) DEVICE response are not output unless the --long option (or

--hex or --raw) are given. When the --long option is given the IDENTIFY

(PACKET) DEVICE response is output as 256 (16 bit) words as is the

fashion for ATA devices. To see that response as a string of bytes use

the '-HH' option. To format the output suitable for hdparm to decode

use either the '-HHH' or '-rr' option. For example if 'dev/sdb' is a

SATA disk behind a SAT layer then this command: 'sg_vpd -p ai -HHH

/dev/sdb | hdparm --Istdin' should decode the ATA IDENTIFY (PACKET) DE?

VICE response.

NOTES

Since some VPD pages (e.g. the Extended INQUIRY page) depend on set?

tings in the standard INQUIRY response, then the standard INQUIRY re?

sponse is output as a pseudo VPD page when PG is set to '-1' or 'sinq'.

Also the decoding of some fields (e.g. the Extended INQUIRY page's SPT

field) is expanded when the '--long' option is given using the standard

INQUIRY response information (e.g. the PDT and the PROTECT fields).

In the 2.4 series of Linux kernels the DEVICE must be a SCSI generic

(sg) device. In the 2.6 series block devices (e.g. disks and ATAPI

DVDs) can also be specified. For example "sg_inq /dev/sda" will work in
the 2.6 series kernels. From lk 2.6.6 other SCSI "char" device names
may be used as well (e.g. "/dev/st0m").

The DEVICE is opened with a read-only flag (e.g. in Unix with the
O_RDONLY flag).

EXIT STATUS

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

EXAMPLES

The examples in this page use Linux device names. For suitable device
names in other supported Operating Systems see the sg3_utils(8) man
page.

To see the VPD pages that a device supports, use with no options. The
command line invocation is shown first followed by a typical response:

  # sg_vpd /dev/sdb

Supported VPD pages VPD page:

  Supported VPD pages [sv]

  Unit serial number [sn]

  Device identification [di]

  Extended inquiry data [ei]

  Block limits (SBC) [bl]

To see the VPD page numbers associated with each supported page then
add the '--long' option to the above command line. To view a VPD page
either its number or abbreviation can be given to the '--page=' option.
The page name abbreviations are shown within square brackets above. In
the next example the Extended inquiry data VPD page is listed:

  # sg_vpd --page=ei /dev/sdb

extended INQUIRY data VPD page:

  ACTIVATE_MICROCODE=0 SPT=0 GRD_CHK=0 APP_CHK=0 REF_CHK=0

  UASK_SUP=0 GROUP_SUP=0 PRIOR_SUP=0 HEADSUP=1 ORDSUP=1 SIMPSUP=1

  WU_SUP=0 CRD_SUP=0 NV_SUP=0 V_SUP=0

  P_I_I_SUP=0 LUICLR=0 R_SUP=0 CBCS=0

  Multi I_T nexus microcode download=0

Extended self-test completion minutes=0

  POA_SUP=0 HRA_SUP=0 VSA_SUP=0

To check if any protection types are supported by a disk use the

'--long' option on the Extended inquiry data VPD page:

  # sg_vpd --page=ei --long /dev/sdb

  extended INQUIRY data VPD page:

   ACTIVATE_MICROCODE=0

   SPT=1 [protection types 1 and 2 supported]

   GRD_CHK=1

   ....

Search for the name (and acronym) of all pages that share VPD page num?

ber 0xb0 .

  # sg_vpd --page=0xb0 --enumerate

  Matching standard VPD pages:

   bl   0xb0   Block limits (SBC)

   oi   0xb0   OSD information

   sad   0xb0   Sequential access device capabilities (SSC)

Some examples follow using the "--all" option. Send an ASCII hexadeci?

mal representation of all VPD pages to a file:

  # sg_vpd --all -HHHH /dev/sg3 > all_vpds.hex

At some later time that file could be decoded with:

  # sg_vpd --all --inhex=all_vpds.hex

To do the equivalent as the previous example but use a file containing

binary:

  # sg_vpd --all --raw /dev/sg3 > all_vpds.bin

  # sg_vpd --all --raw --inhex=all_vpds.bin

Notice that "--raw" must be given with the second (--inhex) invocation

to alert the utility that all_vpds.bin contains binary as it assumes

ASCII hexadecimal by default. Next we only decode T10 specified VPD

pages excluding vendor specific VPD pages that start at page number

0xc0:

  # sg_vpd --all --page=0xbf --raw --inhex=all_vpds.bin

In Linux, binary images of some important VPD page responses (e.g. 0,

80h and 83h) are cached in files within the sysfs pseudo file system. Since VPD pages hardly ever change their contents, decoding those files will give the same output as probing the device with the added benefit that decoding those files doesn't need root permissions. The long and short forms are shown:

    sg_vpd --raw --inhex=/sys/class/scsi_generic/sg3/device/vpd_pg83

    sg_vpd -rI /sys/class/scsi_generic/sg3/device/vpd_pg83

If /dev/sg3 is a disk at 2:0:0:0 , then this invocation should give more verbose output but essentially the same as the previous two exam‐ ples.

    sg_vpd -v -r -I /sys/class/scsi_disk/2:0:0:0/device/vpd_pg83

Further examples can be found on the https://sg.danny.cz/sg/sg3_utils.html web page.

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REPORTING BUGS

Report bugs to <dgilbert at interlog dot com>.

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SEE ALSO

sg_inq(sg3_utils), sg3_utils(sg3_utils), sdparm(sdparm), hdparm(hdparm)

sg3_utils-1.47   June 2021   SG_VPD(8)