hdparm ATA drive tuning

CONCEPTS

hdparm talks ATA to SATA and IDE drives and needs root. Always name the whole device (/dev/sdX), not a partition.

Visible disk what the OS sees
- **HPA** -N hides the tail
  - **DCO** vendor-level limits
    - **Native drive** true capacity

Settings such as -B, -S and -W are lost at power-off. Re-apply them at boot via udev or a service.

Options marked dangerous in the man page can destroy data or the drive. Back up, and double-check the device name.

IDENTIFY AND INFO

`hdparm -I <dev>`
Query drive for full identify data

`hdparm -i <dev>`
Show identify data cached at boot

`hdparm <dev>`
Show basic settings (same as -v)

`hdparm -g <dev>`
Show geometry and start offset

`hdparm -V`
Print hdparm version

`hdparm -I <dev> | grep -i model`
Pick out model, serial, firmware

`hdparm -z <dev>`
Re-read partition table

`hdparm --fibmap <file>`
Print physical extents of a file

BENCHMARKS

`hdparm -t <dev>`
Time buffered disk reads

`hdparm -T <dev>`
Time cache reads (CPU and RAM)

`hdparm -tT <dev>`
Run both timings

`hdparm -t --direct <dev>`
Read test bypassing page cache

BENCHMARKS (cont.)

`hdparm -t --offset <GiB> <dev>`
Read test at an offset into the disk

`hdparm -f <dev>`
Flush device buffer cache on exit

POWER MANAGEMENT

`hdparm -C <dev>`
Show power mode (active, standby, sleeping)

`hdparm -B <n> <dev>`
Set APM level (1-254)

`hdparm -B <dev>`
Show current APM level

`hdparm -S <n> <dev>`
Set standby (spin-down) timeout

`hdparm -S 0 <dev>`
Disable the spin-down timer

`hdparm -y <dev>`
Put drive into standby now

`hdparm -Y <dev>`
Put drive to sleep now

`hdparm --idle-immediate <dev>`
Enter a lower power idle state

`hdparm -M <n> <dev>`
Set acoustic level (128 quiet, 254 fast)

`hdparm -J <n> <dev>`
Set WD idle3 park timer

CACHING AND TUNING

`hdparm -W <dev>`
Show write-cache setting

`hdparm -W 0 <dev>`
Disable write cache

`hdparm -W 1 <dev>`
Enable write cache

`hdparm -A 1 <dev>`
Enable drive read-lookahead

`hdparm -a <n> <dev>`
Set filesystem read-ahead (sectors)

`hdparm -r 1 <dev>`
Mark device read-only

`hdparm -r 0 <dev>`
Mark device read-write

HPA AND DCO

`hdparm -N <dev>`
Show current and native max sectors

`hdparm -N <n> <dev>`
Set visible sector count

`hdparm -N p<n> <dev>`
Set the limit permanently

`hdparm --dco-identify <dev>`
Show DCO-hidden features

SECURITY ERASE

`hdparm -I <dev> | grep -A8 Security`
Check lock and erase support

`hdparm --security-set-pass <pwd> <dev>`
Set a user password on the drive

`hdparm --security-erase <pwd> <dev>`
Erase the whole drive

`hdparm --security-unlock <pwd> <dev>`
Unlock a locked drive

`hdparm --security-disable <pwd> <dev>`
Remove the drive password

SECTORS AND SSDS

`hdparm --read-sector <lba> <dev>`
Dump one sector in hex

RECIPES

Spin down idle disks after 20 minutes

```
sudo hdparm -B 127 /dev/sdX
sudo hdparm -S 240 /dev/sdX
sudo hdparm -C /dev/sdX
```

Compare disks

```
sudo hdparm -tT /dev/sda
sudo hdparm -t --direct /dev/sda
# repeat 2-3 times, idle system
```

Secure erase a SATA drive

```
sudo hdparm -I /dev/sdX | grep -A8
Security
# must say: not frozen
sudo hdparm --user-master u --
security-set-pass p /dev/sdX
sudo hdparm --user-master u --
security-erase p /dev/sdX
```