Advanced Encoding Guide - x265

The official documentation for x265 is very good, so this page will only cover recommended values and switches.

Source-independent settings

- `--preset veryslow` or `slower`
- `--no-rect` for slower computers. There's a slight chance it'll prove useful, but it probably isn't worth it.
- `--no-amp` is similar to `rect`, although it seems to be slightly more useful.
- `--no-open-gop`
- `--no-cutree` since this seems to be a poor implementation of `mbtree`.
- `--rskip 0` `rskip` is a speed up that gives up some quality, so it's worth considering with bad CPUs.
- `--ctu 64`
- `--min-cu-size 8`
- `--rdoq-level 2`
- `--max-merge 5`
- `--rc-lookahead 60` although it's irrelevant as long as it's larger than min-keyint
- `--ref 6` for good CPUs, something like `4` for worse ones.
- `--bframes 16` or whatever your final bframes log output says.
- `--rd 3` or `4` (they're currently the same). If you can endure the slowdown, you can use `6`, too, which allows you to test `--rd-refine`.
- `--subme 5`. You can also change this to `7`, but this is known to sharpen.
- `--merange 57` just don't go below `32` and you should be fine.
- `--high-tier`
- `--range limited`
- `--aud`
- `--repeat-headers`

Source-dependent settings

- `--output-depth 10` for 10-bit output.
- `--input-depth 10` for 10-bit input.
- `--colorprim 9` for HDR, `1` for SDR.
- `--colormatrix 9` for HDR, `1` for SDR.
- `--transfer 16` for HDR, `1` for SDR.
- `--hdr10` for HDR.
- `--hdr10-opt` for 4:2:0 HDR, `--no-hdr10-opt` for 4:4:4 HDR and SDR.
- `--dhdr10-info /path/to/metadata.json` for HDR10+ content with metadata extracted using hdr10plus_parser.

- `--dolby-vision-profile 8.1` specified Dolby Vision profile. x265 can encode only to profiles `5`, `8.1`, and `8.2`
- `--dolby-vision-rpu /path/to/rpu.bin` for Dolby Vision metadata extracted using dovi_tool.
- `--master-display "G(8500,39850)B(6550,2300)R(35400,14600)WP(15635,16450)L(10000000,20)"` for BT.2020 or `G(13250,34500)B(7500,3000)R(34000,16000)WP(15635,16450)L(10000000,1)` for Display P3 mastering display color primaries with the values for L coming from your source's MediaInfo for mastering display luminance.
  For example, if your source MediaInfo reads:

- > Mastering display color primaries : BT.2020
  >
  > Mastering display luminance : min: 0.0000 cd/m2, max: 1000 cd/m2
  >
  > Maximum Content Light Level : 711 cd/m2
  >
  > Maximum Frame-Average Light Level : 617 cd/m2

  This means you set `"G(8500,39850)B(6550,2300)R(35400,14600)WP(15635,16450)L(10000000,0)"`
- `--max-cll "711,617"` from your source's MediaInfo for maximum content light level and maximum frame-average light level. The values here are from the above example.
- `--cbqpoffs` and `--crqpoffs` should usually be between -3 and 0 for 4:2:0. For 4:4:4, set this to something between 3 and 6. This sets an offset between the bitrate applied to the luma and the chroma planes.
- `--qcomp` between `0.60` and `0.80`.
- `--aq-mode 4`, `3`, `2`, `1`, or `--hevc-aq` with `4` and `3` usually being the two best options. If using aMod, there is an extra mode `5`. These do the following:
  1. Standard adaptive quantization, simply add more bits to complex blocks.
  2. Adaptive quantization with auto-variance.
  3. Adaptive quantization with auto-variance and bias to dark scenes.
  4. Adaptive quantization with auto-variance and better edge preservation.
  5. Adaptive quantization with auto-variance, better edge preservation, and bias to dark scenes. Only in aMod.
  6. `hevc-aq` "scales the quantization step size according to the spatial activity of one coding unit relative to frame average spatial activity. This AQ method utilizes the minimum variance of sub-unit in each coding unit to represent the coding unit's spatial complexity." Like most of the x265 documentation, this sounds a lot fancier than it is. Don't enable with other modes turned on.

- `--aq-strength` between `0.80` and `1.40` for AQ modes 1-3 or `0.50` and `1.00` for AQ mode 4.
- `--aq-bias-strength` between `0.50` and `1.20` if using aMod and an AQ mode with dark bias. This is a multiplier with lower numbers lowering the bias. Default is `1.00`.
- `--deblock -4:-4` to `0:0`, similar to x264. Test at least -3:-3 to -1:-1 with live action, -2:-2 to 0:0 with animation.
- `--ipratio` and `--pbratio` same as x264 again.
- `--psy-rd 0.80` to `2.00`, similar-ish effect to x264. Values are generally higher than with x264, though.
- `--psy-rdoq` anything from `0.00` to `2.00` usually.
- `--no-sao` is usually best, but if your encode suffers from a lot of ringing, turn SAO back on. SAO does tend to blur quite heavily.
- `--no-strong-intra-smoothing` on sharp/grainy content, you can leave this on for blurry content, as it's an additional blur that'll help prevent banding.

Revision #1
Created 19 October 2024 16:10:15 by Admin
Updated 19 October 2024 16:10:38 by Admin