English version is derived from the [x264](https://www.nazorip.site/archives/63) x265 Ultimate Tutorial by iAvoe/iiAvoe

|  |  |
| --- | --- |
| [**LigH**](http://www.mediafire.com/?6lfp2jlygogwa) | .hevc GCC10 [single .exe 8-10-12bit] w/ x86 w/ libx265.dll |
| [**Rigaya**](https://drive.google.com/drive/u/0/folders/0BzA4dIFteM2dWEpvWGZXV3ZhdTA) | .hevc GCC 9.3 [8-10-12bit] w/ x86 |
| [**Patman**](http://www.mediafire.com/folder/arv5xmdqyiczc) | .hevc GCC 11+MSVC1925 [8-10-12bit] |
| [**ShortKatz**](https://forum.doom9.org/showthread.php?p=1937773#post1937773) | arm64~64e with x86 ? [?] macOS compiling needed |
| **[DJATOM-aMod](https://github.com/DJATOM/x265-aMod/releases/)** | Intel, AMD zen1~2 [10bit], zen3 [10-12bit] GCC 10.2.1+GCC10.3 |
| **[MeteorRain-yuuki](https://down.7086.in/)** | lsmash.mkv/mp4或.hevc [lavf isn't as reliable as pipe acc. rumor] GCC 9.3+ICC 1900+MSVC 1916 [8][10][12bit]+[8-10-12bit] |
| [**ffmpeg**](http://ffmpeg.org/download.html) all OS compatible. backup link: ottverse.com/ffmpeg-builds | |
| [**mpv**](https://mpv.io/installation/) **player** a small sized opensource video player with no color issues afaik | |
| [**x265GuiEx**](https://drive.google.com/drive/folders/0BzA4dIFteM2dRkRzWXZMT0lkM2M) **(Rigaya)** 日本語, compiles by auto-setup, [link](https://aviutl.info/x265guiex/#toc4) for tutorial | |
| [**Voukoder**; **V-Connector**](https://www.voukoder.org/)free Premiere/Vegas/AE/Davinci Studio export plugin with ffmpeg's internal encoders, and good encoding presets to choose | |
| [**ffprobe**](http://ffmpeg.org/download.html)metadata & media format reader in CLI from the same origin as ffmpeg (within the ffmpeg download zip file), see [tutorial page](https://nazorip.site/archives/169/) (with webpage translate) | |

### x265.exe command line for new users

[Download ffmpeg, ffprobe/MediaInfo & x265 to a memorable path] Here they are under D:\

[Open CMD/PowerShell or Linux/MacOS Bash/Terminal, input path\to\ffmpeg, ffprobe, x265, then press enter] i.e., here they are D:\x265-10bit.exe -V and D:\ffmpeg.exe

[Check ffmpeg build ver.] C:\folder\ffmpeg.exe; [x265 build ver.] C:\folder\x265.exe -V

[Auto-filling] Write PATH/filename partially, and hit [Tab]

### Get source video metadata w/ ffprobe:

ffprobe.exe -i ".\video.mp4" -select\_streams v:0 -v error -hide\_banner -show\_streams -show\_frames -read\_intervals "%+#1" -show\_entries frame=top\_field\_first:stream=codec\_long\_name,width,coded\_width,height,coded\_height,pix\_fmt,color\_range,field\_order,r\_frame\_rate,avg\_frame\_rate,nb\_frames -of ini

### Variable framerate:

Used on mobile devices to save battery, causing compatibility issues. Add ffmpeg option -vsync cfr to convert to cfr

### Rectangular pixel:

old & unsupported lossy compression. Swap src video if possible

### Encoding duration:

number of frames÷encoding speed (fps)=required time(second)

### ffmpeg-pipe-x265 example:

D:\ffmpeg.exe -i F:\video.mov -an -pix\_fmt yuv420p10 -f yuv4mpegpipe -strict unofficial - | D:\x265-10bit.exe --preset slow --me umh --subme 5 --merange 48 --weightb --aq-mode 4 --bframes 5 --ref 3 --hash 2 --allow-non-conformance --qg-size 16 --rd 3 --limit-modes --limit-refs 1 --rskip 1 --splitrd-skip --no-sao --tskip --colorprim bt2020 --colormatrix bt2020nc --transfer smpte2084 --y4m - --output F:\done.hevc 2>D:\Desktop\ffmpeg\_or\_x265\_error\_logs.txt

### Get the correct -pix\_fmt value:

Get source video metadata with MediaInfo by dragging the file onto its program window (first-time use may require selecting [View]-[Tree]), find [Colorspace], [Color Sampling] & [Bit Depth]. (see ffprobe's method above). Usually they are [YUV], [4:2:0] & [8bit], which corresponds to yuv420p from the list below, x265 has a smaller set of supported formats than ffmpeg, they are:

yuv420p, yuv422p, yuv444p, yuv420p10le, yuv420p12le, yuv422p10le, yuv422p12le, yuv444p10le, yuv444p12le, yuv444p10le, yuv444p12le, gray, gray10le, gray12le, nv12, nv16

### Select bit depth for x264/5:

One single x265.exe contain 8-10-12bit (Check with x265.exe -V) are set with option -D, such as -D 10 to encode in 10bit; or the downloaded zip contains separate x265-8bit.exe, x265-10bit.exe, simply call the corresponding executable

### Triangle rule of encoding:



The methodical way to develop encoding strategy & hardware choice. A dedicated solution delivers an unbalanced encoding result with heavy compromise, a general purposed solution in contrast provides a balanced solution that works for most applications. Faster hardware fits with general purposed, slower often fits dedicated solution

### ffmpeg, VS, avs2yuv pipe

ffmpeg -i video\_in.mp4 -an -f yuv4mpegpipe -strict unofficial - | x265 --y4m - --output

ffmpeg -i video\_in.mp4 -an -f rawvideo - | x265.exe --input-res <WxH> --fps <int/flo/frac> - --output

-format, -an bypass audio, -strict unofficial lift std. restrictions, --y4m stands for "YUV for MPEG", both "-" passes stream through the Unix pipe

VSpipe.exe [script].vpy --y4m - | x265.exe - --y4m --output

VSpipe/avs2yuv [script].vpy - | x265.exe --input-res [WxH] --fps [] - --output

avs2yuv.exe [script].avs -raw - | x265.exe --input-res [WxH] --fps [] - --output

### ffmpeg built-in scaling:

-sws\_flags bicubic bitexact gauss neighbor bicublin lanczos spline +full\_chroma\_int +full\_chroma\_inp +accurate\_rnd

Example:

-sws\_flags bitexact+full\_chroma\_int+full\_chroma\_inp+accurate\_rnd)

### ffmpeg multiplex all tracks (container format depends on output extension)

* ffmpeg.exe -i ".\v\_in.hevc" -an -c:v copy -i ".\audio\_in.aac" -c:a copy -i ".\subtitle\_in.srt" -c:s copy "mux\_out.mkv"
* ffmpeg.exe -i ".\v\_in.hevc" -an -c:v copy -i ".\audio1.aac" -c:a copy -i ".\aud2.aac" -c:a copy -i ".\sub1.ass" -c:s copy -i ".\sub2.ass" -c:s copy "mux\_out.mkv"

### Subtitle support of different container formats:

[Wikipedia - Subtitle formats support](https://en.wikipedia.org/wiki/Comparison_of_video_container_formats)

### QAAC audio encoding [tutorial](https://www.nazorip.site/archives/44/) or [Github](https://github.com/iAvoe/QAAC-Tutorial-Standalone/blob/master/%E6%95%99%E7%A8%8B.md)

(use webpage translation)

### 

### ffmpeg replace audio track, itoffset±seconds to align:

* ffmpeg.exe -i ".\mux\_in.mov" -i ".\new\_audio.aac" -c:v copy -map 0:v:0 -map 1:a:0 -c:a copy -itsoffset 0 ".\new\_mux\_out.mov"

**ffmpeg: small thread\_queue\_size warning:**

* -thread\_queue\_size<(avg src bitrate kbps+1000)/usable CPU core count>

### Batch: resume CMD prompt on finish:

cmd /k

### + show windows build version:

cmd -k

### x265 HDR settings:

### HDR Tags

**Color**

Primaries

--master-display <manually tagging for instruct video players or decoders to correctly play HDR sources

DCI-P3: G(13250,34500)B(7500,3000)R(34000,16000)WP(15635,16450)L(maxCLL×10000,1)

bt709: G(15000,30000)B(7500,3000)R(32000,16500)WP(15635,16450)L(maxCLL×10000,1)

bt2020: G(8500,39850)B(6550,2300)R(35400,14600)WP(15635,16450)L(maxCLL×10000,1)

* Check HDR source's metadata for color space，then copy the corresponding settings above as param value
* max for L has no standards，which means every video could be different, check your source stream

DCI-P3: G(x0.265, y0.690), B(x0.150, y0.060), R(x0.680, y0.320), WP(x0.3127, y0.329)

bt709: G(x0.30, y0.60), B(x0.150, y0.060), R(x0.640, y0.330), WP(x0.3127,y0.329)

bt2020: G(x0.170, y0.797), B(x0.131, y0.046), R(x0.708, y0.292), WP(x0.3127,y0.329)>

--max-cll <maxCLL,maxFALL>max, average pel intensity. Skip if MediaInfo doesn't get those values out

--colormatrix <as src, e.g.: gbr bt709 fcc bt470bg smpte170m YCgCo bt2020nc bt2020c smpte2084 ictcp>

--transfer <as source, e.g.: gbr bt709 fcc bt470bg smpte170m YCgCo bt2020nc bt2020c smpte2084 ictcp>

**Dolby vision**

: DV-MEL (BL+RPU) & DV-FEL (BL+EL+RPU), x265 support 3 profiles of DV-MEL

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Profile | Codec | BL:EL resolution | x265 supported | Gamma | Space |
| 4 | 10bit hevc | 1:1/4 |  | SDR | YCbCr |
| 5 | BL only (DV-MEL) | √ |  | ICtCp |
| 7 | 4K=1:1/4; 1920x1080=1:1 |  | UHD BluRay | YCbCr |
| 8.1 | BL only (DV-MEL) | √ | HDR10 |
| 8.2 | √ | SDR |
| 8.4 |  | HLG |
| 9 | 8bit avc | BL only (DV-MEL) |  | SDR | YCbCr |

--dolby-vision-profile

<select 5/8.1 (HDR10)/8.2>8.1 needs --master-display & --hdr10-opt

--dolby-vision-rpu

<path>specify path to input RPU binary (.bin)

Note: Encoding speed reference content is temporarily removed due to change in settings

# Gen-Purpose·Simple·Low-quality

no more configurable options for simplicity, only a few fps slower than top

**splt-trans**

**me-mc**

**adpt quant**

**rate control**

**io**

**tgt. depth**

**multi node**

**others**

**colorspace**

--preset slow

--me umh --subme 5 --merange 48 --weightb

--aq-mode 4

--bframes 5 --ref 3

--hash 2 --allow-non-conformance

-D 8/10/12 (default 8bit or lowest built in x265.exe, same or convert to lower depth only w/ --dither)

--pools ,,,, (e.g.: "-,+"states a 2-node computer & use node 2, don't use >1 node per encode)

crop: --display-window < integer "←,↑,→,↓" pixels >, ≥22 core cpu opt.:--pme, interlaced: --field, pixel depth reduction quality+:--dither, begin; ending frame:--seek; --frames, crf/abr resist noise factor:--rc-grain

ffmpeg -pix\_fmt yuv420p / yuv422p / yuv444p / yuv420p10 / yuv422p10 / yuv444p10…

α——(ffmpeg pipe) x265 CLI parameters

* ffmpeg.exe -loglevel 16 -hwaccel auto -y -hide\_banner -i ".\导入.mp4" -an -f yuv4mpegpipe -strict unofficial -pix\_fmt 〇 - | x265.exe --preset slow --me umh --subme 5 --merange 48 --weightb --aq-mode 4 --bframes 5 --ref 3 --hash 2 --allow-non-conformance --y4m - --output ".\v\_out.hevc"

β——libx265 CLI, copy audio & multiplex to MP4

* ffmpeg.exe -loglevel 16 -hwaccel auto -y -hide\_banner -i ".\v\_in.mp4" -c:v libx265 -pix\_fmt 〇 -x265-params "preset=slow:me=umh:subme=5:merange=48:weightb=1:bframes=5:ref=3:hash=2:allow-non-conformance=1" -fps\_mode passthrough -c:a copy ".\v\_out.mp4"

### γ——Libkvazaar CLI (in dev, crf mode missing)

* ffmpeg.exe -loglevel 16 -hwaccel auto -y -hide\_banner -i ".\v\_in.mp4" -c:v libkvazaar -pix\_fmt 〇 -kvazaar-params "limit-tu=1:tr-depth-intra=2:pu-depth-intra=4:pu-depth-inter=3:smp=1:amp=1:bipred=1:me=tz:subme=4:merange=48:me-early-termination=off:max-merge=2:ref=3:open-gop=0:period=360:gop=16:transform-skip=1:qp=16:fast-residual-cost=1:early-skip=1:max-merge=5:rd=3:mv-rdo=1:rdoq-skip=1:intra-rdo-et=1:sao=edge:hash=checksum" -fps\_mode passthrough -c:a copy ".\v\_out.mp4"

# Standard.

Lots of custom options for optimizations

--tu-intra-depth 3 --tu-inter-depth 3 --limit-tu 1 --rdpenalty 1 --rect

--me umh --subme <24fps=3, 48fps=4, 60fps=5, 100fps=6> --merange <1920:1080=48, 2560:1440=52, 3840:2160=56> --weightb

--ref 3 --max-merge <2fast, 3, 4slow> --early-skip --no-open-gop --min-keyint 5 --keyint <9×fps> --fades --bframes 8 --b-adapt 2 --radl 3 <sharp source: --pbratio 1.2>

<fast: --fast-intra / mid: leave blank / slow: --b-intra / slower: --constrained-intra >

--crf <18~20 HQ 19 ~22 HD> --crqpoffs -3 --cbqpoffs -1

--rdoq-level <1fast，2slow>

<anime source: --hevc-aq, remove aq-mode> --aq-mode 4 --aq-strength <flat=0.8, edgy=1>

--rd 3 --limit-modes --limit-refs 1 --rskip <3fast, 2mid, 1slow> --rc-lookahead <3×fps, greater than bframes> --tskip-fast --rect <veryslow: --amp>

--psy-rd <film=1.6，anime=0.6, +0.6 if ctu=64, -0.6 if ctu=16> --splitrd-skip <EXP: --qp-adaptation-range 3>

--limit-sao --sao-non-deblock --deblock 0:-1

--hash 2 --allow-non-conformance <NAS streaming: --idr-recovery-sei>

-D 8/10/12 (default 8bit or lowest built in x265.exe, same or convert to lower depth only w/ --dither)

--pools ,,,, (e.g.: "-,+"states a 2-node computer & use node 2, don't use >1 node per encode)

crop:--display-window < integer "←,↑,→,↓" pixels >, ≥22 core cpu opt.:--pme, interlaced: --field, pixel depth reduction quality+:--dither, begin; ending frame:--seek; --frames, crf/abr resist noise factor:--rc-grain

ffmpeg -pix\_fmt yuv420p / yuv422p / yuv444p / yuv420p10 / yuv422p10 / yuv444p10…

**splt-trans**

**me-mc**

**ref-rateol**

**intra coding**

**quantization**

**rdoq**

**adapt quant**

**md decision**

**rdo**

**deblock-sao**

**io**

**tgt. depth**

**multi node**

**others**

**colorspace**

α——(ffmpeg pipe) x265 CLI parameters

* ffmpeg.exe -loglevel 16 -hwaccel auto -y -hide\_banner -i ".\v\_in.mp4" -an -f yuv4mpegpipe -strict unofficial -pix\_fmt 〇 - | x265.exe --ctu 〇 --min-cu-size 16 --tu-intra-depth 3 --tu-inter-depth 3 --limit-tu 1 --rdpenalty 1 --me umh --subme 〇 --merange 〇 --weightb --ref 3 --max-merge 〇 --early-skip --no-open-gop --min-keyint 5 --fades --bframes 8 --b-adapt 2 --radl 3 --pbratio 1.2 --fast-intra --b-intra --constrained-intra --crf 〇 --crqpoffs -3 --cbqpoffs -1 --rdoq-level 〇 --aq-mode 4 --aq-strength 〇 --rd 3 --limit-modes --limit-refs 1 --rskip 〇 --rc-lookahead 〇 --tskip-fast --rect --amp --psy-rd 〇 --splitrd-skip --qp-adaptation-range 4 --limit-sao --sao-non-deblock --deblock 0:-1 --hash 2 --allow-non-conformance --y4m - --output ".\v\_out.hevc"

β——libx265 CLI, copy audio & multiplex to MP4

* ffmpeg.exe -loglevel 16 -hwaccel auto -y -hide\_banner -i ".\v\_in.mp4" -c:v libx265 -pix\_fmt 〇 -x265-params "ctu=〇:min-cu-size=16:tu-intra-depth=3:tu-inter-depth=3:limit-tu=1:rdpenalty=1:me=umh:subme=〇:merange=〇:weightb=1:ref=3:max-merge=〇:early-skip=1:open-gop=0:min-keyint=5:fades=1:bframes=8:b-adapt=2:radl=3:pbratio=1.2:fast-intra=1:b-intra=1:constrained-intra=1:crf=〇:crqpoffs=-3:cbqpoffs=-1:rdoq-level=〇:aq-mode=4:aq-strength=〇:rd=3:limit-modes=1:limit-refs=1:rskip=〇:rc-lookahead=〇:tskip-fast=1:rect=1:amp=1:psy-rd=〇:splitrd-skip=1:qp-adaptation-range=4:limit-sao=1:sao-non-deblock=1:deblock=0,-1:hash=2:allow-non-conformance=1" -fps\_mode passthrough -c:a copy ".\v\_out.mp4"

High Compression·Film·HQ Source

--ctu 64 --tu-intra-depth 4 --tu-inter-depth 4 --limit-tu 1

--me star --subme <24fps=3, 48fps=4, 60fps=5, 100fps=6> --merange 56 --weightb

--ref 3 --max-merge 5 --no-open-gop --min-keyint 3 --keyint <9×fps> --fades --bframes 8 --b-adapt 2 --radl 3 --analyze-src-pics

--constrained-intra --b-intra

--crf 21.8 --crqpoffs -3 --ipratio 1.2 --pbratio 1.5

--rdoq-level 2

--aq-mode 4 --aq-strength <clean source=0.8，film=1> --qg-size 8

--rd 5 --limit-refs 0 --rskip 0 --rc-lookahead <1.8×fps, greater than bframes> --rect --amp

--psy-rd <film=1.6, animation=0.6, +0.6 if ctu=64, -0.6 if ctu=16> <EXP: --qp-adaptation-range 3>

--deblock 0:0

--limit-sao --sao-non-deblock --selective-sao 3

--hash 2 --allow-non-conformance --nr-inter 8 <NAS streaming: --idr-recovery-sei>

-D 8/10/12 (default 8bit or lowest built in x265.exe, same or convert to lower depth only w/ --dither)

--pools ,,,, (e.g.: "-,+"states a 2-node computer & use node 2, don't use >1 node per encode)

crop:--display-window < integer "←,↑,→,↓" pixels >, ≥22 core cpu opt.:--pme, interlaced: --field, pixel depth reduction quality+:--dither, begin; ending frame:--seek; --frames, crf/abr resist noise factor:--rc-grain

ffmpeg -pix\_fmt yuv420p / yuv422p / yuv444p / yuv420p10 / yuv422p10 / yuv444p10…

**splt-trans**

**me-mc**

**ref-rateol**

**intra coding**

**quantization**

**rdoq**

**adapt.quant**

**md decision**

**rdo**

**deblock**

**sao**

**io**

**tgt. depth**

**multi node**

**others**

**color space**

α——(ffmpeg pipe) x265 CLI parameters

* ffmpeg.exe -loglevel 16 -hwaccel auto -y -hide\_banner -i ".\v\_in.mp4" -an -f yuv4mpegpipe -strict unofficial -pix\_fmt 〇 - | x265.exe --ctu 64 --tu-intra-depth 4 --tu-inter-depth 4 --limit-tu 1 --me star --subme 〇 --merange 〇 --weightb --ref 3 --max-merge 5 --no-open-gop --min-keyint 3 --keyint 〇 --fades --bframes 8 --b-adapt 2 --radl 3 --analyze-src-pics --constrained-intra --b-intra --crf 21.8 --crqpoffs -3 --ipratio 1.2 --pbratio 1.5 --rdoq-level 2 --aq-mode 4 --aq-strength 〇 --qg-size 8 --rd 5 --limit-refs 0 --rskip 0 --rc-lookahead 〇 --rect --amp --psy-rd 〇 --qp-adaptation-range 3 --deblock 0:-1 --limit-sao --sao-non-deblock --selective-sao 3 --hash 2 --allow-non-conformance --y4m - --output ".\v\_out.hevc"

β——libx265 CLI, copy audio & multiplex to MP4

* ffmpeg.exe -loglevel 16 -hwaccel auto -y -hide\_banner -i ".\v\_in.mp4" -c:v libx265 -pix\_fmt 〇 -x265-params "ctu=64:tu-intra-depth=4:tu-inter-depth=4:limit-tu=1:me=star:subme=〇:merange=〇:weightb=1:ref=3:max-merge=5:open-gop=0:min-keyint=3:keyint=〇:fades=1:bframes=8:b-adapt=2:radl=3:analyze-src-pics=1:constrained-intra=1:b-intra=1:crf=21.8:crqpoffs=-3:ipratio=1.2:pbratio=1.5:rdoq-level=2:aq-mode=4:aq-strength=〇:qg-size=8:rd=5:limit-refs=0:rskip=0:rc-lookahead=〇:rect=1:amp=1:psy-rd=〇:qp-adaptation-range=3:deblock=0,-1:limit-sao=1:sao-non-deblock=1:selective-sao=3:hash=2:allow-non-conformance=1" -fps\_mode passthrough -c:a copy ".\v\_out.mp4"

Stock Footage·Render & Reuse

--ctu 32

--me star --subme <24fps=3, 48fps=4, 60fps=5, 100fps=6> --merange <1920:1080=48, 2560:1440=52, 3840:2160=56> --analyze-src-pics

--max-merge 5 --early-skip --b-intra

--no-open-gop --min-keyint 1 --keyint <7×fps>--ref 3 --fades --bframes 7 --b-adapt 2

--crf 17 --crqpoffs -3 --cbqpoffs -2

--rd 3 --limit-modes --limit-refs 1 --rskip 1 --rc-lookahead <4×fps, , greater than bframes>

--splitrd-skip

--deblock -1:-1

--hash 2 --allow-non-conformance

--tune grain

-D 8/10/12

crop:--display-window < integer "←,↑,→,↓" pixels >, ≥22 core cpu opt.:--pme, interlaced: --field, pixel depth reduction quality+:--dither, begin; ending frame:--seek; --frames, crf/abr resist noise factor:--rc-grain, multi-node: --pools ,,,,

ffmpeg -pix\_fmt yuv420p / yuv422p / yuv444p / yuv420p10 / yuv422p10 / yuv444p10…

**block/unit spitting**

**motion est.&cmp**

**intraframe search**

**rate control**

**quantization**

**mode decision**

**R-D optimization**

**deblock**

**input output**

**tuning**

**tgt pixel bit depth**

**others**

**color space**

α——(ffmpeg pipe) x265 CLI parameters

* ffmpeg.exe -loglevel 16 -hwaccel auto -y -hide\_banner -i ".\v\_in.mp4" -an -f yuv4mpegpipe -strict unofficial -pix\_fmt 〇 - | x265.exe --ctu 32 --me star --subme 〇 --merange 〇 --analyze-src-pics --max-merge 5 --early-skip --b-intra --no-open-gop --min-keyint 1 --keyint 〇 --ref 3 --fades --bframes 7 --b-adapt 2 --crf 17 --crqpoffs -3 --cbqpoffs -2 --rd 3 --limit-modes --limit-refs 1 --rskip 1 --rc-lookahead 〇 --splitrd-skip --deblock -1:-1 --hash 2 --allow-non-conformance --tune grain --y4m - --output ".\v\_out.hevc"

β——libx265 CLI, copy audio & multiplex to MP4

* ffmpeg.exe -loglevel 16 -hwaccel auto -y -hide\_banner -i ".\v\_in.mp4" -c:v libx265 -pix\_fmt 〇 -x265-params "ctu=32:me=star:subme=〇:merange=〇:analyze-src-pics=1:max-merge=5:early-skip=1:open-gop=0:min-keyint=1:keyint=〇:ref=3:fades=1:bframes=7:b-adapt=2:radl=3:constrained-intra=1:b-intra=1:crf=17:crqpoffs =-3:cbqpoffs=-2:rd=3:limit-modes=1:limit-refs=1:rskip=1:rc-lookahead=〇:splitrd-skip=1:deblock=-1,-1:hash=2:allow-non-conformance=1:tune=grain" -fps\_mode passthrough -c:a copy ".\v\_out.mp4"

Anime·High Compression·Subtitle Groups

--tu-intra-depth 4 --tu-inter-depth 4 --max-tu-size 16

--me umh --subme <24fps=3, 48fps=4, 60fps=5, 100fps=6> --merange <1920:1080=48, 2560:1440=52, 3840:2160=56> --weightb --max-merge 5 --early-skip

--ref 3 --no-open-gop --min-keyint 5 --keyint <12×fps> --fades --bframes 16 --b-adapt 2 --radl 3 --bframe-bias 20

--constrained-intra --b-intra

--crf 22 --crqpoffs -4 --cbqpoffs -2 --ipratio 1.6 --pbratio 1.3 --cu-lossless --tskip

--psy-rdoq 2.3 --rdoq-level 2

--hevc-aq --aq-strength 0.9 --qg-size 8

--rd 3 --limit-modes --limit-refs 1 --rskip 1 --rc-lookahead <2.5×fps, greater than bframes> --rect --amp

--psy-rd 1.5 --splitrd-skip --rdpenalty 2 <EXP: --qp-adaptation-range 4>

--deblock 0:-1 --limit-sao --sao-non-deblock

--hash 2 --allow-non-conformance --single-sei <NAS streaming: --idr-recovery-sei>

-D 8/10/12 (default 8bit or lowest built in x265.exe, same or convert to lower depth only w/ --dither)

--pools ,,,, (e.g.: "-,+"states a 2-node computer & use node 2, don't use >1 node per encode)

crop:--display-window < integer "←,↑,→,↓" pixels >, ≥22 core cpu opt.:--pme, interlaced: --field, pixel depth reduction quality+:--dither, begin; ending frame:--seek; --frames, crf/abr resist noise factor:--rc-grain

ffmpeg -pix\_fmt yuv420p / yuv422p / yuv444p / yuv420p10 / yuv422p10 / yuv444p10…

**splt-trans**

**me-mc**

**ref-rateol**

**intra coding**

**quantization**

**rdoq**

**aq**

**md**

**rdo**

**deblock -sao**

**io**

**tgt. depth**

**multi nodes**

**others**

**color space**

α——(ffmpeg pipe) x265 CLI parameters

* ffmpeg.exe -loglevel 16 -hwaccel auto -y -hide\_banner -i ".\v\_in.mp4" -an -f yuv4mpegpipe -strict unofficial -pix\_fmt 〇 - | x265.exe --tu-intra-depth 4 --tu-inter-depth 4 --max-tu-size 16 --me umh --subme 〇 --merange 〇 --weightb --max-merge 5 --early-skip --ref 3 --no-open-gop --min-keyint 5 --keyint 〇 --fades --bframes 16 --b-adapt 2 --radl 3 --bframe-bias 20 --constrained-intra --b-intra --crf 22 --crqpoffs -4 --cbqpoffs -2 --ipratio 1.6 --pbratio 1.3 --cu-lossless --tskip --psy-rdoq 2.3 --rdoq-level 2 --hevc-aq --aq-strength 0.9 --qg-size 8 --rd 3 --limit-modes --limit-refs 1 --rskip 1 --rc-lookahead 〇 --rect --amp --psy-rd 1.5 --splitrd-skip --rdpenalty 2 --qp-adaptation-range 4 --deblock -1:0 --limit-sao --sao-non-deblock --hash 2 --allow-non-conformance --y4m - --output ".\v\_out.hevc"

β——libx265 CLI, copy audio & multiplex to MP4

* ffmpeg.exe -loglevel 16 -hwaccel auto -y -hide\_banner -i ".\v\_in.mp4" -c:v libx265 -pix\_fmt 〇 -x265-params "tu-intra-depth=4:tu-inter-depth=4:max-tu-size=16:me=umh:subme=〇:merange=〇:weightb=1:max-merge=5:early-skip=1:ref=3:open-gop=0:min-keyint=5:keyint=〇:fades=1:bframes=16:b-adapt=2:radl=3:bframe-bias=20:constrained-intra=1:b-intra=1:crf=22:crqpoffs=-4:cbqpoffs=-2:ipratio=1.6:pbratio=1.3:cu-lossless=1:tskip=1:psy-rdoq=2.3:rdoq-level=2:hevc-aq=1:aq-strength=0.9:qg-size=8:rd=3:limit-modes=1:limit-refs=1:rskip=1:rc-lookahead=〇:rect=1:amp=1:psy-rd=1.5:splitrd-skip=1:rdpenalty=2:qp-adaptation-range=4:deblock=-1,0:limit-sao=1:sao-non-deblock=1:hash=2:allow-non-conformance=1" -fps\_mode passthrough -c:a copy ".\v\_out.mp4"

Anime·ripper's cold war·HEDT+HQ Src Only

Paused dark flat scenes must look AS-IS, results less & slower compression than sub grps

--tu-intra-depth 4 --tu-inter-depth 4 --max-tu-size 4 --limit-tu 1 --rect --amp

--me star --subme <24fps=3, 48fps=4, 60fps=5, 100fps=6> --merange <1920:1080=52, 2560:1440=56, 3840:2160=64> --analyze-src-pics --weightb --max-merge 5

--ref 3 --no-open-gop --min-keyint 1 --keyint <12×fps> --fades --bframes 16 --b-adapt 2 --radl 2

--b-intra

--crf 17.1 --crqpoffs -5 --cbqpoffs -2 --ipratio 1.67 --pbratio 1.33 --cu-lossless

--psy-rdoq 2.5 --rdoq-level 2

<Normal: --hevc-aq --aq-strength 1.4; Jpsdr mod: --aq-auto 10 --aq-bias-strength 1.3 --aq-strength-edge 1.4 --aq-bias-strength 1.1> --qg-size 8

--rd 5 --limit-refs 0 --rskip 2 --rskip-edge-threshold 3 --rc-lookahead <2.5×fps, greater than bframes> --no-cutree

--psy-rd 1.5 --rdpenalty 2 <EXP: --qp-adaptation-range 5>

--deblock -2:-2

--limit-sao --sao-non-deblock --selective-sao 1

--hash 2 --allow-non-conformance --single-sei <NAS streaming: --idr-recovery-sei>

**splt-trans**

**me-mc**

**ref-rateol**

**intra coding**

**quantization**

**rdoq**

**aq**

**md**

**rdo**

**deblock**

**sao**

**io**

α——(ffmpeg pipe) std. x265 CLI parameters

* ffmpeg.exe -loglevel 16 -hwaccel auto -y -hide\_banner -i ".\v\_in.mp4" -an -f yuv4mpegpipe -strict unofficial -pix\_fmt 〇 - | x265.exe --tu-intra-depth 4 --tu-inter-depth 4 --max-tu-size 4 --limit-tu 1 --rect --amp --me star --subme 〇 --merange 〇 --analyze-src-pics --weightb --max-merge 5 --ref 3 --no-open-gop --min-keyint 1 --keyint 〇 --fades --bframes 16 --b-adapt 2 --radl 2 --b-intra --crf 17.1 --crqpoffs -5 --cbqpoffs -2 --ipratio 1.67 --pbratio 1.33 --cu-lossless --psy-rdoq 2.5 --rdoq-level 2 --hevc-aq --aq-strength 1.4 --qg-size 8 --rd 5 --limit-refs 0 --rskip 2 --rskip-edge-threshold 3 --rc-lookahead 〇--no-cutree --psy-rd 1.5 --rdpenalty 2 --qp-adaptation-range 5 --deblock -2:-2 --limit-sao --sao-non-deblock --selective-sao 1 --hash 2 --allow-non-conformance --y4m - --output ".\v\_out.hevc"

β——(ffmpeg pipe) jpsdr mod x265 CLI parameters

* ffmpeg.exe -loglevel 16 -hwaccel auto -y -hide\_banner -i ".\v\_in.mp4" -an -f yuv4mpegpipe -strict unofficial -pix\_fmt 〇 - | x265.exe --tu-intra-depth 4 --tu-inter-depth 4 --max-tu-size 4 --limit-tu 1 --rect --amp --me star --subme 〇 --merange 〇 --analyze-src-pics --weightb --max-merge 5 --ref 3 --no-open-gop --min-keyint 1 --keyint 〇 --fades --bframes 16 --b-adapt 2 --radl 2 --b-intra --crf 17.1 --crqpoffs -5 --cbqpoffs -2 --ipratio 1.67 --pbratio 1.33 --cu-lossless --psy-rdoq 2.5 --rdoq-level 2 --aq-auto 10 --aq-bias-strength 1.3 --aq-strength-edge 1.4 --aq-bias-strength 1.1 --qg-size 8 --rd 5 --limit-refs 0 --rskip 2 --rskip-edge-threshold 3 --rc-lookahead 〇--no-cutree --psy-rd 1.5 --rdpenalty 2 --qp-adaptation-range 5 --deblock -2:-2 --limit-sao --sao-non-deblock --selective-sao 1 --hash 2 --allow-non-conformance -fps\_mode passthrough -c:a copy ".\v\_out.mp4"

γ——Standard libx265 CLI, copy audio & multiplex to MP4

* ffmpeg.exe -loglevel 16 -hwaccel auto -y -hide\_banner -i ".\v\_in.mp4" -c:v libx265 -pix\_fmt 〇 -x265-params "tu-intra-depth=4:tu-inter-depth=4:max-tu-size=4:limit-tu=1:rect=1:amp=1:me=star:subme=〇:merange=64:analyze-src-pics=1:weightb=1:max-merge=5:mcstf=1:ref=3:open-gop=0:min-keyint=1:keyint=〇:fades=1:bframes=16:b-adapt=2:radl=2:b-intra=1:crf=17.1:crqpoffs=-5:cbqpoffs=-2:ipratio=1.6:pbratio=1.33:cu-lossless=1:psy-rdoq=2.5:rdoq-level=2:hevc-aq=1:aq-strength=1.4:qg-size=8:rd=5:limit-refs=0:rskip=2:rskip-edge-threshold=3:rc-lookahead=〇:cutree=0:psy-rd=1.5:rdpenalty=2:qp-adaptation-range=5:deblock=-2:-2:limit-sao=1:sao-non-deblock=1:selective-sao=1:hash=2:allow-non-conformance=1" -fps\_mode passthrough -c:a copy ".\v\_out.mp4"