H.264 / AVC Cheat Sheet

The workhorse of the internet - what to know in 2026

Fora Soft Learn

Companion to article 3.4 of Block 3 (Codec Evolution). Print on A4 or US Letter.

What it is - three names, one standard

ITU-T H.264	Published by ITU-T Telecommunication Standardization Sector, May 2003
ISO/IEC 14496-10	MPEG-4 Part 10, published by ISO/IEC JTC 1/SC 29/WG 11, March 2003
AVC	Advanced Video Coding - marketing-friendly name used by Apple and most vendors
Authors	Joint Video Team: G. Sullivan, T. Wiegand, A. Luthra (JVT formed Dec 2001)

Profiles and levels - what to ship where

Profile @ Level	Resolution / fps	Max bitrate	Where it ships
Constr. Baseline @ 1.2	Up to 352 x 288 @ 30	0.4 Mbps	WebRTC (RFC 7742 mandatory)
Baseline @ 3.0	720 x 480 @ 30	10 Mbps	Early mobile video, lossy networks
Main @ 3.1	1280 x 720 @ 30	14 Mbps	First-gen mobile HDTV
High @ 4.0	1920 x 1080 @ 30	25 Mbps	Broadcast HD, early VOD
High @ 4.1	1920 x 1080 @ 30	50 Mbps	Blu-ray, default 1080p VOD
High @ 4.2	1920 x 1080 @ 60	50 Mbps	1080p60 streaming, gaming capture
High @ 5.1	4096 x 2304 @ 30	240 Mbps	4K Blu-ray, pro cameras
High @ 5.2	4096 x 2160 @ 60	240 Mbps	4K60 streaming
High 4:2:2 @ 5.1	1920 x 1080 @ 60	300 Mbps	Broadcast contribution, XDCAM
Hi444PP @ 5.1	4096 x 2304 @ 30	1200 Mbps	Studio mastering, lossless

x264 presets - speed vs compression efficiency

ultrafast / superfast	Live ingest with extreme CPU budget. -30% efficiency vs medium.
veryfast / faster	Live encoding on commodity hardware. -15% efficiency vs medium.
fast / medium (default)	Sane default for live and ad-hoc encodes.
slow / slower	VOD encoding, multi-pass-grade quality. +5-10% efficiency.
veryslow / placebo	Reference quality. +1-2% over slower for 10x more CPU.

FFmpeg recipes you will actually use

1080p VOD, High Profile, CRF 21:

```
ffmpeg -i in.mov -c:v libx264 -profile:v high -level 4.1 -preset slow -crf 21 \
  -pix_fmt yuv420p -c:a aac -b:a 128k -movflags +faststart out.mp4
```

Live 720p low-latency RTMP, Constrained Baseline:

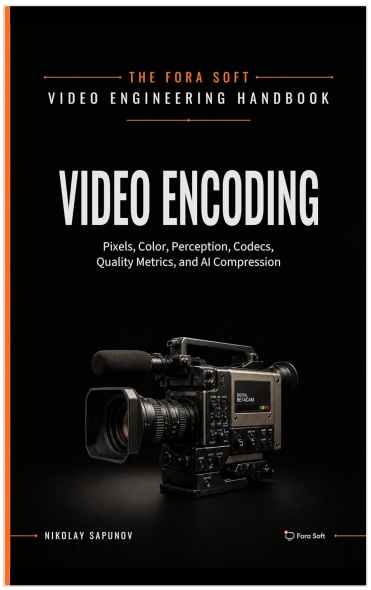
```
ffmpeg -re -i live -c:v libx264 -profile:v baseline -level 3.1 \
  -preset veryfast -tune zerolatency -b:v 2500k -maxrate 2500k \
  -bufsize 5000k -g 60 -keyint_min 60 -f flv rtmp://ingest/stream-key
```

ABR ladder member, 540p, 1.5 Mbps:

```
ffmpeg -i in.mp4 -vf scale=960:540 -c:v libx264 -profile:v main -preset slow \
  -b:v 1500k -maxrate 1650k -bufsize 3000k -pix_fmt yuv420p out_540p.mp4
```

Patent calendar (2026)

- Pool administered by Via Licensing Alliance (Via LA) - MPEG LA merged into Via LA in April 2023.
- Streaming licence fees restructured in 2026: tiered, up to USD 4.5M/yr for largest new licensees.
- Last US patent in the pool (US 7,826,532) expires 29 November 2027.
- Free-to-end-user internet video has been royalty-waived since August 2010 (MPEG LA decision).
- AAC audio + DRM are licensed separately - clear those chains before declaring a product royalty-free.



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This sheet keeps H.264 profiles and levels, x264 presets, working FFmpeg recipes and the patent dates on one page. Volume 1 covers the codec in depth: block structure, prediction and entropy coding, rate control choices, how H.264 compares with HEVC and AV1 at matched quality, and measuring what you ship.

WHAT YOU WILL FIND INSIDE

- H.264 internals: macroblocks, prediction, CABAC
- Rate control: CRF, VBV and two-pass
- Quality checks with PSNR, SSIM and VMAF
- Profiles and levels for each delivery target
- H.264 against HEVC and AV1 at equal quality

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