ffmpeg Audio/video converter

START HERE

`ffmpeg -i <in> <out>`
Convert by extension

`ffprobe <file>`
Inspect streams

`ffmpeg -ss <t> -i <in> -t <dur> -c copy <out>`
Cut without re-encode

`ffmpeg -codecs`
List codecs

`ffmpeg -i <in> -vf scale=-2:720 <out>`
Resize to 720p

`ffmpeg -i <in> -vn -c:a copy <out>`
Extract audio

`ffmpeg -i <in> -c:v libx264 -crf 23 <out>`
Compress video

`ffmpeg -i <in> -an <out>`
Drop audio

Input -i file → **demux** → **Decoder** raw frames → **`-vf` / `-af`** → **Filters** scale, trim… → **`-c:v` / `-c:a`** → **Encoder** codec + quality → **mux** → **Output** container

CONCEPTS

Options apply to the next file: before -i they describe the input, before an output name they describe that output.

-c copy skips decoding and encoding: fast and lossless, but no filters and cuts land on keyframes.

Add -y to overwrite without asking, -n to never overwrite. Without either, ffmpeg prompts.

BASICS

`ffmpeg -i <in> <out>`
Convert; format follows the extension

`ffprobe <file>`
Show container and stream info

`ffmpeg -i <in> -c copy <out>`
Remux without re-encoding

`ffmpeg -y -i <in> <out>`
Overwrite output without asking

`ffmpeg -hide_banner -i <in>`
Print file info, no banner

`ffmpeg -loglevel error -i <in> <out>`
Only show errors

BASICS (cont.)

`ffmpeg -stats -i <in> <out>`
Show progress line (default)

`ffprobe -v error -show_format -show_streams <file>`
Full detail of every stream

`ffprobe -v error -show_entries format=duration -of csv=p=0 <file>`
Print only the duration

TRIM AND JOIN

`-ss <time> -i <in>`
Seek before input: fast

`-t <duration>`
Stop after this much output

`-to <time>`
Stop at this timestamp

`ffmpeg -ss <t> -i <in> -t <dur> -c copy <out>`
Cut a clip losslessly
With -c copy the start snaps to the previous keyframe; re-encode for frame-accurate cuts.

`-f concat -safe 0 -i <list.txt> -c copy <out>`
Join files of the same codec
list.txt has lines like: file '/path/a.mp4'

`-sseof -<sec> -i <in>`
Seek relative to the end

`-frames:v 1`
Write a single frame

VIDEO

`-c:v libx264`
Encode H.264

`-c:v libx265`
Encode H.265 (HEVC)

`-c:v libvpx-vp9`
Encode VP9

`-c:v libsvtav1`
Encode AV1 (if built in)

`-crf <n>`
Constant quality; lower is better
x264: 18 near-lossless, 23 default, 28 small. x265 default is 28.

`-preset <name>`
Speed vs size, slow to ultrafast

`-b:v <rate>`
Target video bitrate, e.g. 2M

`-r <fps>`
Set frame rate

`-pix_fmt yuv420p`
Maximise player compatibility

`-movflags +faststart`
Put MP4 index first for web play

`-vn`
Drop the video stream

`-c:v h264_nvenc`
Hardware encode on NVIDIA

`-c:v h264_vaapi`
Hardware encode via VA-API

`-tune <name>`
Tune x264 e.g. film, animation

AUDIO

`-vn -c:a copy <out>`
Extract audio unchanged

`-vn -c:a libmp3lame -q:a 2 <out.mp3>`
Extract audio as MP3

`-c:a aac -b:a 128k`
Encode AAC audio

`-an`
Drop all audio

`-ac <n>`
Set channel count

`-ar <hz>`
Set sample rate

`-af volume=<factor>`
Change volume, e.g. 1.5 or 6dB

`-af loudnorm`
Normalise loudness

`-c:a libopus -b:a 96k`
Encode Opus

FILTERS

`-vf scale=<w>:<h>`
Resize

`-vf scale=-2:<h>`
Resize keeping aspect, even width

`-vf fps=<n>`
Change frame rate

`-vf crop=<w>:<h>:<x>:<y>`
Crop a region

`-vf transpose=1`
Rotate 90 degrees clockwise

FILTERS (cont.)

`-vf hflip / -vf vflip`
Mirror horizontally / vertically

`-vf setpts=PTS/<n>`
Speed up video n times

`-af atempo=<n>`
Change audio speed (0.5 to 100)

`-vf drawtext=text='<txt>':fontsize=<n>`
Burn in text

`-vf subtitles=<file.srt>`
Burn in subtitles

`-vf "scale=iw/2:-2,fps=10"`
Chain filters with commas

`-filter_complex "<graph>"`
Filters with several inputs/outputs

STREAMS AND METADATA

`-map <in>:<stream>`
Choose streams, e.g. -map 0:a:0

`-map 0`
Keep all streams of input 0

`-map 0:v -map 1:a`
Video from one file, audio from another

`-metadata title="<txt>"`
Set a tag

`-map_metadata -1`
Strip metadata

DISCOVERY

`ffmpeg -codecs`
List codecs

`ffmpeg -encoders`
List encoders

`ffmpeg -formats`
List containers

`ffmpeg -h encoder=<name>`
Options of one encoder

RECIPES

Shrink a video for sharing

```
ffmpeg -i in.mov -c:v libx264 -crf 26 -preset slow \
  -vf scale=-2:720 -pix_fmt yuv420p \
  -c:a aac -b:a 128k -movflags +faststart out.mp4
```

GIF with a good palette

```
ffmpeg -i in.mp4 -vf "fps=12,scale=480:-1:flags=lanczos,palet
pal.png
ffmpeg -i in.mp4 -i pal.png -lavfi "fps=12,scale=480:-1:flags=lanczos[x];[x][1:v]paletteuse" out.gif
```

Frames to images and back

```
# every second as PNG
ffmpeg -i in.mp4 -vf fps=1 frame_%04d.png
# images to video
ffmpeg -framerate 25 -i frame_%04d.png -c:v libx264 -pix_fmt yuv420p out.mp4
```

Replace the audio track

```
ffmpeg -i video.mp4 -i audio.m4a -map 0:v -map 1:a \
  -c copy -shortest out.mp4
```