Loudness in Practice - Cheat Sheet

Two families: metadata moves the volume knob; processing changes the signal.

Mechanism by destination

MECHANISM	FAMILY	REFERENCE / RULE
Dialnorm (AC-3 / E-AC-3 / AC-4)	**metadata**	attenuation = dialnorm - 31 dB
ReplayGain 2.0 (music files)	**metadata**	ref -18 LUFS; track + album gain
Opus output gain (RFC 7845)	**metadata**	ref -23 LUFS (not -18!)
Apple Sound Check	**metadata**	playback gain toward -16 LUFS
Spotify normalization	**processing**	real-time, -14 LUFS (3 modes)
YouTube normalization	**processing**	turn-down-only, -14 LUFS
FFmpeg loudnorm	**processing**	re-render to a target level

The math

```
dialnorm field = 27  ->  27 - 31 = -4 dB  ->  decoder turns programme down 4 dB
Range 1..31 maps to -30..0 dB. Value 31 = no attenuation. Measure dialogue; never
default.
ReplayGain dB = reference - measured.  -18 - (-12) = -6 dB  (track at -12 LUFS turned
down 6 dB)
Opus uses -23 LUFS: a -18 tagger sets Opus gains 5 dB wrong.
```

Test before delivery (FFmpeg loudnorm)

Pass 1 (measure only):

```
ffmpeg -i master.wav -af loudnorm=I=-14:TP=-1:LRA=11:print_format=json -f null -
```

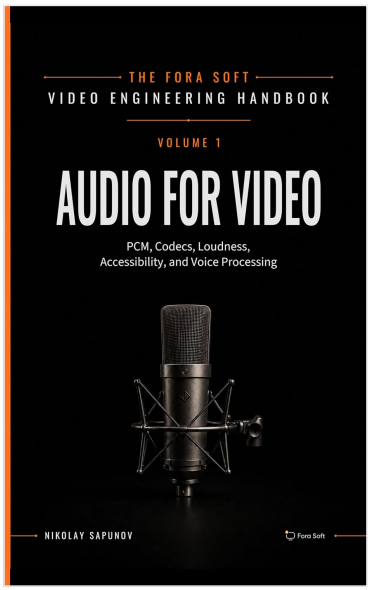
Pass 2 (re-render, one linear gain):

```
ffmpeg -i master.wav -af loudnorm=I=-23:TP=-1:LRA=11:measured_I=..:linear=true out.wav
```

Remember

- [ ] Metadata moves the player's volume; processing changes the signal.
- [ ] A wrong dialnorm is fixed by re-muxing metadata - never re-encode the audio.
- [ ] You cannot out-loud a normalizer: mastering hot only sacrifices dynamic range.
- [ ] Turn-down-only platforms never boost - master to target, not below it.
- [ ] Measure first with loudnorm, then choose the family. Re-render only if required.

Companion to: 'Loudness in Practice: Dialnorm, Normalize, Attenuate, Replay Gain'
www.forasoft.com/learn/audio-for-video/articles-audio/dialnorm-replay-gain-normalize



GO DEEPER · VOLUME 4 OF 7

Audio for Video: A Complete Guide to Sound in Video Products

From PCM and Codecs to Loudness, Accessibility, and Real-Time Voice Processing

By Nikolay Sapunov, CEO at Fora Soft · 1,229 pages · Kindle & paperback on Amazon

Read it on Amazon → amazon.com/dp/B0HH6PRZH1

This cheat sheet splits loudness tools into metadata and processing and shows the dialnorm, ReplayGain and loudnorm math. Volume 4 covers loudness work end to end: LUFS measurement, broadcast and streaming targets, codec metadata such as dialnorm and Opus output gain, and normalization in players.

WHAT YOU WILL FIND INSIDE

- Loudness measurement with LUFS
- Opus output gain and ReplayGain
- Dialnorm and codec loudness metadata
- Normalization in streaming players

THE FULL HANDBOOK · 7 VOLUMES · 9,000+ PAGES · ALL ON AMAZON

Vol. 1 · Video Encoding — pixels and color to H.264, HEVC, AV1, quality metrics and AI
Vol. 2 · Video Streaming I — network transport, contribution and ingest, HLS, MPEG-DASH, CMAF
Vol. 3 · Video Streaming II — ABR, CDNs, players, WebRTC, DRM and the economics of delivery
Vol. 4 · Audio for Video I — PCM, codecs, loudness, accessibility, real-time voice processing
Vol. 5 · Audio for Video II — jitter buffers, lip sync, Atmos, quality metrics, neural codecs
Vol. 6 · AI for Video I — models and inference, computer vision, speech, search, generative video
Vol. 7 · AI for Video II — real-time pipelines, agents, serving, cost, compliance, verticals

Getting inconsistent volume across your catalog, ads and live streams?

We will choose metadata or processing for each path and set up loudnorm in your encoding pipeline. 250+ video products shipped since 2005.

Book a 30-min call → **WhatsApp →** **Email us →**