

WebRTC Echo Cancellation — Integration Cheat Sheet

Fora Soft Learn · AI for Video Engineering

1 · Where echo cancellation sits (and the one rule)

Audio Processing Module order	1) Echo cancellation (AEC3) 2) Noise suppression 3) AGC
The reference / render signal	the far-end audio BEFORE any mixing — feed it correctly
#1 cause of WebRTC echo	a broken or fed-back reference wire, not a weak model

2 · The browser switches you control (getUserMedia)

`echoCancellation: true` → ON by default (Chrome, Firefox, Safari) = AEC3.
`echoCancellationType` → 'browser' (AEC3 software) | 'system' (OS/hardware).
 Default picks hardware AEC when good, else falls back to AEC3 software.

3 · Mobile: the phone usually does the work

iOS / iPadOS	Voice-Processing I/O unit via AVAudioSession .voiceChat mode
Android	AcousticEchoCanceller — quality varies wildly by device model
Consistency trick	run AEC3 in software on Android for the same behaviour everywhere

4 · The number to log when debugging: ERLE

$ERLE = 10 \times \log_{10}(\text{echo power before} / \text{after})$. Higher = more echo removed.
 Healthy: climbs to 20-40 dB in 1-2 s. Below 10 dB = filter not converging.

5 · The stacking trap (the most common self-inflicted bug)

Two cancellers at once → half-duplex 'walkie-talkie', your voice cut off.

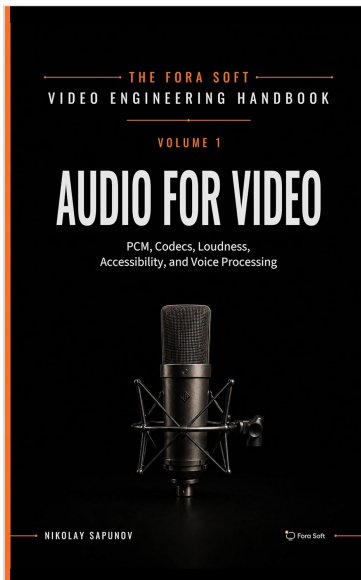
Fix: run EXACTLY ONE. Adopt a vendor SDK? Set browser `echoCancellation=false`.

6 · Decision checklist

- ☐ Ship browser AEC3 first (`echoCancellation: true`); verify with an ERLE log, not one test call.
- ☐ Stubborn echo? Check the reference wire and delay estimate BEFORE blaming the model.
- ☐ Non-linear echo only (loud/cheap speaker, double-talk, reverb)? → add a neural canceller.
- ☐ Devices you control → on-device SDK (Krisp) via AudioWorklet; phone-ins → server-side (Maxine / SFU).
- ☐ Always one canceller in the chain — turn the others off.

Companion to: 'Echo cancellation in WebRTC — classical AEC + AI hybrid'

www.forasoft.com/learn/ai-for-video-engineering/articles-ai/echo-cancellation-aec-ai-hybrid-webrtc



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This sheet shows where AEC3 sits, which getUserMedia switches matter and how to read ERLE. Volume 4 covers real-time voice processing in depth, with echo cancellation, AGC, noise suppression and VAD, plus the sampling and codec basics that decide how a canceller behaves.

WHAT YOU WILL FIND INSIDE

- Acoustic echo cancellation in practice
- AGC, noise suppression and VAD
- Opus and speech codecs
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