

CasCut Sync-Lab — User Guide v3.0

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Version: **v3.0** · Platforms: **macOS 11+ (Apple Silicon), Windows 10/11**

What sync-lab v3.0 does

CasCut sync-lab is a standalone multi-camera audio sync module. It accepts heterogeneous sources (multiple cameras, separate recorders, multi-part folders with pauses or overlaps between takes) and produces a frame-accurate timeline — an XML ready for Premiere / DaVinci Resolve.

Key v3.0 innovations:

- ✅ **Independent per-part sync** — every file in a multi-part folder (FAT32 camera split, paused/resumed recorder, distinct takes) is synchronized independently. Arbitrary gaps or overlaps between parts are preserved as-is.
- ✅ **5 material-type presets** — Podcast, Multi-cam, Concert, 2 cams + mic, Talking head. Each preset configures fingerprint parameters, reference-selection strategy, and deep-mode availability.
- ✅ **Auto joint-zone resolution** — three-tier algorithm to determine the gap between parts: cross-source audio anchor (Tier 1) → file `creation_time` metadata (Tier 2) → cumulative fallback (Tier 3). Visible as chips 🔗 audio / 🕒 metadata / ⚠️ est in the results table.
- ✅ **Import analyzer** — at the import step the app checks 14 common issues (Cyrillic file names, spaces and special characters, silent tracks, sources without time-overlap, gaps in multi-part numbering, etc.) and offers one-click fixes.
- ✅ **Sync-only normalize** — audio normalization applied only to the fingerprint buffer; originals stay untouched. Rescues quiet sources without re-encoding media.
- ✅ **Deep analysis** — iterative refinement of weak pairs with relaxed parameters. Helps with echo or noisy material.
- ✅ **Timeline-wide verification** — segmented sync check across the entire timeline (not just the first minutes). Timeline scrubber, auto-scan windows, per-window verdicts.
- ✅ **Per-part XML emit** — for a multi-part source the XML contains a separate master clip and sequence clipitem for each part with its own start/end. Premiere/Resolve see real gaps between parts.

In v3.0 everything runs locally, without internet or AI.

Installation

macOS

1. Open `CasCut-v3.0.dmg` → drag `CasCut.app` into **Applications**.
2. **First launch:** right-click the icon → «**Open**» → confirm in the dialog (the app is not notarized — normal for an R&D build).
3. Subsequent launches — regular double-click.

Windows

1. Run `CasCut-Setup-v3.0.exe`, follow the installer.
2. The app appears in the Start menu and on the desktop.

Activation (if your license requires it)

On first launch, the activation screen opens. Paste the key you received from the author and click **Activate**.

File naming rules

⚠ This is the most important section. Bad file names → errors when opening the XML in Premiere/Resolve. **v3 import analyzer** highlights problems and offers automatic rename, but it's better to follow the rules from the start.

Three rules:

1. **ASCII only** — no Cyrillic / non-Latin characters.
2. **No spaces** — use underscores `_`.
3. **Letters, digits, `-`, `_` only** — no parentheses, quotes, extra dots.

Recommended names:

Source	File or folder name
Wide shot	<code>wide.mp4</code> or folder <code>wide/</code>
Speaker A camera	<code>cam_A.mp4</code> or folder <code>cam_A/</code>
Speaker B camera	<code>cam_B.mp4</code> or folder <code>cam_B/</code>
Microphone A	<code>mic_A.wav</code> or folder <code>mic_A/</code>
Microphone B	<code>mic_B.wav</code> or folder <code>mic_B/</code>

Multi-part sources: a camera or recorder that split the recording into several files must live in **one source folder**. Files inside are sorted naturally (`C0001` → `C0002` → `C0010`).

Ideal layout example:

```
project/  
  cam_A/   C0001.MP4 C0002.MP4 ...  
  cam_B/   C0001.MP4 ...  
  wide/    C0001.MP4 ...  
  mic_A.wav  
  mic_B.wav
```

❌ Wrong: `Camera Anton.MOV`, `mic recording 1 (copy).wav` ✅ Right: `cam_A.mp4`, `mic_1.wav`

Workflow

Create a project

On the home screen — + **New project**, name in Latin without spaces, Enter.

Step 01 — Import

Drag files and folders into the drop zone or click to pick. Minimum **2 sources**.

Ideal layout (collapsible panel at top) — shows recommended structure and naming rules. Can be collapsed after first read.

FindingsPanel — appears after sources are added. Lists detected issues with severity icons:

-  **error** — blocks proceeding to Step 02 (e.g., unreadable file).
-  **warn** — warning (Cyrillic, gaps in multi-part numbering, sources without time overlap).
-  **info** — recommendations (quiet track → enable normalize, proxy suspicion).

One-click fixes:

- **Rename** — instantly renames the file/folder on disk to an ASCII variant.
- **Enable normalize** — activates sync-only normalization on Step 02. After application the chip changes to ✓ Applied.

When only warn/info findings remain — the «**Continue** →» button stays active, you can proceed.

Step 02 — Synchronization

Preset picker. Five cards with details (click ⓘ for the expanded description):

Preset	Case	STFT window	Reference strategy
Podcast	1–2 speakers on lavs + cameras	4096	Longest audio-only part
Multi-cam	N cams on interview	4096	Highest-confidence part
Concert	Stage, mixer, complex acoustics	8192	Mixer feed (longest_audio); normalize+deep by default
2 cams + mic	Two-camera shoot with recorder	4096	Longest audio-only part
Talking head	One camera + one microphone	2048 (sub-frame precision)	Highest confidence; deep unavailable

Toggles:

- **Normalize audio for sync** — applied only to the fingerprint buffer; originals untouched. If Step 01 emitted an `audio.low_level` finding, a banner «We recommend enabling» appears with a quick-toggle button.
- **Deep analysis** — two-pass scheme: after the first pass, weak pairs are re-fingerprinted with relaxed parameters (doubled fanout, lower peak threshold, wider hash window). Enable for echo / noisy cases. Unavailable for Talking head (redundant).

Run → starts sync. Real-time progress (probe / extract / fingerprint / match / done).

Result — offsets table:

- Each source = one row with **offset_seconds** (where the first part lands on the timeline) and **confidence** (sync reliability).
- For multi-part — expandable **per-part** sub-rows with own offset, confidence, and **anchor-source chip**:
 -  **audio** (green) — position locked by cross-source fingerprint match (most reliable).
 -  **metadata** (bronze) — position derived from the file's `creation_time` tag (real gap from the device's clock).
 -  **est** (yellow) — gap couldn't be determined from audio or metadata; continuous recording assumed. **Verify visually in your NLE.**
- **Confidence bar** — logarithmic scale, colour-coded by tier (green = strong, yellow = ok, red = weak).
- **Reference** is marked with a bronze dot; everything aligns to it.

Use-config summary above the table — shows preset and toggles used. Next to it — the  **Re-sync** button clears the result so you can pick different parameters and rerun.

If you only need **sync without camera switching** — on Step 03 click «Download sync XML».

Step 03 — Sync verification

Audio verification across all timeline windows. On entry, the screen builds a plan of **N 30-second windows** evenly distributed across the overlap of all sources.

Timeline scrubber at the top:

- Full-length timeline bar.
- **Overlap zone** (translucent accent) — region where all sources are active.
- **Window markers** — click to switch active window.
- **Tick marks** and time labels (`mm:ss` / `h:mm:ss`).
- **► Auto-scan** — automatically cycles through all windows at 5-second intervals. Handy for fast triage.

Pair cards (reference vs each other source):

- Header shows totals ✓ ok / ⚠ issue + per-window verdict dots.
- Body — audio player for the active window (mono mix of two sources).
- **Sounds correct** / **Has a problem** buttons — per-window per-pair verdict.

What to listen for:

- Correct sync → one clear voice (soft echo from different acoustics is normal).
- Bad sync → obvious double echo or words not matching up.

If a problem is found — click **Back to import** or **⚡ Re-sync** on Step 02 and try a different preset / enable deep / normalize.

XML export

The «**Download XML**» button is in the Verify screen footer. Format — FCP7 XML (.xml), compatible with Adobe Premiere Pro and DaVinci Resolve.

Multi-part in XML: each part of a source is emitted as a **separate master clip + sequence clipitem** with its own timeline position. Premiere/Resolve open this as multiple clips on one V-track with real gaps/overlaps. Prior to v3.0 a multi-part folder was glued into one continuous clip — fixed now.

File location:

- macOS: `~/Library/Application Support/CasCut/projects/<id>/<name>_sync.xml`
- Windows: `%APPDATA%\CasCut\projects\<id>\<name>_sync.xml`

How to open in your NLE:

1. **Premiere Pro:** File → Import → pick the XML.
2. **DaVinci Resolve:** File → Import → Timeline → pick the XML.

After import:

- V-tracks (V1, V2, V3...) — one per video source; multi-part = multiple clipitems on one V-track.
- A-tracks — stereo (L/R) pair per source.
- Sync applied via `<start>` / `<end>` in timeline coordinates.

Where data is stored

	macOS	Windows
App	<code>/Applications/CasCut.app</code>	<code>C:\Program Files\CasCut\</code>
Projects & XML	<code>~/Library/Application Support/CasCut/projects/</code>	<code>%APPDATA%\CasCut\projects\</code>
License	<code>~/Library/Application Support/CasCut/license.key</code>	<code>%APPDATA%\CasCut\license.key</code>
Logs	<code>~/Library/Logs/CasCut/castcut.log</code>	<code>%APPDATA%\CasCut\logs\</code>

Per-project files:

- `project.json` — sources manifest.
- `analysis.json` — import analyzer cache.
- `sync_report.json` — sync report (offsets, confidences, anchor sources, used preset).
- `<name>_sync.xml`, `<name>_sync_v2.xml`, ... — exports (versioned on rerun).
- `verify/` — cached WAV pairs for the Verify screen.

Full uninstall (macOS):

```
rm -rf /Applications/CasCut.app
rm -rf ~/Library/Application Support/CasCut
rm -rf ~/Library/Logs/CasCut
```

Glossary

Fingerprint — spectrogram «signature» of audio (Shazam-style constellation matching). Robust to acoustic differences (lav vs camera).

Confidence — `peak_count / median_count` of the offset-candidate histogram. >1000 — reliable, <100 — weak.

Reference — the source everything else aligns to. Chosen by the preset's `reference_strategy`.

MST (Maximum Spanning Tree) — graph of inter-source links built from the strongest pairwise-match edges. Transitively gives each source its offset relative to the reference.

Per-part anchor source:

- **audio** — offset from cross-source fingerprint; primary and most reliable path.
- **metadata** — offset from file **creation_time** tag, used when cross-source audio is weak (joint zone between parts with no spanning third source).
- **cumulative** — fallback gap=0 if neither audio nor metadata worked. A warning is emitted.

Drift warning — on recordings longer than 30 minutes, device clocks drift slightly. CasCut currently flags this only; correction is on the roadmap.

FAQ

App won't open on macOS — «damaged» / «can't verify»? Right-click the icon in Applications → «Open» → «Open» again in the dialog. Standard behaviour for unsigned apps.

Sync stuck at 0% or very slow? Make sure all files have audio. Files longer than 4 hours are capped at 2 hours during extract. For very large projects (>30 sources × 2 parts each) give it 1–2 minutes.

XML opened but files are offline in Premiere? Premiere looks for media at the original paths. Don't move files after XML creation. If moved — File → Link Media in Premiere.

Multi-part camera glued into one clip in Premiere / no gaps visible. That was the pre-v3.0 issue. Fixed now — each part is a separate clipitem. If the behaviour persists, check on the Sync screen that part_1 is not stuck on anchor **cumulative** without reason.

Confidence < 100 for part_1 of a multi-part source with anchor=metadata — is that OK? Yes, if this part has no cross-source overlap (e.g., all cameras stopped recording during the same break). Metadata anchor uses device clocks — more accurate than the cumulative gap=0 assumption.

audio.low_level finding on a quiet lav — what to do? Enable **Normalize for sync** on Step 02. It applies HP80→AGC→soft-limit ONLY to the fingerprint buffer; originals stay untouched. The blue-bronze chip **norm** in the use-config summary confirms it's on.

My WAV files have no creation_time tags — Tier 2 won't work? Right. Standard WAV without a BWF chunk has no embedded timestamp. Tier 3 (cumulative gap=0) is the fallback, with a warning in SyncReport. Sony/Canon/Panasonic MP4 cameras usually do have it; Zoom/Tascam recorders depend on the model.

Confidence < 500 — is sync reliable? Low confidence happens with short overlap (<30 min) or very different acoustics. Verify by ear on Step 03. If both voices in Verify mix into one — sync is fine; the number is just low due to limited matchable content.

If something goes wrong

1. Take a screenshot of the error.

2. Find the log: macOS — `~/Library/Logs/CasCut/castcut.log` , Windows — `%APPDATA%\CasCut\logs\` .
 3. Describe: which files you used, which step, which preset was active, what exactly broke.
 4. Email **recdotpro@gmail.com** with the screenshot and log attached.
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Contacts

Author: recdotpro@gmail.com **Document version:** v3.0 · sync-lab branch