

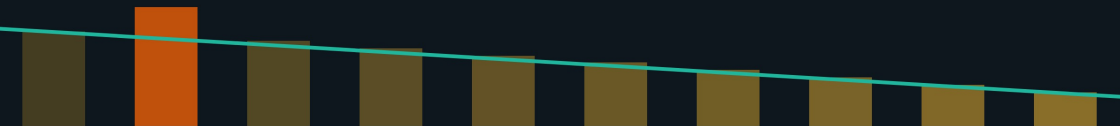


AUDIOVIBES AI | AMP

# The Repair Book

Every finding that is not a pass, and the most likely fix. Twenty-nine pages, one for each.

THE FREE PAGES



Designed, ruled and approved by  
BRAD HUETT

Greeley, Colorado  
AUDIOVIBES AI

# What this book is

Second edition, October 2026. Two tools, two parts.

AudioVibes tells you what is wrong with a mix. Part One of this book tells you what to do about it: one page for every finding that is not a pass, 29 in all (4 critical, 17 warning, 8 note).

ABA Phaze Check, the second tool, measures how the mics and DIs on one source line up in time and polarity, before the blend. Part Two gives a page to everything it can report: 14 pages, with their codes starting PH.

Every page follows the same eight parts, so you always know where the answer is: what tripped it, what kind of finding it is, what it sounds like, the likely causes, the fix step by step, the tools for the job, how to verify the repair, and the tempting wrong fix.

## Why four pages are free

To show you what the book can do, the four critical findings are yours, free. They are the ones that can wreck a release, because they follow the file onto every platform and every copy:

|    |                                           |         |
|----|-------------------------------------------|---------|
| c1 | True peak above the delivery ceiling      | p. 10 → |
| c2 | Heavy limiting                            | p. 13 → |
| c3 | Low end out of phase between the channels | p. 16 → |
| c4 | Digital clipping                          | p. 19 → |

Part Two adds two more free pages, the Phaze Check findings that thin a blend the moment the second fader comes up: **PH1** Arrives late: move it earlier and **PH3** Polarity flipped.

The other 25 AudioVibes pages and 12 Phaze Check pages are in the full book, for 15 bucks.

**The standing rule:** no threshold in AudioVibes is ever moved to produce more findings. The book is for sale; the measurements are not.

## How to use this book

1. **Find the page.** Your AudioVibes report names each finding by its severity and its heading, for example *Critical · True peak*. The four free pages are linked above. *The 29* below lists every finding by what it sounds like, with the page beside the four in this edition; in the PDF you can tap a line to jump straight there.
2. **Check what kind of finding it is.** Some are failures; some are questions:
  - **STANDARD.** Measured against a published delivery standard or platform specification. A failure here is a failure.
  - **PHYSICS.** Measured against physics: phase, cancellation, flat-topped samples. A failure here is a failure.
  - **CONVENTION.** Measured against a fixed engineering threshold that does not change with the genre. Strong evidence, and still worth a listen.
  - **SELF-TREND.** Measured against the mix's own spectral trend, not against anyone's taste. The octave is certain; the cause needs finding.
  - **PROFILE.** Judged against a DECLARED genre profile. The profiles are starting points, not yet calibrated against a reference corpus. This finding is a question, not a verdict: if the choice was deliberate, keep it.
  - **FILE.** A condition of the file itself, not of the mix.
3. **Find where it came in.** Every ABA milestone closes on an AudioVibes verify, and the report is kept with the milestone's assets. Read back through them: the first report where the reading crossed its threshold names the milestone to return to. A milestone that fails verification never closed; it is on its second cycle.

4. **Change one thing, then measure again.** Two fixes at once and you will not know which one worked.
5. **Tools are examples, not endorsements.** Each page names what ships with Fender Studio Pro 8, a few popular third-party plugins, and a free option. Nobody paid to be listed and any tool that does the job works. *Used at ABA* marks a plugin the studio itself uses; *in the ABA rack* marks outboard hardware in the studio's rack.
6. **Listen level-matched.** A louder version always sounds better for a moment. AudioVibes' compare matches levels; use it.

**What this book can't do.** Each page gives the most likely cause and the fix that most often works. It can't hear your mix for you. Hearing the problem, making the change and judging the result still take an engineer's ear, and the same fix in different hands gives different results.

**Acoustics.** ABA builds the acoustics: a stage that every performance feeds, heard as the player hears it on stage, and a venue on the master mix. Reverb is what you hear when sound decays inside them. In Fender Studio Pro 8, Room Reverb builds both.

**Trademarks.** Fender, Fender Studio and PreSonus are trademarks of Fender Musical Instruments Corporation and/or its affiliates. Other product names are trademarks of their owners. Not affiliated with or endorsed by Fender.

# Part One - AudioVibes

## The 29: can you hear them all?

Every problem AudioVibes can find, by what it sounds like. Twenty-five of them are sounds you can learn to hear. Four are marked *meter*: a meter catches them before an ear can. Read down the list and be honest about which ones you would have caught by ear.

The four criticals are free in this edition, with the page beside each. The rest are in the full book.

Click any of the four to go straight to its page. Each one ends with a button that brings you back here.

### CRITICAL

#### c1 True peak above the delivery ceiling METER

p. 10 →

Often nothing, in the studio. The file itself may be clean. The damage arrives after the platform encodes it: AAC and MP3 overshoot on conversion, and the loudest transients come back gritty or crackling.

#### c2 Heavy limiting

p. 13 →

Loud and small at the same time. The snap of the snare and the pick attack have been folded into the body of the mix; on repeat listening it tires the ear. Pumping on the kick is common.

#### c3 Low end out of phase between the channels

p. 16 →

Bass and kick that seem fine in stereo go thin, hollow or wobbly in mono. On a club PA, a phone speaker or most TVs, part of the low end cancels itself out.

#### c4 Digital clipping

p. 19 →

A crackle or a harsh edge on the loudest hits. In a dense mix it can hide, and it still ends up on every copy.

### WARNING

|           |                                                                                                                                           |                         |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>W1</b> | <b>Louder than the delivery target</b>                                                                                                    | <b>in the full book</b> |
|           | On the platform, no louder than anything else: it is turned down on playback. What is left is whatever dynamics were spent getting there. |                         |
| <b>W2</b> | <b>Much quieter than the delivery target (more than 4 LU)</b>                                                                             | <b>in the full book</b> |
|           | Next to other tracks in a playlist it sits noticeably low.                                                                                |                         |
| <b>W3</b> | <b>Narrow loudness range</b>                                                                                                              | <b>in the full book</b> |
|           | Flat on repeat listening. The chorus has nowhere to lift to.                                                                              |                         |
| <b>W4</b> | <b>A limiter working all the time</b>                                                                                                     | <b>in the full book</b> |
|           | Constant density, with no breathing room between hits.                                                                                    |                         |
| <b>W5</b> | <b>Dark: the spectrum falls off steeply</b>                                                                                               | <b>in the full book</b> |
|           | Dull or muffled next to commercial releases in the same style.                                                                            |                         |
| <b>W6</b> | <b>Bright: the spectrum is bright for the style</b>                                                                                       | <b>in the full book</b> |
|           | Harsh on small speakers; fatiguing over a whole song.                                                                                     |                         |
| <b>W7</b> | <b>Too much low end</b>                                                                                                                   | <b>in the full book</b> |
|           | Big on the studio monitors, then a blur on a laptop or a phone, which cannot reproduce the bottom octave.                                 |                         |
| <b>W8</b> | <b>Top end stops early (below 16 kHz)</b>                                                                                                 | <b>in the full book</b> |
|           | Closed-in at the very top; the air is missing.                                                                                            |                         |
| <b>W9</b> | <b>Resonance: one octave stands out</b>                                                                                                   | <b>in the full book</b> |
|           | A boom, a honk or a ring that tires the ear even when the broad balance measures fine.                                                    |                         |

|                                                                  |                                              |                         |
|------------------------------------------------------------------|----------------------------------------------|-------------------------|
| <b>W10</b>                                                       | <b>Spectral hole: one octave scooped out</b> | <b>in the full book</b> |
| Hollow, as if something in the middle of the picture is missing. |                                              |                         |

|                                                  |                                        |                         |
|--------------------------------------------------|----------------------------------------|-------------------------|
| <b>W11</b>                                       | <b>Loses level when folded to mono</b> | <b>in the full book</b> |
| On a mono speaker, parts drop back or disappear. |                                        |                         |

|                                                                                |                               |                         |
|--------------------------------------------------------------------------------|-------------------------------|-------------------------|
| <b>W12</b>                                                                     | <b>Very wide stereo image</b> | <b>in the full book</b> |
| Impressive on headphones; the center (vocal, kick, snare, bass) can feel weak. |                               |                         |

|                                                               |                                    |                         |
|---------------------------------------------------------------|------------------------------------|-------------------------|
| <b>W13</b>                                                    | <b>The mix leans left or right</b> | <b>in the full book</b> |
| The image sits off center; on headphones it pulls to one ear. |                                    |                         |

|                                                 |                                      |                         |
|-------------------------------------------------|--------------------------------------|-------------------------|
| <b>W14</b>                                      | <b>Phase goes negative too often</b> | <b>in the full book</b> |
| Vague and hard to place; things vanish in mono. |                                      |                         |

|                                          |                                    |                         |
|------------------------------------------|------------------------------------|-------------------------|
| <b>W15</b>                               | <b>Noise in the quiet passages</b> | <b>in the full book</b> |
| Hiss, hum or buzz where the music rests. |                                    |                         |

|                                                                      |                               |                         |
|----------------------------------------------------------------------|-------------------------------|-------------------------|
| <b>W16</b>                                                           | <b>DC offset</b> <b>METER</b> | <b>in the full book</b> |
| Usually nothing directly. It wastes headroom and can click at edits. |                               |                         |

|                                                                 |                                               |                         |
|-----------------------------------------------------------------|-----------------------------------------------|-------------------------|
| <b>W17</b>                                                      | <b>A lossy file was analyzed</b> <b>METER</b> | <b>in the full book</b> |
| Not a mix problem. The reading is partly measuring the encoder. |                                               |                         |

## NOTE

|                             |                                                  |                         |
|-----------------------------|--------------------------------------------------|-------------------------|
| <b>N1</b>                   | <b>A little quieter than the delivery target</b> | <b>in the full book</b> |
| Slightly low in a playlist. |                                                  |                         |

|                                                          |                            |                         |
|----------------------------------------------------------|----------------------------|-------------------------|
| <b>N2</b>                                                | <b>Wide loudness range</b> | <b>in the full book</b> |
| Quiet passages may vanish on phone speakers and in cars. |                            |                         |

|           |                                                                                                                                                    |                         |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>N3</b> | <b>Light low end</b><br>Thin on full-range systems.                                                                                                | <b>in the full book</b> |
| <b>N4</b> | <b>The spectrum does not follow one slope</b><br>Depends on where the bump or the dip is.                                                          | <b>in the full book</b> |
| <b>N5</b> | <b>Narrow stereo image</b><br>Close to mono.                                                                                                       | <b>in the full book</b> |
| <b>N6</b> | <b>No noise floor could be measured</b> <span>METER</span><br>Nothing to hear: the track never rests, so the quietest passage is music, not noise. | <b>in the full book</b> |
| <b>N7</b> | <b>Silence before the music</b><br>A gap before the first note.                                                                                    | <b>in the full book</b> |
| <b>N8</b> | <b>Silence after the music</b><br>A long gap after the last note.                                                                                  | <b>in the full book</b> |

---

FREE • YOURS TO KEEP

# Your four free pages

The four critical findings, in full. They start on the next page.

---

**C1** True peak above the delivery ceiling

---

**C2** Heavy limiting

---

**C3** Low end out of phase between the channels

---

**C4** Digital clipping

---

# C1 - True peak above the delivery ceiling

CRITICAL

STANDARD

FREE PAGE

**What the report says:** True peak is above the delivery ceiling. Lossy encoders (AAC/MP3) overshoot on conversion, so this will produce audible distortion on streaming even though the file itself is clean.

**What tripped it:** `if (L.true_peak_dbtp > t.tp)` (scoring.js line 84)

| Delivery             | True-peak ceiling (dBTP) |
|----------------------|--------------------------|
| Spotify              | -1                       |
| Apple Music          | -1                       |
| YouTube              | -1                       |
| Tidal                | -1                       |
| Amazon Music         | -2                       |
| Deezer               | -1                       |
| SoundCloud           | -1                       |
| Broadcast (EBU R128) | -1                       |
| Club / DJ            | -0.3                     |
| CD master            | -0.1                     |

**What kind of finding:** Measured against a published delivery standard or platform specification. A failure here is a failure.

**What it sounds like:** Often nothing, in the studio. The file itself may be clean. The damage arrives after the platform encodes it: AAC and MP3 overshoot on conversion, and the loudest transients come back gritty or crackling.

**Likely causes, most common first:**

- The final limiter is set to a sample-peak ceiling (for example -0.1 dBFS) instead of a true-peak ceiling. Sample peaks miss the peaks that form between samples.

- Something sits after the limiter: a plugin, a fader move on the master, a sample-rate conversion at export.
- Heavy clipping or saturation upstream, which creates inter-sample overs.

### **The fix:**

1. Make the limiter the last process on the master. Only dither may follow it.
2. Switch the limiter to true-peak (oversampled) mode if it has one. Limiter<sup>2</sup> in Fender Studio Pro 8 does.
3. Set the ceiling a little under the target in the table above. For a -1 dBTP target, -1.2 dBTP leaves room for export.
4. If the limiter has no true-peak mode, lower the ceiling in 0.2 dB steps until AudioVibes clears it.
5. Export at the session sample rate. If a conversion is needed, do it before the limiter, not after.

### **Tools for the job:**

- *In Fender Studio Pro 8:* Limiter<sup>2</sup> as the last insert on the main bus, in its true-peak mode; Level Meter in its EBU R128 mode, with true-peak metering chosen from its drop-down.
- *Popular third-party:* FabFilter Pro-L 2 (true-peak limiting and loudness metering); iZotope Ozone Maximizer (true-peak ceiling); Waves WLM Plus (loudness and true-peak meter).
- *Free:* Youlean Loudness Meter 2 (integrated loudness and true peak).

**Where it goes back to in ABA:** Milestone 8, the delivery pass. If an earlier milestone's verify report already shows it, the mix bus of that milestone is overshooting: fix it there so it does not travel forward.

**Verify:** True peak at or under the ceiling. Integrated loudness should move by less than about 0.3 LU. If it dropped much more, the limiter was doing too much work: read C2.

**The tempting wrong fix:** Normalizing the file to -1 dBFS peak. That is a sample-peak normalization and it does not see the peaks between samples, so the reading barely moves.

---

*Or send it to the ABA studio.*

[↑ Back to the list](#)

# C2 - Heavy limiting

CRITICAL

CONVENTION

FREE PAGE

**What the report says:** Peak-to-loudness ratio this low means heavy limiting. Transients — the snap of a snare, the pick attack — have been flattened into the body of the mix.

**What tripped it:** `if (L.peak_to_loudness_ratio < 6)` (scoring.js line 115)

| Style profile      | Peak-to-loudness (dB) |
|--------------------|-----------------------|
| General            | 8 to 18               |
| Rock               | 9 to 16               |
| Country            | 9 to 17               |
| Metal              | 7 to 13               |
| Pop                | 8 to 14               |
| Hip-hop            | 8 to 15               |
| Electronic         | 8 to 16               |
| Jazz               | 14 to 24              |
| Classical          | 15 to 28              |
| Acoustic           | 12 to 22              |
| Cinematic/Score    | 13 to 26              |
| Urbano / Reggaetón | 7 to 14               |
| Regional Mexican   | 8 to 17               |
| K-pop              | 7 to 13               |

**What kind of finding:** Measured against a fixed engineering threshold that does not change with the genre. Strong evidence, and still worth a listen.

**What it sounds like:** Loud and small at the same time. The snap of the snare and the pick attack have been folded into the body of the mix; on repeat listening it tires the ear. Pumping on the kick is common.

**Likely causes, most common first:**

- Chasing loudness at the master limiter.
- Limiting stacked on limiting: a bus limiter or clipper, then the master limiter, each taking a little.
- A compressor on every bus, all pulling the same way.
- A loud delivery target (club, CD) chosen for a file going to streaming.

### **The fix:**

1. Check the delivery target first. If the file is going to streaming, the platform turns it down anyway (see W1), so the loudness is being paid for and then thrown away.
2. Lower the gain INTO the limiter until it catches peaks rather than holding the music; a few dB of reduction on the loudest hits, not constant.
3. Remove stacked limiting. One limiter at the end is the rule; everything upstream controls, it does not crush.
4. Get level from automation, not compression. That is what the ABA dynamic mix milestones are for.
5. If the mix still needs density, build it upstream with parallel (New York) compression: crush a copy of the drums or bass and blend it under the dry signal. The transients survive, and the master limiter has less to do.

### **Tools for the job:**

- *In Fender Studio Pro 8*: Limiter<sup>2</sup> with less input gain; Level Meter, EBU R128 mode.
- *Popular third-party*: FabFilter Pro-L 2 (its loudness meter shows how hard it works); UADx Capitol Mastering Compressor (used at ABA) for gentle control before the limiter; SSL G3 MultiBusComp (used at ABA) for glue that does not crush; UADx Empirical Labs Distressor (used at ABA) in parallel: its Mix knob blends the crushed signal under the dry one.

- *Free:* Youlean Loudness Meter 2 (the Pro version adds peak-to-loudness ratio).
- *In the ABA rack (hardware):* A pair of Avalon VT-737 tube channel strips: their opto compressors for gentle control when mastering through hardware.

**Where it goes back to in ABA:** Milestone 8. If the verify reports from Milestone 3 or 5 already show a low peak-to-loudness ratio, the dynamic mix is over-compressed before delivery: return to the first milestone where it appeared.

**Verify:** Peak-to-loudness ratio at 6 dB or more and inside the style's range in the table above. Loudness should still sit inside the delivery window.

**The tempting wrong fix:** Adding a transient shaper or an 'enhancer' after the limiter to bring the snap back. It adds peaks after the only process that controls them, and trips C1.

---

*Or send it to the ABA studio.*

[↑ Back to the list](#)

## C3 - Low end out of phase between the channels

CRITICAL

PHYSICS

FREE PAGE

**What the report says:** Bass content below 120 Hz is not phase-coherent between channels. It will partially cancel on any mono system — club PAs, phone speakers, most TVs.

**What tripped it:** `if (S.low_freq_correlation < 0.8)` (scoring.js line 197)

**What kind of finding:** Measured against physics: phase, cancellation, flat-topped samples. A failure here is a failure.

**What it sounds like:** Bass and kick that seem fine in stereo go thin, hollow or wobbly in mono. On a club PA, a phone speaker or most TVs, part of the low end cancels itself out.

### Likely causes, most common first:

- A stereo widener, chorus or stereo delay on the bass, the kick or a synth bass.
- Two sources of one instrument out of time: DI and amp, or inside and outside kick mics.
- A stereo synth bass patch with detuned unison voices spread left and right.
- Overheads or room mics catching the kick late against the close mic.
- A stereo acoustic-space or effect return that carries low end.

### The fix:

1. Listen to the problem: put the master in mono and low-pass it around 120 Hz. [In Fender Studio Pro 8: Binaural Pan's Mono button for mono, Pro EQ<sup>3</sup> for the low-pass.]

2. Find the source: mute tracks one at a time while you watch the correlation meter. The track that moves the needle is the one.
3. Align paired sources: nudge the DI against the amp, or the inside mic against the outside, until the low end is fullest. Check polarity too.
4. Make everything below 100 to 120 Hz mono on the bass and drum buses.
5. High-pass the acoustic-space returns and stereo effects so they carry no low end.

### **Tools for the job:**

- *In Fender Studio Pro 8*: Phase Meter on the main bus; Mixtool for polarity; Pro EQ<sup>3</sup> to low-pass the monitor while you listen.
- *Popular third-party*: Sound Radix Auto-Align 2 (time-aligns DI/amp and multi-mic pairs); Waves InPhase (phase alignment between two tracks); Little Labs IBP (UAD) (phase adjustment); Plugin Alliance bx\_digital V3 (Mono-Maker below a set frequency); FabFilter Pro-Q 4 (used at ABA) in mid/side mode to remove side below 120 Hz.
- *Free*: Voxengo Correlometer (correlation per frequency band).

**Where it goes back to in ABA:** Milestone 1: the ABA Phaze Check alignment and consolidation of the rhythm section (rows 19 and 21). If the rhythm section passed and the problem arrived later, return to that milestone's green ABA Phaze Check row (rows 38, 43, 72, 88 or 100).

**Verify:** Low-frequency correlation above 0.85. The mono fold-down loss (W11) usually drops with it.

**The tempting wrong fix:** Flipping the polarity of the whole bass track and calling it done. It can fix one band and wreck another; compare both ways, and prefer alignment in time to a flip.

---

*Or send it to the ABA studio.*

[↑ Back to the list](#)

## C4 - Digital clipping

CRITICAL

PHYSICS

FREE PAGE

**What the report says:** ... sustained runs of full-scale samples — the waveform is flat-topped, which is digital clipping rather than limiting.

**What tripped it:** `if (D.consecutive_clip_runs > 0)` (scoring.js line 253)

**What kind of finding:** Measured against physics: phase, cancellation, flat-topped samples. A failure here is a failure.

**What it sounds like:** A crackle or a harsh edge on the loudest hits. In a dense mix it can hide, and it still ends up on every copy.

### Likely causes, most common first:

- The export clipped: the master ran over full scale into a fixed-point file.
- A limiter ceiling at 0.0 dBFS with no oversampling.
- The recording clipped at the interface during tracking.
- A sample or loop that arrived already clipped.

### The fix:

1. Find where it happened. Look for flat tops on the source tracks first, then on the master's peak hold.
2. If it is the export: bring the ceiling down and export again.
3. If it is a take: record it again. The three-take limit exists to make sure there is another take to go to.
4. Only if the take cannot be replaced: a de-clipping repair tool, as a last resort, checked by ear.

### Tools for the job:

- *In Fender Studio Pro 8:* Channel and main-bus clip indicators; look for flat tops on the events.

- *Popular third-party:* iZotope RX De-clip (last resort, checked by ear).
- *Free:* Youlean Loudness Meter 2 to watch sample peaks on export.

**Where it goes back to in ABA:** A clipped take goes back to the milestone where it was tracked, usually Milestone 1. A clipped export goes back to Milestone 8.

**Verify:** Zero clip runs.

**The tempting wrong fix:** A soft clipper on the master to 'round it off'. The clipped samples are already in the file; a clipper adds more distortion on top.

---

*Or send it to the ABA studio.*

[↑ Back to the list](#)

## That was four of twenty-nine

The other twenty-five pages are built the same way: the loudness targets, the limiter working all the time, dark and bright mixes, too much low end, the resonance in one octave and the hole in another, mono fold-down, width and balance, noise, DC offset and the rest. Every one with its causes, its fix, its tools, its check and its wrong fix.

**The full Repair Book: 15 bucks.**

---

*Or send it to the ABA studio.*

[↑ Back to the list](#)

# Part Two - ABA Phaze Check

## What Part Two is

Part One reads a finished bounce. Part Two works earlier, between the sources, before anything is blended.

When one sound is picked up twice (a guitar's DI and the mic on its speaker, a snare's close mic and the overheads), the two pickups rarely arrive at the same moment, and sometimes one arrives upside down. ABA Phaze Check measures both: how far apart in time, to a fraction of a sample, and which way up. It measures and changes nothing. The move is yours to make in the DAW.

It works against one **reference**: the DI off the pickup for a guitar or bass rig, the overhead pair for a drum kit. Every other source is measured against it three times across the take (start, middle, end), so the report can tell a steady offset from a take that moved.

**Beta, in calibration.** Phaze Check is a beta. It recovers planted delays and polarity flips on signals with known answers, and its comparison with other alignment tools on real sessions is ongoing. On every page in this part, the fix, the tools and the verify step carry the same label: they are standard engineering practice, and the next edition refines them from those comparisons.

| Status on the report | What it means                                                                        | Pages      |
|----------------------|--------------------------------------------------------------------------------------|------------|
| In line              | Under half a sample from the reference, the right way up. Nothing to do.             | none       |
| Move, Move + flip    | A steady offset, measured with confidence. Make the move.                            | PH1 to PH4 |
| Check                | The readings disagree, or the tool is not sure. Find out why before moving anything. | PH5 to PH7 |

| Status on the report | What it means              | Pages |
|----------------------|----------------------------|-------|
| Could not measure    | The files are the problem. | PH8   |
| Kept as color        | You heard it and chose it. | PH14  |

Five more pages explain readings that sit on a row whatever its status: the phase left after a move, a high-pass, a stereo pair's gap, a drum nearer one overhead, and a take too short for three readings (PH9 to PH13).

**What kind of finding.** As in Part One, each page says what the reading is measured against:

- **PHYSICS.** Measured against physics: two pickups of the same sound, compared in time and polarity. A failure here is a failure.
- **TAKE.** The measurement worked, and it says the take was not steady. Fix the take before you move anything.
- **LIMIT.** A limit of the measurement, not a sound. Listen before you move anything.
- **FILE.** A condition of the bounce, not of the rig.
- **GEAR.** A difference by frequency that no time move can fix: the gear's own phase. Measured, and often worth keeping.
- **PICTURE.** Part of the source's stereo picture. Measured and recorded, and kept.
- **CHOICE.** You heard the difference and chose it. It goes on the record as a choice.

## Why a few milliseconds sounds like tone

A delay of two or three milliseconds is not heard as a delay. The ear fuses two arrivals that close together into one sound (the precedence effect). But when the two pickups are *mixed*, the delay is heard as **tone**: some frequencies arrive in step and add, others arrive out of step and cancel. On a spectrum it looks like the teeth of a comb, which is why it is called **comb filtering**.

The first cancellation lands at **500 Hz divided by the delay in milliseconds**, and the next ones at 3, 5 and 7 times that.

- A snare close mic about 3 ms ahead of the overheads: first cancellation near **170 Hz**, in the snare's body, then near 500 Hz and 830 Hz. That is the hollow, thin snare.
- A speaker mic 30 cm from the speaker, about 0.9 ms behind the DI: first cancellation near **570 Hz**, in the middle of the guitar.

**The units.** Sound covers about 34 cm (13.5 in) in a millisecond. At 48 kHz a millisecond is 48 samples, so one sample is about 7 mm of air. Phase Check reports samples, because samples are what a DAW moves.

**Time and polarity are different problems.** A delay shifts every frequency by the same time, so it cancels some frequencies and not others. A polarity flip turns the whole signal upside down, so it cancels most at the bottom, where the two pickups are most alike. A time move cannot fix a flip, and a flip cannot fix a time offset.

**Which drums cause phase trouble.** The pairs on one drum: kick in against kick out, snare top against snare bottom (a bottom snare mic faces up, so its snare arrives flipped as a matter of course). And the low end of the kit against the overheads: kick, snare and toms are each picked up twice, by their own close mic and by the overheads a few milliseconds later. Cymbals with no close mic of their own have nothing to fight. A bigger kit

adds more of the same, not new problems. A room mic is left out on purpose: it is there for its distance.

**One rule under all of it:** phase is about two pickups of the **same** sound. Separate sounds that never play together (a hi-hat against an 808) share nothing to line up, and read Low. Layers of one hit (an 808 under a kick, two snare samples stacked) are what Phaze Check is for.

# How the two tools work together

AudioVibes hears the symptom on a bounce. Phaze Check finds the cause between the sources, when the cause is alignment.

| AudioVibes finding<br>(Part One)             | What it hears                        | What to check in Phaze Check                                             |
|----------------------------------------------|--------------------------------------|--------------------------------------------------------------------------|
| C3 Low end out of phase between the channels | Bass and kick thin or wobbly in mono | A flipped or late source in the low end: PH1 to PH4                      |
| W11 Loses level when folded to mono          | Parts drop back in mono              | Two pickups of one sound panned apart and out of time                    |
| W14 Phase goes negative too often            | Vague, hard to place                 | The same: two pickups panned apart                                       |
| W10 Spectral hole: one octave scooped out    | Hollow in one region                 | One possible cause: a comb notch from two pickups out of time (PH1, PH2) |

**The order inside an ABA milestone.** Phaze Check runs first, at the green ABA Phaze Check row: after the last performance and before any blend. AudioVibes runs last, at the purple sign-off, after the mix. Fix the cause at the green row and the purple row has less to find.

Neither tool replaces the other. A clean Phaze Check does not promise a clean AudioVibes report, because a mix has many other ways to go wrong. And AudioVibes cannot say which source caused a finding: by the time it listens, the sources are one file.

**Two ways to use Phaze Check.** As a **studio calibration**, once the room is tuned: measure the rig's stock sources against the reference and keep the offsets as the rig's record, adding a session's own sources when that session uses them. And **inside the ABA process**, at every green ABA Phaze Check row.

## The 14: can you hear them?

Everything Phaze Check can tell you, by what it sounds like. PH1 and PH3 are free in this edition, with the page beside each; the rest are in the full book.

### TO MOVE

#### PH1 Arrives late: move it earlier

p. 30 →

Not an echo. A few milliseconds is not heard as a delay: it is heard as tone. Solo, each source sounds fine. Blended, the low end loses body, the sound goes thinner and hollower, and the tone changes as you ride the second fader.

---

#### PH2 Arrives early: move it later

in the full book

The same as a late source: thinner, hollower, less body in the blend. The ear cannot tell early from late. Only the measurement can.

---

#### PH3 Polarity flipped

p. 33 →

The worst case. At low frequencies the two cancel instead of adding. The giveaway: the blend gets *thinner* as you bring the second fader up.

---

#### PH4 Out of time and flipped

in the full book

The low end cancels (the flip) and the tone above it is combed (the time). Usually the thinnest blend on the report.

---

### TO CHECK

#### PH5 The three readings disagree: something moved

in the full book

Sometimes. The tone of the blend shifts partway through the take, or the fix works for the verse and not the chorus.

---

**PH6**      **Polarity disagrees across the take**      **in the full book**

Sometimes. The blend is full in one part of the take and thin in another, or one side of a stereo pair sounds thinner than the other.

---

**PH7**      **Low confidence** **METER**      **in the full book**

Nothing. This is the measurement telling you it is not sure, not a sound.

---

**PH8**      **Could not measure** **METER**      **in the full book**

Nothing to hear. The files are the problem, not the sound.

---

## ON THE ROW

**PH9**      **Phase left after the move**      **in the full book**

Yes, in one band. The blend is right everywhere but one region, which stays thin, or peaky.

---

**PH10**      **The high-pass's own phase shift**      **in the full book**

Faintly. A little less weight just above the cutoff.

---

**PH11**      **Stereo pair: the gap between left and right**      **in the full book**

Yes. The gap is the width: an amp box's room, a spaced pair's spread.

---

**PH12**      **A drum nearer one overhead**      **in the full book**

Yes. It is where the drum sits in the kit's stereo picture.

---

**PH13**      **One reading: the file is too short for three**      **in the full book**

**METER**

Nothing to hear.

---

## KEPT AS COLOR

**PH14**      **Kept as color**      **in the full book**

Whatever you heard and chose. That is the point of it.

---

---

FREE • YOURS TO KEEP

# Your two free Phaze Check pages

The two that thin a blend the moment the second fader comes up. They start on the next page.

---

**PH1** Arrives late: move it earlier

---

**PH3** Polarity flipped

---

## PH1 - Arrives late: move it earlier

TO MOVE

PHYSICS

FREE PAGE

**What the report says:** Move it earlier by N samples (N ms).

**What tripped it:** The source's best match with the reference sits at half a sample or more after it, with its polarity the right way up. In the code:

```
Math.abs(move) < 0.5 && !flips[0] ? 'aligned' : 'move' (core.js), and  
a positive move reads as earlier.
```

**What kind of finding:** Measured against physics: two pickups of the same sound, compared in time and polarity. A failure here is a failure.

**What it sounds like:** Not an echo. A few milliseconds is not heard as a delay: it is heard as tone. Solo, each source sounds fine. Blended, the low end loses body, the sound goes thinner and hollower, and the tone changes as you ride the second fader.

**Likely causes, most common first:**

- Distance. The mic is farther from the sound than the reference's pickup. Sound covers about 34 cm (13.5 in) in a millisecond, about 7 mm per sample at 48 kHz, so a speaker mic 30 cm back lands about 0.9 ms (42 samples) behind the DI.
- A digital box in the path: a load box or amp modeller with its own converters, or a plugin printed on the way in, adds latency the DAW cannot see.
- A second interface or outboard converters that the DAW does not compensate for.
- Latency compensation switched off when the source was recorded or bounced.

**The fix (beta, in calibration):**

1. Bounce every source of one take from the same start point, at the same length and the same sample rate.
2. Measure, and read the move in samples, not milliseconds: samples are what the DAW moves.
3. Move the source earlier by that many samples. For one take, slide the event. For a rig offset that comes back every session, set it once as a negative track delay.
4. If your DAW cannot move a track earlier, delay every other track by the same amount instead. The relationship is what matters.
5. Bounce again and measure again.

### **Tools for the job (beta, in calibration):**

- *In Fender Studio Pro 8*: The Delay setting in the track's Inspector, in milliseconds; a negative value moves the track earlier, for a rig offset that comes back every session; Slide the event with snap off, zoomed in to the samples, for one take; Phase Meter on the blend bus while you listen.
- *Popular third-party*: Sound Radix Auto-Align 2 (time-aligns DI/amp and multi-mic pairs); Waves InPhase (delay, polarity and phase adjustment between two tracks); MeldaProduction MAutoAlign (multi-track delay and polarity alignment).
- *Free*: Voxengo Sound Delay (delays a track by samples).

**Where it goes back to in ABA:** The green ABA Phase Check row of the milestone where the source was recorded. That row runs after the last performance and before any blend. Milestone 1's ABA Phase Check row sets the rhythm section reference that every later milestone is laid against, so a late source left there travels forward. A late source that comes back every session is a rig offset: it belongs in the studio calibration, measured once after the room is tuned.

**Verify (beta, in calibration):** Measure again. The move reads under half a sample and the status reads *In line*. The low-mid blend (before → after) should rise: two copies of one sound add up to +3 dB, two different-sounding sources add less. Then listen level-matched: the blend should gain body, not just level.

**The tempting wrong fix:** Aligning the room mic. A room mic is there for its distance. Line it up with the close mic and it stops sounding like a room. Phaze Check leaves the room mic out of the drum rig on purpose.

---

*Or send it to the ABA studio.*

[↑ Back to the Part Two list](#)

## PH3 · Polarity flipped

TO MOVE

PHYSICS

FREE PAGE

**What the report says:** Move it earlier (or later) by N samples (N ms) and flip its polarity. The status reads *Move + flip*.

**What tripped it:** The strongest match between the two sources is upside down: where the reference pushes, this source pulls. In the code: `const flip = bestV < 0` (core.js).

**What kind of finding:** Measured against physics: two pickups of the same sound, compared in time and polarity. A failure here is a failure.

**What it sounds like:** The worst case. At low frequencies the two cancel instead of adding. The giveaway: the blend gets *thinner* as you bring the second fader up.

### Likely causes, most common first:

- A mic facing the other side of the source: the snare bottom against the snare top, a mic behind an open-back cabinet.
- A cable or patch point wired pin 2 to pin 3.
- Gear that inverts polarity by design. Some amps, pedals and preamps do.
- A polarity switch left engaged on a preamp, or in the DAW.

### The fix (beta, in calibration):

1. Flip the polarity of the source, not the reference. On a drum kit, flip the bottom mic, not the top.
2. If the move beside it is under half a sample, flip only. The move is too small to make.
3. If the move is larger, flip first, then make the move: one change at a time.

4. Measure again.

**Tools for the job (beta, in calibration):**

- *In Fender Studio Pro 8*: Mixtool for polarity; Phase Meter on the blend bus.
- *Popular third-party*: Waves InPhase (polarity invert and delay between two tracks); Little Labs IBP (UAD) (polarity and phase adjustment).
- *Free*: The DAW's own polarity control. No plugin needed.

**Where it goes back to in ABA:** The green ABA Phaze Check row of the milestone where the source was recorded. A flip that comes from the patch or the gear comes back every session: fix it at the studio calibration.

**Verify (beta, in calibration):** The polarity reads *normal* and the status reads *In line*. The low-mid blend jumps: a flipped source can go from below 0 dB (canceling) to near +3 dB (adding). By ear: the blend now gets fuller as the second fader comes up.

**The tempting wrong fix:** Calling it "phase" and reaching for a time nudge or a phase-rotation plugin. A flip is not a delay. No amount of moving in time turns an upside-down signal the right way up.

---

*Or send it to the ABA studio.*

[↑ Back to the Part Two list](#)

## That was two of fourteen

The other twelve Phaze Check pages are built the same way: a source that arrives early, out of time and flipped, readings that disagree, low confidence, files that cannot be measured, the phase left after a move, the high-pass's own shift, a stereo pair's gap, a drum nearer one overhead, a take too short for three readings, and the choice to keep it. Plus the training chapter.

**The full Repair Book, both parts: 15 bucks.**

---

*Or send it to the ABA studio.*

[↑ Back to the Part Two list](#)