

ANALEMMA LABS



AUDIO REACTOR GUIDE · V1.0 · WINDOWS

ScienceFX

Audio Reactor Guide

A practical deep dive into Beat Driver, the Audio Companion, Audio Routing and the Custom Matrix.

VERSION

v1.0

PLATFORM

Windows only

SIGNAL

Beat Driver

HOST

After Effects 2022+

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Effect vs Companion: two components, distinct roles

The Audio Reactor involves two separate plug-ins that work together.

ScienceFX.aex The main effect. It performs the rendering and **reads** a parameter called **Beat Driver**. Based on Beat Driver and its settings – Mode, Amount, Response, Routing and Custom Matrix – it modulates the visual parameters.

ScienceFXAudioCompanion.aex A separate AEGP companion. It analyzes the audio and **writes** keyframes onto the Beat Driver. It is launched from the **Animation** menu.

• ARCHITECTURE IN ONE SENTENCE

The companion produces the signal; the ScienceFX effect consumes it and turns it into visual movement.

What the Beat Driver is

The **Beat Driver** is a keyframable parameter of the effect, with a range of 0-100. It is the bridge between audio and graphics.

On its own, at 0, it is inert. When the companion writes an audio envelope onto it, the Beat Driver value changes frame by frame, following the energy of the audio. In **Driver** mode, the effect reads this value and uses it as a modulation source.

• MATCH NAME

Internally, Beat Driver corresponds to the match name **ScienceFX-0531**. This is exactly the stream that the companion identifies and writes to.

Why the companion writes keyframes

The effect does **not** read the audio during rendering. Reactivity is achieved by baking the audio into keyframes on the Beat Driver.

01 Stability and determinism

The render gives the same result frame by frame.

02 Performance and idle behavior

The effect does not have to hook into the host audio stream on every frame.

03 Decoupling

The companion performs audio analysis; the effect performs routing and modulation.

• DESIGN RULE

The companion knows only the Beat Driver. It does not know about Audio Routing or the Custom Matrix. All interpretation of the signal happens on the effect side.

04 MODES

Modes: Off / Test Pulse / Driver

MODE	MEANING
Off	No reaction. The effect behaves as if the Audio Reactor were not there.
Test Pulse	A deterministic synthetic envelope that does not read any real audio. Use it to verify routing, target and depth before baking.
Driver	The effect reads the Beat Driver keyframes generated by the companion. This is the mode for real audio reactivity.

Typical workflow: use **Test Pulse** to set up and test routing/matrix, then switch to **Driver** after baking.

05 AUDIO ROUTING / macro

Audio Routing (macro)

Audio Routing decides, at the macro level, where the envelope energy goes.

ROUTING	BEHAVIOUR
Glow	Modulation tied to the glow.
Cymatics	Cymatics fields; requires the Cymatics module enabled.
Plasma	Plasma fields; requires the Plasma module enabled.
Structure	Structural fields / global transformation; does not require matrix slots.
Energy	A moderate macro combination of multiple contributions.
All	Global macro routing. It responds even if all Custom Matrix slots are Off, because it does not depend on the matrix.
Custom Matrix	Uses exclusively the Map 1-4 slots.

- KEY CLARIFICATION

All does not use the Custom Matrix. **Custom Matrix** uses only Map 1-4. They are alternative paths: either the macro routing or the custom matrix.

06 CUSTOM MATRIX / 4 slots

Custom Matrix: Map 1-4 and the 30 targets

The Custom Matrix has 4 independent slots: **Map 1** , **Map 2** , **Map 3** , **Map 4** . Each slot has a **Target** and a signed **Depth**. Negative values invert the direction.

01 Off	02 Size	03 Segments
04 Topology Mix	05 Chimerism Split	06 Global Z Dist
07 Inside Shift X	08 Inside Shift Y	09 Inside Z Dist
10 Inside Twirl	11 Glow Exposure	12 Plasma Intensity
13 Cymatics Intensity	14 Global Color Amount	15 Math Phase
16 Math Zoom	17 Chaos Delta	18 Noise Evolution
19 Thin-Film Thickness	20 Event Horizon	21 Quantum Phase
22 Quantum Evolution	23 Cymatics Luminosity	24 Cymatics Phase
25 Glow Radius	26 Glow Threshold	27 Global Rotate
28 Kaleido Rotate	29 Inside Rotate	30 Cymatics Rotation

To get a reaction with the matrix: set at least one Target ≠ Off and Depth ≠ 0, with Audio Routing = **Custom Matrix** .

- MODULE GATING

Each target still respects the enable of its own module. If you map **Plasma Intensity** but the Plasma module is off, you will not see anything until you enable it.

07 BAKE PROFILES

Bake Profiles

PROFILE	CHARACTER
Balanced	Default; balance between fidelity and smoothness.
Punchy	More aggressive on transients, with a marked reaction.
Smooth	Soft envelope and gentle transitions.
Minimal Keys	Fewer keyframes, lightweight curves that are easy to edit.

You can re-bake with a different profile whenever you want: every new bake clears the Beat Driver keyframes in the work area before rewriting them.

08 AUTO-TRIM

Auto-trim

When it launches the bake, the companion performs an **auto-trim**: it analyzes the audio and limits the envelope to the audible range within the work area, adding a small padding of about ± 0.5 seconds around it.

- WHY IT MATTERS

Keyframes are concentrated where there is actually sound, avoiding silent stretches filled with useless keyframes.

09 COMP MIX

Two or more audio tracks: comp mix

The companion does not work on a single audio layer, but on the **audio mix of the entire composition**. Multiple tracks – for example music plus voice, or drums plus bass – are combined automatically into the mix that the companion analyzes.

To isolate a single source, mute or temporarily disable the other audio tracks before baking.

— 10 NO AUDIO

What happens if there is no audio

If there is no audio in the composition – or the audio is silent/disabled in the work area – the companion finds no audible material to analyze and does not produce a useful envelope. The Beat Driver remains essentially flat and you will see no reaction.

Add at least one active audio track to the comp before launching the bake.

— 11 PERFORMANCE

Why high CPU/RAM during preview is normal

● PERFORMANCE NOTE

ScienceFX generates graphics procedurally on the CPU. During preview and render, CPU/RAM usage is high by nature. The Audio Reactor does not change this: Beat Driver keyframes drive graphics that are still computed frame by frame.

This is expected behavior, not a malfunction. At idle, CPU usage returns to a low level. To work more smoothly, lower the preview resolution and keep only the necessary modules enabled.

— 12 RECOMMENDED WORKFLOWS

Recommended workflows

A. Quick reaction

- 01 Add audio and select the layer**
Add the audio to the comp, then select the layer with ScienceFX.

- 02 Bake the envelope**
Use **Animation** > **ScienceFX: Bake Audio Reactor Envelope** with the **Balanced** profile.

- 03 Use the macro route**
Set Mode = **Driver** , Audio Routing = **All** , raise Audio Amount and play back.

B. Custom reaction

01 Design with Test Pulse

Before baking, set Mode = **Test Pulse** and Audio Routing = **Custom Matrix** .

02 Configure Map 1-4

Choose Target + Depth and visually verify the test pulse.

03 Bake and fine-tune

Bake with the desired profile, switch Mode = **Driver** , then fine-tune the individual Depth values and Audio Response.

C. Iterating on profiles

- If the reaction is too nervous, re-bake with **Smooth** or **Minimal Keys** .
- If it is too flat, use **Punchy** and/or increase Audio Amount.
- Use **Test Pulse** to design routing without depending on the audio.

• ARCHITECTURAL REMINDER

The companion writes only the Beat Driver (**ScienceFX-0531**) and is wrapped in an Undo group. It does not know about Audio Routing or the Custom Matrix. The Pattern/Mirror popups are not driven by the Audio Reactor.

