

gFractor — User Manual

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gFractor — User Manual

This is the end-user manual for **gFractor 1.0.8**, a multi-mode spectrum analyzer, oscilloscope, and metering plugin from GrowlAudio. It assumes you're an audio engineer or producer who already knows what FFT, mid/side, slope tilt, transients, and phase correlation are.

1. What gFractor is

A measurement plugin (VST3 / AU / Standalone) you put on any bus to **see** what's in your audio. It shows two views — a spectrum analyzer and a tempo-synced oscilloscope — over three channel decompositions (Mid/Side, Left/Right, Tonal/Transient), with a goniometer + correlation + width-per-octave metering panel and a full ITU-R BS.1770-4 LUFS meter alongside. It does not colour the audio unless you tell it to: a gain stage, a dry/wet mix, and an audition bell filter are the only signal-path controls.

Insert it post-fader on a master bus or any group whose tonal/stereo balance you want to monitor.

2. Quick start

1. Load **gFractor** on a bus and play audio.
2. Two coloured spectrum curves animate in real time. By default:
 - **Green** is the **Primary** channel (Mid in M/S mode, Left in L/R, Transient in T/T).
 - **Amber** is the **Secondary** channel (Side, Right, or Tonal).
3. Press **Tab** to cycle the channel decomposition: **M/S** → **L/R** → **TRN** → **M/S**... The pill captions in the footer rename themselves to match

(MID | SIDE , LEFT | RIGHT , TRANS | TONAL).

4. Press **V** to toggle between the **Spectrum** view and the **Oscilloscope** view.
5. Click **STEREO** in the footer to slide out the right-side metering panel (goniometer, correlation, width-per-octave). Click **LUFS** for the loudness meter.
6. Hover the spectrum to read frequency / dB / nearest musical note. **Right-click and drag** to audition a bell filter (drag vertical for Q).

That's the whole product, conceptually. The rest of this manual explains each piece.

3. The Primary / Secondary concept

gFractor's most important UI decision: the **same two channel toggles, the same two curves, and the same two colours** are reused across all three channel modes. They are always labelled **Primary** (green) and **Secondary** (amber) internally — only the captions change.

Channel mode	Primary (green)	Secondary (amber)
M/S	Mid = $(L+R)/2$	Side = $(L-R)/2$
L/R	Left	Right
TRN (Tonal/Transient)	Transient component	Tonal component

Two consequences:

- Keys **1** and **2** always toggle the green and amber traces, no matter which mode you're in. They only affect what you see, not what is heard — turning a trace off does not mute the signal.
- The Reference / Ghost / Target overlays use *different* colours (blue and pink) to avoid collisions, so you can run a reference comparison without losing track of which curve is which.

The T/T mode is worth a separate note: it uses a dual-envelope tracker (fast vs slow envelope, normalised by body level). The Transient curve emphasises percussive content; the Tonal curve emphasises sustained content. Adjust the time constant in **Preferences** → **Trans Len** (default 1.0 ms; range 0.1–10 ms).

4. Interface tour

```
+-----+
| HEADER      gFractor • by GrowlAudio  [Preset] [⚙] [?] |
+-----+
|                                     | Stereo / |
|                                     | LUFS panel |
| VIEW AREA   Spectrum or Oscilloscope | (sliding) |
|                                     |           |
+-----+
| FOOTER      [M/S▼] [MID] [SIDE] [REF] [GHOST] [FREEZE] |
|              [SPEC▼] [HOLD] [TARGET] [LOAD] [SAVE]      |
|              [LUFS] [STEREO]                             |
+-----+
| HINT BAR    hover hints                    [FFT▼][Ovr▼][Dec▼][Slp▼]|
+-----+
```

Header bar

- **Preset pill** — shows the current preset name, with a dot if the state is dirty. Click for the preset menu.
- **Settings (⚙)** — opens the Preferences overlay (section 10).
- **Help (?)** — About, Check for Updates, link to this Manual. A small dot on the icon means a newer gFractor version is available.

View area

The main display. Either the spectrum or the oscilloscope renders here. Press **W** in spectrum mode to expand the view fullscreen across the footer/hint bar.

Footer bar

The control surface. Most footer pills are **toggles**; a few (Channel Mode, View, Vertical Scale, Time Window) are **dropdowns**. Pill captions on the left depend on channel mode; pill availability on the right depends on which view is active.

Hint bar

The bottom strip is contextual: hover over any control or the spectrum/scope itself, and the hint bar shows what you can do there (e.g. `CLICK` | `DRAG` – `Audition band` | `Move between bands`). On the right, in spectrum mode, you also get four global dropdowns for **FFT size**, **Overlap**, **Decay**, and **Slope**.

Right-side panels

The **Stereo** and **LUFS** pills each slide out a panel on the right edge. They can be open simultaneously. Drag the vertical divider on the left edge of the panel to resize.

5. The Spectrum view

A real-time FFT magnitude spectrum, log-frequency × dB, with 256 log-spaced render points across the visible range. Both Primary and Secondary curves are drawn simultaneously and can be overlaid with Ghost (sidechain) and Reference (frozen capture) curves.

Analysis parameters (hint-bar dropdowns)

Control	Options	Notes
FFT	2048 / 4096 / 8192	Larger = finer low-end resolution, slower update. Default 8192. Key F cycles.
Overlap	2× / 4× / 8×	Higher overlap = smoother time-resolution at higher CPU. Key O cycles.
Decay	Off / Fast / Med / Slow	Exponential ballistics on the rendered magnitude. <i>Off</i> shows raw instantaneous bins. Key D cycles.
Slope	0 / +3 / +4.5 dB/oct	Tilt to compensate for the 1/f spectral slope of music. +4.5 approximates a pink-noise-flat display. Key S cycles.

Persistence controls (footer)

- **FREEZE** (key **Z**) — pauses the display without stopping audio analysis. Useful for taking a screenshot of a transient.
- **HOLD** (key **H**) — infinite peak hold. Adds a glow trace at the maximum bin levels seen since enabled. Disable + re-enable to reset.
- **GHOST** (key **G**) — shows a faded "now" copy of the spectrum even while frozen, so you can compare a captured moment against live audio.

Reference, Target, Audition

- **REF** (key **R**) — analyses the **sidechain input** and overlays it in blue (Primary) and pink (Secondary). See section 7 for routing.
- **TARGET** (key **T**) — overlay a saved EQ curve loaded from disk. Use **LOAD** to import; **SAVE** captures the current Primary curve as a target file you can reload later.
- **Right-click drag on the spectrum** — auditions a 4th-order bell filter on the audio path at the cursor frequency. Horizontal drag sweeps frequency, vertical drag adjusts Q (0.5–10). Release to remove. Useful for confirming a resonance by ear.

Band hint strip

Just above the frequency axis, gFractor draws a thin clickable strip with seven musical band labels (sub, bass, low-mid, mid, hi-mid, presence, air). Click a label to apply a 4th-order band-isolation filter and audition that band; drag along the strip to move between bands. Click again to release.

Fullscreen

Press **W** to hide the footer + hint bar and expand the spectrum across the entire window. Press **W** again or **Esc** to restore.

6. The Oscilloscope view

Press **V** to switch. Tempo-synced time-domain waveform of Primary and Secondary, with the cursor tracking DAW playback position.

Control	Options	Notes
Time window	1/16 → 8 bars (musical)	Synced to the host BPM. Dropdown in the footer.
Vertical scale	0.5× → 5×	Gain on the display only — doesn't affect audio. Dropdown in the footer.
Spectral coloring (key C)	on/off	Tints each sample by its instantaneous frequency content — bass darker, highs brighter. Off = flat trace colour.
Split Scope (key X , or Preferences → Split Scope)	on/off	Draws Primary and Secondary in their own stacked lanes instead of sharing a centred axis. Better when both channels have content near each other.

Pan and zoom

- **Mouse wheel** over the scope — horizontal zoom.
- **Horizontal drag** — pan the time window when zoomed in.

Ghost / Reference in the scope

GHOST and REF work in the oscilloscope too: they overlay the sidechain signal as ghosted traces on top of the main waveform. Useful when comparing pre/post processing on the same musical moment.

7. Reference mode (sidechain A/B)

Reference mode lets you A/B against any signal routed to gFractor's **sidechain input**. When enabled, that signal is analysed in parallel with the main input and drawn as blue/pink curves over the green/amber ones.

Routing the sidechain

DAW	How
Logic Pro	The "Side Chain" menu in the top-right of the plugin window — pick the source bus.
Ableton Live	Drop gFractor on the main track; in the source track's I/O, set Audio To → the gFractor track → Sidechain .
Reaper	Add a second input pair on gFractor's FX, then route the reference track's send to channels 3/4 of the gFractor track.
Cubase / Nuendo	Enable the side-chain button at the top of gFractor's plugin window, then route the reference track's send to it.
Pro Tools	Set the plugin's Key Input to the reference bus.

Using reference

- REF (key **R**) — latching toggle.
- Hold **Ctrl** — momentary reference: REF is on only while held. Useful for fast A/B without taking your hand off the keyboard.

The reference signal does not pass to the output — it's analysis-only.

8. Stereo metering panel

Click **STEREO** in the footer to open. Three instruments, top to bottom:

Goniometer

A 45°-rotated Lissajous of L vs R with phosphor persistence. Reads the same way as any classical vectorscope:

- A vertical line = mono content.
- A wide diamond = strong stereo content with good phase.
- A horizontal line = out-of-phase (mono-collapse will cancel).

Correlation meter

A horizontal bar from -1 to +1. Useful at-a-glance check: stays around +0.4 to +0.9 for healthy stereo; dipping toward 0 or below 0 on a mix bus is a phase warning.

Width per octave

10 octave bands. For each band, the bar shows the **Secondary/Primary energy ratio** — i.e. how wide that band is. In M/S mode this is Side/Mid; in L/R it's Right/Left. Quickly reveals which frequencies collapse to centre and which spread out.

LUFS panel (separate pill)

Click **LUFS** to open the loudness meter alongside. ITU-R BS.1770-4 / EBU R128 compliant. Bar on a mastering-range -12 to +2 LUFS scale (short-term) with the integrated value marked by an amber tick on the same axis. Five numeric readouts — **Short-term, Integrated, Loudness Range, Dynamics, Avg Dynamics**. Three Max-since-reset pills — **Momentary Max, Short-term Max, Peak Max**. Click the reset button to clear integrated + max history. K-weighting and gating run on the audio thread; the UI reads via lock-free atomics.

9. Presets

Click the preset pill in the header to open the menu.

- **Save** — writes the current state under the active preset name.
- **Save As...** — prompts for a new name.
- **Rename / Delete** — edit existing presets.
- **Factory and User folders** — User presets live in the OS-standard application data folder (macOS: ~/Library/Application Support/GrowlAudio/gFractor/Presets ; Windows: %APPDATA%\GrowlAudio\gFractor\Presets).

A **dot next to the preset name** indicates the state is dirty — a parameter or a display setting has changed since the preset was loaded. Loading another preset, saving, or reverting clears the dot.

State that is *not* saved into presets, but persisted globally per-user: window size, panel divider position, theme, the "Shortcuts On/Off" toggle, and the daily update-check cache.

10. Settings (Preferences)

Click the ⚙ pill in the header. A modal panel (350 × 432px) overlays the view with:

Setting	Options / Range	Notes
Min dB	–120 to –12 dB	Floor of the spectrum axis.
Max dB	–24 to +12 dB	Ceiling of the spectrum axis.
Min Hz	10 to 200 Hz	Left edge of the spectrum axis.
Max Hz	5000 to 24000 Hz	Right edge of the spectrum axis.
Colours	4 swatches	Primary, Secondary, Ref Primary, Ref Secondary. Click any swatch for a colour picker.
Smoothing	Off / 1/3 / 1/6 / 1/12 Oct	Octave-band smoothing applied to the spectrum curve.
Solid Fill	on / off	Fill under the spectrum curve, or outline only.
Split Scope	on / off	Same as the ☐ key — splits the oscilloscope into per-channel lanes.
Shortcuts	On / Off	Globally enable or disable the keyboard shortcuts. Disable if the DAW eats keystrokes.
Trans Len	0.1 – 10.0 ms	Transient-detection envelope time constant for T/T mode. Automatable.
Theme	Balanced / Dark / Light	Default is Balanced.
Analytics	Off / On	Opt-in usage analytics. No audio data is ever transmitted.

Save commits all changes; **Cancel** discards them; **Reset** restores factory defaults for everything except theme and analytics.

Note: only `gain` , `dryWet` , `bypass` , `outputPrimaryEnable` , `outputSecondaryEnable` , and `transientLength` are exposed as DAW-

automatable parameters. Display options (dB/Hz range, colours, smoothing, theme) are user-global, not per-session — they apply across all instances of the plugin.

11. Keyboard shortcuts

Shortcuts can be globally disabled in **Preferences → Shortcuts**.

Channel

Key	Action
1	Toggle Primary visibility
2	Toggle Secondary visibility
Tab	Cycle channel mode (M/S → L/R → TRN)

View

Key	Action
V	Spectrum / Oscilloscope
W	Fullscreen spectrum
X	Split Scope (oscilloscope only)
C	Spectral coloring (oscilloscope only)

Display overlays

Key	Action
R	Reference (sidechain)
Ctrl (hold)	Momentary reference
G	Ghost
Z	Freeze
H	Infinite peak Hold
T	Target curve

Spectrum parameter cycling

Key	Cycles
F	FFT size (2048 → 4096 → 8192)
O	Overlap (2× → 4× → 8×)
D	Decay (Off → Fast → Med → Slow)
S	Slope (0 → +3 → +4.5 dB/oct)

Misc

Key	Action
Esc	Close overlay panel / exit fullscreen
P	Performance display (debug builds only)

Mouse

Action	Effect
Hover spectrum	Crosshair + freq/dB/note tooltip
Right-click drag (spectrum)	Audition bell filter — horiz: freq, vert: Q
Click band label	Audition that octave band
Drag band label	Sweep across bands
Wheel over scope	Horizontal zoom
Drag in scope	Pan time window
Drag panel divider	Resize metering panel
Drag window corner	Resize window

12. Troubleshooting

Reference mode shows nothing. The sidechain input isn't routed. See section 7 for your DAW's sidechain setup. In standalone mode there is no sidechain — REF will be inert.

Pressing Tab / R / Z etc. does nothing. Either the plugin window doesn't have keyboard focus (click anywhere inside it first), or your DAW captures the key before gFractor sees it (common with Tab in Live and Pro Tools).
Workaround: change channel modes via the dropdown in the footer, or disable Shortcuts in Preferences and use the footer pills.

Spectrum looks coarse at the low end. Increase FFT size to 8192 (key F). Below 80 Hz, frequency resolution is limited by the FFT and a smaller size won't resolve adjacent bass notes.

Spectrum is choppy. Increase Overlap to 8× (key 0) and/or set Decay to Slow (key D). If CPU is the constraint, drop FFT size to 4096.

Plugin uses high CPU. The biggest cost factors are FFT × Overlap. Try 4096 / 4× as a baseline; reserve 8192 / 8× for static-track analysis. The oscilloscope and metering panels are cheap by comparison.

Preset state didn't recall correctly. Display settings (dB range, freq range, colours, smoothing, theme) are stored **per-user, not per-session**. They are intentionally not saved into presets or the session DAW state. Verify the parameter that didn't recall is one of the six automatable parameters (section 10).

The Help button has a small dot on it. A newer version of gFractor is available. Click Help → Check for Updates to see the version number. The check is local and once per day — no telemetry.

Update check failed / I want to disable it. The check hits `growl-audio.com/plugins/gfractor/version.json` once per calendar day on a worker thread. No telemetry is sent. There is no UI toggle to disable the check itself; if you need to block it, block the domain at your firewall.

gFractor 1.0.8 — © GrowlAudio. Built with the JUCE Framework.