# Dynamic EQ User Manual (VST3/AU version)

## 1. Introduction

Welcome to Dynamic EQ. This VST3/AU plugin combines precise static tone-shaping with per-band dynamic (level-triggered) gain control, real-time problem-frequency detection, and a freehand curve-drawing workflow, all inside a single 8-band equalizer.

Designed for engineers who want the speed of a modern EQ without giving up the control of a true dynamics processor, this plugin bridges the gap between everyday corrective EQ and dedicated multiband dynamics tools.

It began life as a Max for Live device and has been rebuilt as a native C++/JUCE plugin so it runs directly inside Cubase, Studio One, Logic Pro, and any other VST3/AU host, without needing Max for Live installed.

Unlike a plain static EQ, every band on Dynamic EQ can be told to only engage once the signal crosses a threshold you set. Sound shaping is handled through two things working together:

- **Static shape:** each band's Frequency, Q, Gain, and Shape (Bell / Low Shelf / High Shelf) define what the band does when it's simply “on”, exactly like a conventional EQ band.
- **Dynamic behaviour:** Threshold, Range, Attack, and Release decide whether — and how — that band's gain moves in response to the signal level, either its own (Internal) or an external sidechain source (SC1–SC6).

By separating the static shape from the dynamic behaviour, you have surgical control over exactly when and how much any given frequency region moves — whether you're taming a resonance that only flares up occasionally, de-essing a vocal, or carving space for a kick drum only while it's actually hitting.

Whether you're doing everyday corrective mixing, chasing masking problems between instruments, or shaping a finished master, Dynamic EQ puts a complete detection-and-dynamics EQ engine right inside your DAW.

## 2. The Interface

The Dynamic EQ interface is designed to keep the frequency/gain graph front and centre while all of the controls that shape it stay one click away underneath.

The UI is divided into three areas: the Graph (the main frequency/gain display, with the band handles and curves on it), the Band Tabs (running along the bottom edge of the graph), and the Band Control Strip and Global Controls beneath that.

## 2.1 The Graph (Main Display)

This is the heart of the plugin. It's a logarithmic frequency axis (20 Hz–20 kHz) against a gain axis in dB, on which every enabled band draws a coloured, draggable handle and its own curve. A softly filled area under each band's curve shows how far that band's gain can swing dynamically between its static value and its value at full Range.

- **Gain Range:** the graph's vertical zoom (±6, 12, 18, 24, 30, 36, 42, 48 dB), adjusted by Ctrl/Cmd-dragging on empty grid space or scrolling your mouse wheel over the vertical scale/grid.
- **Handles:** click and drag a band's handle to change its Frequency (and Gain, for the 6 parametric bands). See §2.5 for the full set of drag/click behaviours.
- **Mode buttons:** the D / I / S / R / A buttons sit directly inside the graph's own top-right corner, overlaid on the grid rather than in a separate toolbar row (see §2.4).

Before any band is enabled, the panel beneath the graph shows a short reminder instead of controls: *“DOUBLE-CLICK ON THE GRID TO ENABLE A BAND, OR ENABLE IT VIA THE ON/OFF ICON ON ITS TAB, OR DRAW A CURVE SKETCH BY ENTERING DRAW MODE.”*

## 2.2 The Band Tabs

Eight tabs run along the bottom of the graph — Low Cut, Band 1–Band 6, and High Cut — each colour-coded so its tab, handle, and curve all match at a glance.

- **Left/main area of a tab:** selects that band as the current band if it’s enabled.
- **Right edge of a tab (shows a small power icon on hover):** toggles that band on/off with or without changing which band is currently shown in the control strip (based on the “Auto-Select Enabled Band” setting inside the About window).

Low Cut and High Cut display a small filter-slope icon instead of a number; the six parametric tabs display their band numbers.

> **Note on Band Renumbering:** If the *Auto-Renumber Bands* setting is enabled in the About window, tabs display a dual-number label (e.g., "2(5)"). The first number represents its visual left-to-right order, while the number in parentheses indicates its true parameter slot as recognized by DAW automation.

## 2.3 The Band Control Strip

Beneath the band tabs, the bottom row of the interface splits into two panels. The wide panel on the left is the Band Control Strip: whichever band is currently selected shows its full set of controls here.

- **Low Cut / High Cut:** Freq, Q, and Slope (6, 12, 24, 36, 48, 60, 72, 84, 96 dB/oct).
- **The 6 parametric bands:** Shape (Low Shelf / Bell / High Shelf), Freq, Q, Gain, Threshold, Range, Attack, Release, a row of Sidechain-source buttons (Internal, SC1–SC6), and a row of routing buttons (Stereo, L, R, M, S).

***The Live Threshold Indicator***

The Threshold knob doubles as a live meter. Whenever a band's dynamics are active (Range $\neq$ 0), a moving orange arc is drawn over the knob showing the current, real-time detected level on the same scale as Threshold — so you can watch the signal approach, cross, and retreat from your threshold as you dial it in.

## 2.4 The Overview Panels

To view and edit parameters across all bands simultaneously without switching tabs, Dynamic EQ features two sliding overview panels located directly beneath the main interface.

### Panel Structure & Contents

- **Panel 1 (EQ Overview):** Displays static EQ parameters for all 8 bands (Low Cut, Bands 1–6, and High Cut) side-by-side.
    - *Bands 1–6:* Direct controls for **Frequency**, **Q**, **Gain**, **Stereo/Channel Routing** (Stereo, L, R, M, S), and **Filter Shape** (Low Shelf, Bell, High Shelf).
    - *Low Cut / High Cut:* Direct controls for **Frequency**, **Q**, and **Slope**.
- **Panel 2 (Dynamics Overview):** Displays dynamic parameters for the 6 parametric bands (Bands 1–6).
    - Direct controls for **Range**, **Threshold** (featuring a live signal detection meter), **Attack**, **Release**, and **Sidechain Routing** (Internal, SC1–SC6).

**Visual Identifiers:** Each enabled cell in the overview panels displays a large, translucent watermark indicating its band number or filter shape. Disabled bands hide their controls and display a clear band’s label.

### Opening and Closing Panels

You can reveal or hide the panels using either the mouse or keyboard shortcuts:

**Using Mouse Navigation:**

- **Expand Panel 1:** Click the downward arrow button centered at the very bottom edge of the main plugin interface.
- **Expand Panel 2:** Click the downward arrow at the bottom of Panel 1 to reveal Panel 2 underneath.
- **Collapse Panels:** Click the upward-pointing arrow on either panel to fold it back up.

**Using Keyboard Shortcuts:**

- **Down Arrow (↓):** Press once to expand **Panel 1** (EQ Overview). Press a second time to expand **Panel 2** (Dynamics Overview).
- **Up Arrow (↑):** Press once to fold **Panel 2** back into Panel 1. Press a second time to close **Panel 1** and return to the standard main view.

### Dynamic Renumbering Support

If **Auto-Renumber Bands** is enabled in the About overlay, the columns in both Overview Panels automatically re-order themselves from left to right to match the visual arrangement of the main display

screen. Disabled cells automatically adapt their display labels to stay perfectly synchronized with the tab strip above them.

***Note on Value Editing:*** Knobs inside the Overview Panels are adjusted via mouse drag or scroll wheel. Direct numerical text entry remains exclusive to the main control strip.

A new setting in the About overlay allows you to set the default view of the device: No Panels, One Panel, Two Panels.

## 2.5 The Toolbar & Master Section

Five small mode buttons — D, I, S, R, A — sit in the graph's own top-right corner, overlaid directly on the grid rather than in a separate row above it.

- **D (Draw):** toggles Draw/Sketch mode — sketch a target curve freehand and have it matched onto real bands (§3.3).
- **I (Individual):** the normal editing view — each band shown and edited on its own (§3.1). Selected by default.
- **S (Summed):** a monitoring view showing the true combined Left/Right output plus Mid/Side ghost curves; editing is locked while it's open (§3.2).
- **R (Reset):** resets every band to its factory default, after a confirmation prompt.
- **A (Analyzer):** toggles the real-time spectrum analyzer overlay on/off.

The narrower panel on the right of the bottom row holds the master section:

- **Global Gain & Autogain:** trim output level manually (±24 dB) or engage Autogain (§8.3).
- **Meters & Logo:** stacked Input/Output level meters plus the plugin logo. Clicking the logo opens the **About Overlay** (holding workflow preferences such as *Default Gain Range*, *Auto-Select Enabled Band*, *Auto-Renumber Bands*, and *Auto-Exit Draw Mode*).
- **Bypass Button:** sits next to the input/output meters to toggle global processing on or off.

## 2.6 Mouse & Keyboard Reference

Most of the plugin's editing happens directly on the graph, using clicks, drags, scroll gestures, and hotkeys:

**Mouse Controls:**

- **Drag a handle:** move that band's Frequency (and Gain, for bands 1–6).
- **Shift + drag a handle:** fine adjustment — the same drag, at much smaller steps.
- **Ctrl/Cmd + drag a handle (bands 1–6):** adjust that band's dynamic Range instead of Freq/Gain. Pressing Ctrl/Cmd mid-drag seamlessly switches from Freq/Gain adjustment to Range control.
- **Ctrl/Cmd + drag a handle (LC/HC):** adjust filter Slope instead of Frequency.
- **Ctrl/Cmd + drag on empty grid:** zoom the visible Gain Range in/out (±6…±48 dB).
- **Mouse wheel over grid:** adjust the visible vertical Gain Range.
- **Mouse wheel over a handle:** adjust that band's Q. Hold Shift to fine-tune.
- **Alt/Option + drag a handle:** Solo/Audition that band (§7) without changing its settings.

- **Alt/Option + click empty grid:** arm/disarm Resonance or Clash Detection on the selected band (§6).
- **Double-click a handle:** disable that band.
- **Double-click empty grid space:** spawn the nearest free band at that frequency (automatically set to Low Cut below ~60 Hz, and High Cut above ~10 kHz, otherwise the first free parametric band), pre-set to the clicked frequency/gain.

**Keyboard Shortcuts:**

- 0: Toggle visibility of frequency and gain tooltips for all currently enabled bands simultaneously.
- 1 – 6: Select parametric Bands 1 through 6.
- 7: Select the Low Cut (High Pass) band.
- 8: Select the High Cut (Low Pass) band.

# 3. View Modes: Individual, Summed, and Draw

## 3.1 Individual View (“I”)

This is the normal working view. Every enabled band is drawn as its own coloured curve, handle, and filled dynamic-range area, and you can freely select, drag, and edit any band. This is where you'll do all of your day-to-day EQ work.

## 3.2 Summed View (“S”)

Summed View replaces the per-band curves with the actual, final result the listener will hear: the true combined Left-channel curve (green) and Right-channel curve (red), drawn as solid lines. On top of those, two dashed “ghost” curves show the equivalent Mid (cyan) and Side (orange) curves, if there are bands that affect Mid/Side channels.

***Note:*** *editing is intentionally locked while Summed View is active — it's a monitoring/verification view, not an editing view. Switch back to Individual (“I”) to keep working.*

## 3.3 Draw / Sketch Mode (“D”)

Draw mode lets you sketch the EQ curve you want with the mouse instead of dragging individual handles. Click and drag a single, roughly left-to-right stroke across the grid; when you release the mouse, the stroke is analyzed and automatically matched onto real bands.

If “Auto-Exit Draw Mode After Sketching” (About $\rightarrow$ Settings) is enabled, a successful sketch automatically returns you to Individual view so you can immediately fine-tune what was matched.

***Note:*** *Draw mode is a fast way to get close to a target curve, not a substitute for the precision of dragging individual bands. Always review and fine-tune what gets matched.*

# 4. The Dynamic EQ Engine

Any of the 6 parametric bands (not Low Cut/High Cut) can be turned into a dynamic band using four controls: Threshold, Range, Attack, and Release. Internally, each dynamic band runs its own detector — a bandpass filter tuned to that band's own frequency and Q, followed by a fast peak follower — so the dynamics react specifically to energy in that band's own frequency region, not to the track's overall loudness.

## 4.1 Threshold, Range, Attack, Release

- **Threshold:** the detected level (in dB) above which the band's gain starts moving away from its static value, toward Range.
- **Range:** the maximum amount of dynamic gain change (±48 dB) applied once the signal is well above Threshold.
    - A negative Range makes the band cut harder as the detected level rises above Threshold — classic dynamic/compressive EQ behaviour: gentle de-essing, taming a resonance only when it actually rings out loudly, ducking a frequency only while a competing sound is present.
    - A positive Range makes the band boost more as the detected level rises above Threshold — an “upward” dynamic EQ: adding presence/clarity only when the source is already loud/energetic in that region, without permanently boosting quieter moments.
- **Attack:** how quickly the dynamic gain engages (moves away from its static, unity position) once the signal crosses Threshold.
- **Release:** how quickly the dynamic gain lets go (returns toward its static position) once the signal drops back below Threshold.

With Range at 0, a band behaves as a completely ordinary static EQ band — Threshold/Attack/Release have nothing to act on.

## 4.2 Sidechain Source: Internal vs. External (SC1–SC6)

- **Internal:** the band reacts to its own filtered version of the signal passing through the EQ itself — the standard, self-contained dynamic EQ behaviour.
- **SC1–SC6 (External):** the band's detector instead listens to a separate audio input routed into one of the plugin's six sidechain buses, while the gain change is still applied to the main signal — letting one track's dynamics be driven by another track entirely.

***Note:*** *Make sure your DAW supports multiple sidechaining to use all 6 sidechain channels.*

Typical external-sidechain uses:

- Route a bass track's low band to react to the kick drum's sidechain, carving a dip only while the kick is actually hitting, instead of a static, always-on cut.
- Route a rhythm guitar or synth bed's midrange band to react to the lead vocal, ducking the exact frequencies that mask the vocal only while the vocal is present.
- Route a reverb/room bus to react to the dry source it's paired with, so the reverb automatically loses competing frequencies only during the direct sound.

# 5. Stereo Routing: Stereo, L, R, M, and S

Each of the 6 parametric bands can be routed to process the full stereo signal, a single channel, or the Mid/Side components independently. This is one of the most powerful — and most misunderstood — tools in the plugin, so it's worth being precise about what each option actually does and when to reach for it.

***Stereo (default)***

The band affects the Left and Right channels identically. This is the transparent, predictable default — use it for the vast majority of tonal and corrective EQ moves, especially on mono or already-centred sources, and any time you don't have a specific reason to isolate a channel or the Mid/Side components.

***L / R (independent channels)***

The band affects only the Left or only the Right channel. Use this when a problem is genuinely asymmetric between the two channels — a resonance on one drum overhead mic but not the other, a hum or buzz picked up by only one DI/mic, correcting a channel-specific frequency imbalance in a stereo recording — or for deliberate, creative stereo effects. L/R routing is rarely needed on a single mono source, but is common on stereo recordings, stereo samples, and stereo buses.

***M (Mid)***

The band affects only the mono-summed centre content of the signal (everything panned dead centre, or common to both channels). Reach for M when you want to shape what's in the middle of the stereo image — lead vocal, bass, kick, snare, centre-panned lead instruments — without touching whatever lives in the sides. A very common move is tightening the low end using M only, so the mono low end gets cleaned up without narrowing the stereo width the low end may be carrying via Side content.

***S (Side)***

The band affects only the stereo difference content — everything that differs between Left and Right (room ambience, stereo reverb/delay tails, width effects). Reach for S when you want to control the sense of space and width without touching the centred elements. Two very common moves: cutting low end in Side (“mono-izing” the sub-bass) to avoid phase cancellation, and adding a gentle high-shelf boost in Side for “air”/openness that widens the perceived stereo image without pushing a centred vocal or lead forward.

***Note:*** *M/S EQ only does something audible if there actually is Side content to act on. It is most powerful on stereo submixes and buses (drum overheads, stereo synths, the full mix/master bus) and on individual stereo recordings, rather than on mono tracks like a single-mic'd vocal or a DI bass.*

# 6. Resonance & Clash Detection

Alt/Option-click on any empty area of the grid to arm Detection Mode for the currently selected band; Alt/Option-click again to disarm it. What gets shown depends entirely on that band's own Sidechain-source setting.

## 6.1 Resonance Detection (Sidechain = Internal)

With the selected band's Sidechain set to Internal, arming detection analyses that band's own signal and surfaces the top 3 momentary resonant/problem frequencies, colour-coded by severity (red = most prominent, then orange, then yellow). Alongside the live markers, a slower-building heatmap accumulates underneath the spectrum display, showing which frequencies resonate most persistently over time rather than just in the current instant — useful for catching an intermittent resonance that only shows up on certain notes or phrases.

Typical workflow: select (or create) a parametric band, arm detection, play the track, and watch where markers repeatedly land and where the heatmap builds up. Move that band (or a spare band) to sit on the hot spot and apply a narrow cut.

## 6.2 Clash Detection (Sidechain = External SC1–SC6)

With the selected band's Sidechain set to an external source, arming detection instead compares the main signal against that external sidechain signal, and surfaces the frequencies where the two sources are competing/masking each other the most — i.e. where both signals carry significant energy at the same time.

Typical workflow: on a bass track, route its sidechain to the kick drum bus and arm detection to find exactly where bass and kick overlap in the low end; on a guitar or keys track, route the sidechain to the lead vocal bus to find where the instrument is masking the vocal. Once you know the frequency, either dip it (statically or dynamically — see §4) on the masking track, or use it to inform a complementary EQ move on the other track. Section §10 below is dedicated entirely to this workflow.

# 7. Solo / Audition Mode (Alt + Drag)

Alt/Option-dragging any band's handle temporarily solos a narrow “flashlight” probe around that band's frequency, letting you hear exactly what's happening there without changing any of the band's actual settings.

# 8. Spectrum Analyzer, Gain Range, and Autogain

## 8.1 Spectrum Analyzer

Toggled with the “A” button in the toolbar, the analyzer overlays a real-time FFT view of the post-EQ signal behind the curve display, on a fixed –90 to 0 dBFS scale that stays constant regardless of which gain range you're currently viewing the curve at. A separate, slower-decaying peak-hold line tracks the recent ceiling at each frequency.

### 8.2 Gain Range

The vertical scale of the graph itself — independent of the analyzer — can be zoomed between ±6, ±12, ±18, ±24, ±30, ±36, ±42, and ±48 dB by Ctrl/Cmd-dragging on empty grid space or using the mouse wheel over the gain range scale. Use a narrow range (±6/12 dB) for precise, subtle work, and a wider range (±24–48 dB) when making aggressive corrective moves or working with steep filter slopes.

> **Default Gain Range Setting:** You can choose your preferred default gain range for all new instances via the About overlay menu (click the plugin logo). Existing instances in saved sessions retain their saved scale.

### 8.3 Global Gain, Bypass, and Autogain

- **Global Gain:** A manual output trim (±24 dB) applied after all processing.
- **Autogain:** Computes an automatic level-compensation value purely from the shape of the current curve (never from the live audio signal, so it's deterministic and won't pump or drift with the program material), applying it smoothly so boosting or cutting tone doesn't alter perceived loudness.
- **Bypass Button:** Located next to the output meters, this toggles processing on or off for instant A/B evaluation.

## 9. Practical Use by Source

The sections below are starting points and common moves, not rules — always let your ears and the material decide. Frequencies are approximate and will shift depending on the instrument, recording, and genre.

### 9.1 Drums

- **Kick:** LC around 30–40 Hz to remove sub-rumble without robbing weight; a dynamic cut (negative Range) around 300–500 Hz can tame boxiness only when it flares up, rather than thinning the kick permanently.
- **Snare:** use Resonance Detection to hunt ringy overtones (often 800 Hz–2 kHz on wood-shell snares); a dynamic band with a negative Range around 3–6 kHz can control excess snap/crack on hard hits only.
- **Overheads/room mics:** L/R routing is genuinely useful here if one mic has a specific resonance the other doesn't; S routing on a stereo overhead pair can add air/shimmer to cymbals without brightening the kit's centre image.
- **Kit bus:** M routing to tighten low-mid mud in the centre (kick/snare) while leaving the S content (room, cymbal spread) untouched; Clash Detection with the sidechain routed to the bass bus can reveal exactly where kick and bass fight.

### 9.2 Bass

- LC around 30–50 Hz depending on tuning, to remove unusable sub-rumble while keeping the fundamental.

- Route a low-mid band's sidechain to the kick drum bus and use Clash Detection to find the exact overlap frequency, then apply either a static dip or, more transparently, a dynamic (negative Range) cut on the bass that only engages while the kick is hitting.

### 9.3 Guitars

- A negative-Range dynamic band around 2–5 kHz tames fret noise, pick attack, or fizz only on the loudest hits, preserving the natural dynamics the rest of the time.
- On doubled/stereo rhythm guitars, S routing can widen the sense of space (gentle high-shelf boost) while M routing tightens the low-mids that would otherwise clash with bass and vocal.
- Use Clash Detection with sidechain routed to the vocal bus to find where a rhythm guitar's midrange is masking the vocal, then apply a static or dynamic dip there.

### 9.4 Keys / Synths / Pads

- Wide stereo pads respond well to S-routed EQ: shaping width-carrying content (highs for air, or trimming a boomy low-mid buildup in the sides) without touching the mono core of the sound.
- For a lead synth or piano competing with a vocal, Clash Detection (sidechain $\rightarrow$ vocal bus) quickly finds the exact masking frequency; a dynamic, negative-Range dip there keeps the part present but out of the vocal's way only when the vocal is actually singing.

### 9.5 Vocals

- A dynamic band with negative Range around 4–9 kHz (tuned to the specific voice/mic) is a classic de-esser: it only engages on sibilant “s/sh” sounds, leaving the rest of the vocal's high end untouched.
- Resonance Detection is excellent on vocals for catching nasal or honky resonances (often 800 Hz–2.5 kHz) that only appear on certain vowels/notes — a dynamic cut there is far less audible than a static one.
- LC around 80–120 Hz removes mic rumble/proximity boom — check by ear against the specific take.
- Lead vocals are typically mono sources, so Stereo routing is standard; M/S is more relevant on stacked/doubled backing vocals treated as a stereo bus.

### 9.6 Bus / Group Processing

- On a drum bus, vocal stack bus, or instrument group bus, use M/S far more freely than on individual tracks — these are genuinely stereo signals with real side content to shape.
- Clash Detection at the bus level (e.g. drum bus sidechained to bass bus, or instrument bus sidechained to vocal bus) finds broader, more mix-relevant masking than checking track-by-track.
- Dynamic EQ on a bus is a great way to control a resonance that only appears when several elements reinforce each other at once, which wouldn't show up on any single track in isolation.

### 9.7 Main / Master Bus

- Moves here are usually broad and gentle: wide-Q bells, gentle shelves, narrower gain ranges (±6/12 dB) for maximum resolution on small changes.

- M/S EQ is one of the master bus's most valuable tools: a Mid-only low-end tightening keeps the mono low end controlled and mono-compatible, while a Side-only high shelf adds openness/air without pushing the centre forward.
- Resonance Detection on the master bus is useful for catching a mix-wide buildup that only shows up once everything is playing together.
- Autogain is particularly valuable here for reliable, level-matched A/B comparisons against a reference or an unprocessed bypass.

# 10. Unmasking Instruments (Tips & Tricks)

“Masking” happens whenever two sounds carry significant energy in the same frequency region at the same time — one covers the other up, and the listener's ear can only really register whichever one is louder or more prominent at that moment. Dynamic EQ's Clash Detection engine (§6.2) exists specifically to find these collisions, and its External-sidechain dynamic EQ exists specifically to resolve them without permanently damaging either sound. The recipes below walk through that workflow on the most common masking pairs.

***Note:*** *unmasking almost always works better as a dynamic, sidechain-triggered move than a static cut. A static cut removes energy all the time, even in the many moments where the two sounds aren't actually colliding; a dynamic cut (negative Range, External sidechain) only engages during the actual collision, so the rest of the time the sound keeps its full, untouched tone.*

## 10.1 The General Unmasking Recipe

This is the same four-step process behind every recipe in this section:

1. **Identify the collision:** on the track you're willing to carve into (usually the less important element in that moment), select a spare parametric band and set its Sidechain source to the SC input carrying the competing track.
2. **Detect:** Alt/Option-click empty grid space to arm Clash Detection. Play both parts together and watch where the markers and heatmap concentrate — that's your masking frequency.
3. **Set the band:** drag that band's handle onto the hot frequency, then set a negative Range so it only cuts when the competing signal is actually present. Tune Threshold so it stays out of the way at normal levels and only engages during the collision.
4. **Shape the dynamics:** a fast-ish Attack keeps the duck tight to the transient (e.g. a kick hit); a slower Release avoids audible pumping.

## 10.2 Kick vs. Bass

The oldest masking problem in mixing: both instruments live in the same 60–150 Hz region, and whichever hits last usually wins.

- **Setup:** on the bass track, select a spare band and set its Sidechain to the SC input carrying the kick drum.
- **Detection:** arm Clash Detection and play the groove; the marker will usually settle wherever the kick's punch and the bass's fundamental overlap most (commonly 80–120 Hz).

- **Dynamic EQ:** set that band's frequency to the hot spot, Range around −3 to −6 dB, fast Attack (a few ms), Release around 80–150 ms so the bass “breathes” back in between kick hits rather than sitting permanently ducked.

**Result:** the bass yields just enough room for the kick's transient to punch through, then immediately returns to its full low end — no static, always-on low-end cut required.

### 10.3 Vocal vs. Rhythm Guitar / Keys

A common midrange fight: strummed guitars, chordal keys, and pads often sit directly on top of vocal presence and intelligibility (roughly 1–4 kHz).

- **Setup:** on the guitar or keys track, select a spare band and route its Sidechain to the lead vocal bus.
- **Detection:** arm Clash Detection with both parts playing; look for a persistent hot spot in the 1–4 kHz range where the heatmap builds up fastest.
- **Dynamic EQ:** set the band on that frequency with a moderate negative Range (−4 to −8 dB), a Q wide enough to cover the problem without hollowing out the instrument's tone, fast-ish Attack, and a Release timed to the vocal's phrasing (150–300 ms) so the duck doesn't chatter on every syllable.

**Result:** the guitar or keys part steps back automatically only while the vocal is singing, and fills the space back in during instrumental gaps, instead of sounding permanently thin.

### 10.4 Vocal vs. Cymbals / Overhead “Air”

Bright, breathy vocal sibilance and shimmering cymbals/overheads both live in the same 6–12 kHz “air” region, and heavy cymbal wash can make a vocal feel buried or harsh in the top end.

- **Setup:** on the overheads or cymbal bus, select a spare band and route its Sidechain to the lead vocal bus.
- **Detection:** arm Clash Detection; because both sources are broadband up top, look for where the marker consistently lands rather than chasing every momentary flicker.
- **Dynamic EQ:** route the band to S if the overheads are a genuine stereo pair (§5) so the mono-centred vocal is left alone by the routing itself, then apply a gentle negative Range (−2 to −4 dB is usually enough up here) with a slower Attack/Release so the duck reads as a smooth dip in brightness, not a chop.

**Result:** the vocal's top end cuts through during phrases without needing to be over-brightened, and the cymbals get their full shimmer back the instant the vocal rests.

### 10.5 Lead Synth / Solo Instrument vs. Vocal

A lead synth line, guitar solo, or other featured instrument that shares register with the vocal will fight it every time both are present — common whenever a track has instrumental hooks answering vocal lines.

- **Setup:** on the lead instrument track, select a spare band and route its Sidechain to the lead vocal bus.

- **Detection:** arm Clash Detection through a full verse/chorus so you catch the collision wherever the two parts actually overlap, not just at one moment.
- **Dynamic EQ:** a fairly narrow band (higher Q) with a decent negative Range (−5 to −10 dB) keeps the effect surgical — you want the lead instrument to duck out of the vocal's specific frequency, not lose its overall body.

**Result:** the two parts trade the frequency space automatically as they trade musical focus, which is exactly the arrangement effect you'd otherwise have to automate by hand.

### 10.6 Bus-Level Unmasking (Drum Bus vs. Bass Bus, or Full Mix)

The same technique scales up: route a bus's sidechain to another bus (drum bus $\leftrightarrow$ bass bus is the most common pairing) to resolve masking between entire sections rather than single tracks, or arm Resonance Detection on the master bus to catch buildups that only appear once the whole mix is playing.

- **Setup:** on the drum bus, route a spare band's Sidechain to the bass bus (or vice versa, whichever side you're more willing to carve into for that section of the arrangement).
- **Detection:** arm Clash Detection through a full section of the arrangement so temporary overlaps (a bass fill, a drum break) don't skew where you set the band.
- **Dynamic EQ:** keep Range modest (−2 to −5 dB) at the bus level — you're resolving a broad collision across many instruments at once, so a heavy-handed cut here is much more audible than the same move on a single track.

**Result:** kick and bass (or any two competing buses) keep clearing room for each other automatically as the mix plays, without needing constant manual rebalancing as the arrangement changes.

## 11. Mixing vs. Mastering Workflow

Dynamic EQ works the same way in both contexts, but how it gets used shifts significantly between a mixing session and a mastering pass.

### 11.1 Mixing

- Applied per track and per bus — corrective and creative moves on individual sources, aiming to make each element sit in its own space.
- Wider gain moves are normal: several dB of static cut/boost, and dynamic Range values of 6–12 dB or more, are common when actively shaping or fixing a specific source.
- Heavy reliance on Dynamic EQ for de-essing, taming resonances that only appear intermittently, and de-masking one source from another via sidechain-triggered ducking (§10).
- Clash Detection is used constantly and locally: bass vs. kick, guitars/keys vs. vocal, any two elements competing for the same frequency space.
- L/R and M/S routing appear mainly on stereo sources and buses (drum overheads, stereo synths, backing vocal stacks, group buses) rather than on individual mono tracks.
- LC/HC are used assertively wherever a source doesn't need the frequency range being removed — cleaning up the mix's low end and reducing unnecessary buildup across many tracks at once.

## 11.2 Mastering

- Applied to the finished stereo mix as a whole — broad, careful, often very small moves (frequently under 1–3 dB) using wide-Q bells and gentle shelves.
- M/S routing becomes central rather than occasional: tightening/mono-focusing the low end via M, and adding width/air via S, are two of the most common and most impactful mastering EQ moves this plugin enables.
- Dynamic EQ is used more surgically — catching a resonance or harshness that only appears at the loudest moment of a mix (e.g. the final chorus), rather than shaping the overall tonal balance, which is better handled with static moves.
- Resonance Detection is used across the whole mix rather than per element, looking for mix-wide buildups or ringing that only became audible once everything was combined and/or loudness-matched.
- LC/HC are used far more cautiously — aggressive slopes or frequencies risk thinning or choking an otherwise-finished mix; small, gentle moves at the extremes are the norm.
- Autogain is especially useful for trustworthy A/B comparisons against a reference track or the unprocessed mix, since mastering decisions are extremely sensitive to accidental loudness differences biasing your judgment.