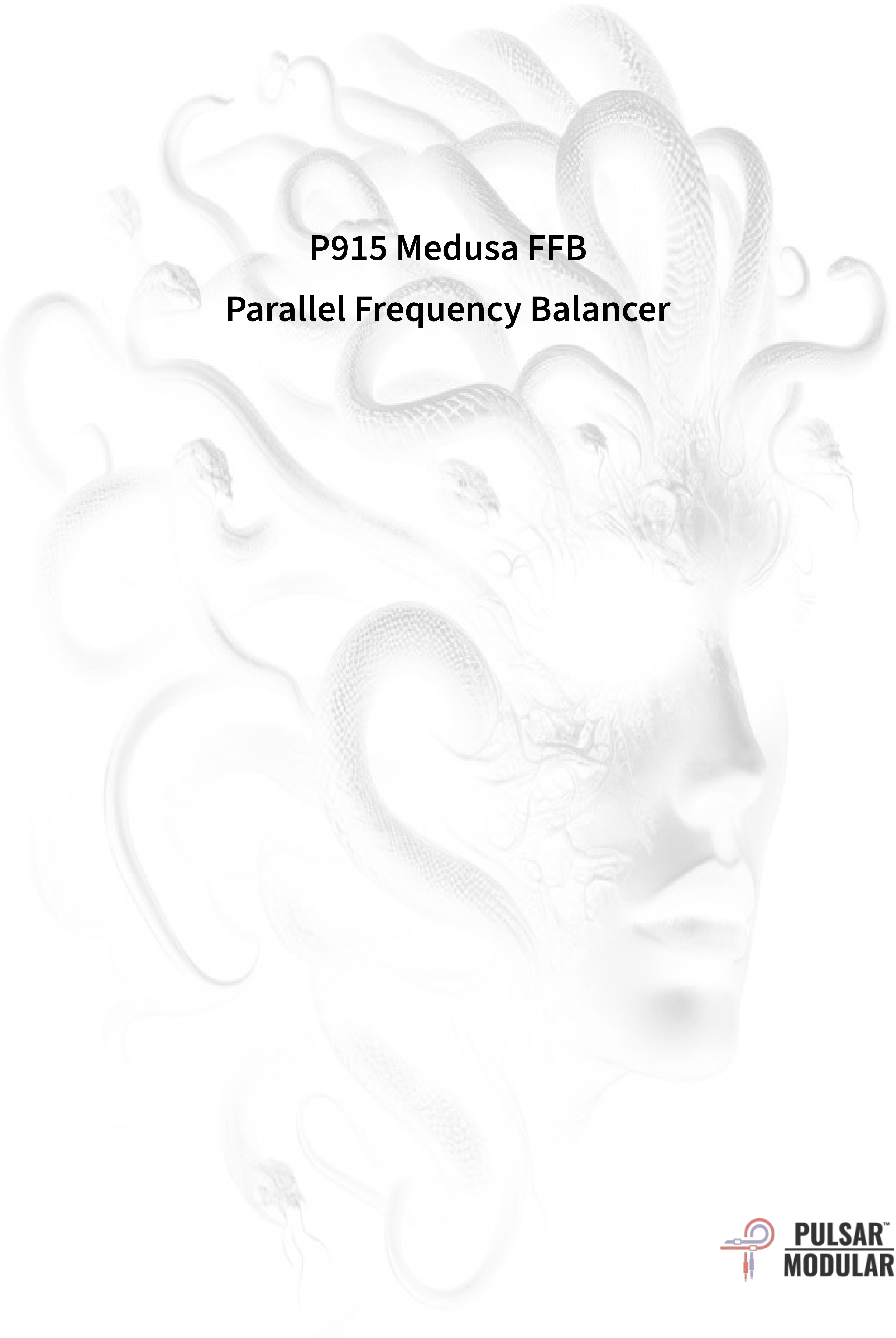
P915 Medusa FFB

Parallel Frequency Balancer



PULSAR™ MODULAR

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Preface

A Different Kind of Tone Shaper

P915 Medusa is not a conventional equalizer. It is a **parallel frequency balancer** built around fixed, musically spaced bands, intended for shaping perception rather than drawing or correcting frequency curves.

Medusa works by combining the original signal with a parallel contribution shaped by its filter bank. The result is defined by interaction and balance across bands, not by isolated adjustments. It tends to reward broad, intentional moves rather than precision tweaking.

Why Visual Matching Is Misleading

Medusa is not designed to be understood visually.

A frequency graph may show the final result, but it does not describe how Medusa produces that sound. Part of this behavior comes from its **LC-based filter topology**, where phase response is an inherent aspect of how bands interact when signals are combined in parallel.

For this reason, copying Medusa's apparent shape with a parametric EQ will not recreate the same sonics or behavior, even if the display looks similar. No parametric equalizer can replicate the sound of P915 Medusa, because its character emerges from interaction, not from a static frequency curve.

The most reliable way to work with Medusa is to judge it by listening, not by attempting to match or interpret it visually.

How to Use This Guide

This guide is structured to build understanding progressively.

You will first be introduced to Medusa's core concepts and terminology. From there, each section focuses on a specific part of the signal flow or control set, before moving on to practical workflows and musical use cases.

Medusa is not meant to replace an EQ. It is meant to complement one, offering a different way to shape weight, density, openness, and overall spectral balance.

Acknowledgment

This development could not have been achieved without the detailed input, direction, and mentoring of **David Ingebretsen** of **Modular Synthesis**.

1. Core Signal Architecture

This section defines how P915 Medusa processes audio at a structural level. Understanding these concepts is essential before working with individual controls.

1.1 Parallel Signal Topology

P915 Medusa operates using a parallel signal structure.

The input signal is split into two paths:

- an unprocessed original path, and
- a processed path generated by the fixed filter bank.

These paths are recombined downstream. Medusa does not replace the original signal; it adds a structured contribution alongside it.

This parallel architecture is fundamental to Medusa's sound and distinguishes it from serial equalizers, where all processing occurs inline.

1.2 The DELTA Signal

The DELTA signal represents the spectral contribution generated by Medusa's fixed filter bank.

It is not the original signal, and it is not a traditional wet EQ output. DELTA contains only what Medusa contributes as a result of band activity and interaction, independent of the source signal path.

Key characteristics of DELTA:

- It is generated by the filter bank as a standalone contribution.
- It reflects band gains, band states, and interaction across the filter structure.
- It does not replace or alter the original signal path.

Because DELTA is detached from the original signal, it can lack musical reference when heard entirely on its own. Introducing a small amount of the original signal via the BLEND control can provide rhythmic, tonal, and pitch context, making the contribution easier to interpret, without changing Medusa's underlying parallel structure.

DELTA therefore functions both as a signal definition and as an analytical reference, depending on how it is auditioned.

1.3 Parallel Blend

Parallel Blend describes Medusa's core processing architecture, not a monitoring mode.

In Medusa, the original signal and the DELTA contribution always exist as separate, parallel paths. The BLEND control determines their relative balance at the output, regardless of whether DELTA is being monitored in isolation or with reference.

In other words:

- DELTA defines the processed contribution.
- Parallel Blend defines how that contribution coexists with the original signal.
- BLEND controls the proportion between the two.

This separation allows DELTA to be auditioned on its own, or with partial reference to the original signal, without changing Medusa's underlying signal structure.

1.4 The BLEND Control

The BLEND control sets the proportion between the original signal and the DELTA signal.

At lower values, Medusa's contribution is subtle and supportive.
At higher values, the DELTA signal becomes increasingly dominant.

BLEND is a linear gain relationship, not an equal-power crossfade. Changes in BLEND affect perceived level as well as tonal balance.

The BLEND control is active at all times and affects the output regardless of how DELTA is being monitored.

The implications of this behavior, including level perception and gain staging considerations, are addressed in later sections.

The full 0–100 range is valid, higher values simply scale the contribution relative to the dry signal.

2. Fixed Filter Bank Structure and Band Behavior

This section describes the structure of Medusa's fixed filter bank and how its bands interact. Musical application is covered later.

2.1 Fixed Bands, Not Variable Filters

P915 Medusa uses a fixed filter bank. Each band is set to a predefined center frequency and bandwidth and cannot be repositioned or retuned by the user.

This is intentional.

Fixed bands encourage decision-making by balance, not by search. Instead of sweeping for frequencies, the user works with a known spectral layout and adjusts emphasis relative to the program material.

The bands are musically spaced to cover the audible spectrum in broad, perceptually relevant regions rather than surgical intervals.

2.2 Band Contribution Model

Each band contributes energy to the DELTA signal based on its gain and state.

Important characteristics:

- Bands do not operate in isolation.
- Adjusting one band affects how adjacent bands are perceived.
- The audible result is cumulative and interaction-based.

Because Medusa's bands are part of a parallel structure, raising a band does not "boost" that frequency in the traditional EQ sense. Instead, it adds structured energy that interacts with both the source signal and the other bands when recombined.

2.3 Interaction Across Bands

The filter bank is designed so that band responses overlap and interact, rather than behaving as independent slots.

As multiple bands are engaged:

- Phase relationships across bands influence perceived balance.
- Reinforcement in one region can change the apparent weight of another.
- Small changes across several bands often sound more natural than large changes in a single band.

This interaction is a defining characteristic of Medusa and explains why its behavior cannot be predicted by looking at a single band in isolation.

2.4 Band States and Signal Presence

Each band can be active or inactive, determining whether it contributes to the DELTA signal.

Inactive bands contribute nothing and do not affect interaction. Active bands participate fully in the filter structure and influence the overall spectral result.

Band state is therefore not merely an on/off convenience; it is part of how Medusa's internal balance is constructed.

3. Global Structures and Non-FFB Controls

This section describes the controls in P915 Medusa that operate outside the fixed filter bands. These controls shape the overall posture, dimension, and perceived solidity of the sound. They do not behave like conventional EQ controls and are best understood through listening rather than measurement.

3.1 FOUNDATION

FOUNDATION establishes the sense of weight and grounding in the sound.

When adjusted, FOUNDATION does not behave like a low-frequency boost or shelf. Instead, it affects how firmly the sound feels anchored, influencing the relationship between low-frequency energy and the rest of the spectrum. Increasing FOUNDATION tends to make the sound feel more supported and complete, rather than louder or heavier in a narrow sense.

In listening tests, FOUNDATION was perceived as strengthening the “floor” of the sound, making instruments and mixes feel more planted without drawing attention to a specific frequency region.

3.2 HIGH BLOOM

HIGH BLOOM influences how the upper spectrum opens and blooms outward.

Rather than adding brightness or presence in a conventional sense, HIGH BLOOM affects how energy in the upper range spreads and breathes. Increasing HIGH BLOOM tends to make the sound feel more open, lifted, and expansive, without introducing sharpness or emphasis on specific high frequencies.

In listening, HIGH BLOOM was perceived as adding openness and airiness that feels *grown* rather than boosted, complementing FOUNDATION by shaping the top of the sound in a similarly broad and musical way.

3.3 AIR and EDGE

AIR introduces openness and breathing space in the upper portion of the sound.

Rather than adding brightness or sheen, AIR affects how freely the sound seems to extend upward. Increasing AIR tends to make material feel less constrained and more spacious, without introducing hype, glare, or the sensation of a pushed top end.

EDGE shapes contour and presence by increasing firmness and articulation at the boundary of the AIR range. Instead of behaving like resonance or a presence boost, EDGE influences how clearly upper detail and transients are defined. As EDGE is increased, articulation becomes more focused and deliberate, while AIR determines how far that openness extends.

Together, AIR and EDGE control the character of the upper spectrum as a perceptual region, not as a set of isolated frequencies.

3.4 DEPTH and EDGE

DEPTH influences the sense of dimension and reach in the lower portion of the sound.

DEPTH does not behave like a high-pass filter. Increasing DEPTH does not remove low end, but instead changes how depth and distance are perceived, often making the sound feel more dimensional and less flat.

In this context, EDGE shapes contour and firmness at the boundary of the DEPTH range. EDGE can make the low region feel tighter and more articulated, or softer and more diffuse, without introducing resonance or frequency emphasis.

Used together, DEPTH and EDGE shape the perceived dimensionality and contour of the low end, rather than its level.

3.5 DENSITY

DENSITY affects how compact, cohesive, and weighted the sound feels.

Increasing DENSITY does not introduce obvious distortion or saturation. Instead, it changes how energy is perceived once all elements are combined, often making the sound feel more unified and substantial.

3.6 FOCUS

FOCUS redistributes emphasis across the spectrum around a fixed pivot point. Rather than boosting highs or lows, FOCUS repositions the overall balance of the sound. It can make material feel more forward, darker, lighter, or more relaxed, without altering the internal relationships between bands.

FOCUS should not be approached as a conventional tilt EQ. It does not behave like a static spectral slope, but as a perceptual rebalancing control that shifts the center of gravity of the sound rather than reshaping it analytically.

4. TIME Circuit — Behavior and Creative Use

This section explains what the TIME circuit does, how it differs from the fixed filter bank, and how it should be evaluated. TIME introduces behavior that does not exist elsewhere in Medusa and should be understood on its own terms.

4.1 What the TIME Circuit Is

The TIME circuit introduces short time offsets into Medusa's parallel structure.

Unlike the fixed filter bank, which operates through frequency interaction alone, the TIME circuit works in the time domain. When engaged, a delayed version of Medusa's contribution is recombined with the original signal, allowing time-based interference to occur.

This is the only part of Medusa capable of producing comb-filter-like behavior, and it does so intentionally.

4.2 Listening Expectations for TIME

Although TIME values are expressed in milliseconds, the TIME circuit should not be approached as a conventional delay, slapback, or chorus effect.

In traditional delay-based processors, millisecond values correspond to audible repeats, rhythmic echoes, or modulation-based widening. Medusa's TIME circuit behaves differently. Its contribution is spectrally shaped and recombined in parallel, which causes time offsets to be perceived primarily as smearing, extension, and temporal diffusion, rather than as discrete echoes.

Even at values commonly associated with slapback or chorus, such as 20 ms or 90 ms, the audible result is usually a lengthening of articulation and decay, not a recognizable repeat. The effect is felt as added depth, motion, or realism, rather than as a time-based effect with identifiable rhythmic structure.

For this reason, TIME should be evaluated by listening for changes in envelope, sustain, and texture, rather than for echoes or modulation.

4.3 Why It Is Called TIME (Not Delay)

Although the TIME circuit uses millisecond values, its effect does not behave like a conventional delay or stereo offset.

During development and listening tests, changes in TIME did not produce predictable or linear changes in stereo width, Mid/Side balance, or spatial separation. Increasing the time offset did not consistently increase Side energy, nor did small values reliably produce smaller spatial effects than larger ones.

Instead, the audible and measurable result of TIME was found to depend strongly on the spectral content of the source material. Harmonic density, transient structure, and frequency distribution all influenced how time offsets translated into perception. In some cases, small TIME adjustments produced more apparent movement or width than larger ones, while in other cases the opposite occurred.

Because the outcome depends on how time interaction meets frequency content, the control cannot be understood as a delay in the traditional sense. It is better understood as a way of altering temporal interaction within the sound, whose effect is material-dependent rather than value-dependent.

For this reason, the control is called TIME, not DELAY.

4.4 TIME vs Fixed Filter Bank

It is important to distinguish clearly between the two systems:

Fixed Filter Bank

- Operates through frequency interaction
- Redistributes spectral energy
- Introduces no discrete time delay

TIME Circuit

- Operates through short time offsets
- Can create periodic interference

- Enables smearing, diffusion, and intentional comb filtering

Because these systems are independent, TIME can be used subtly to enhance realism or aggressively to introduce coloration and motion, without changing how the fixed bands themselves behave.

4.5 Audible Effects of TIME

Depending on settings, the TIME circuit can produce:

- temporal smearing and softening of transients,
- extension of decay and articulation,
- animated spectral movement,
- intentional comb-filter-like coloration.

At shorter values, the effect may be felt more than heard. At more extreme settings, the periodic nature of time-based interference becomes audible and clearly identifiable.

4.6 Using TIME Musically

The TIME circuit is best approached as a creative and perceptual tool, not as a conventional delay effect.

Typical uses include:

- adding motion to otherwise static sources,
- extending the perceived length of sounds through smearing and diffusion,
- enhancing realism in synthesized instruments,
- introducing controlled coloration without overt echoes,
- creating intentional comb-filter-like effects for resonant texture and animation.

Because TIME operates in parallel, it can be explored freely without immediately destabilizing balance, especially at lower BLEND values.

4.7 TIME Parameters and Channel Behavior

The TIME circuit includes controls that define how time interaction is distributed across the stereo field.

TIME sets the amount of time offset introduced by the circuit. Values are expressed in milliseconds and determine the scale of temporal interaction, rather than rhythmic delay.

LEFT / RIGHT enable or disable the TIME circuit independently for each channel. This allows TIME to be applied symmetrically or asymmetrically across the stereo image.

SPLIT changes how Medusa's contribution is spatially organized.

When SPLIT is OFF, both the left and right channels are processed identically. All active fixed filter bands contribute equally to both channels, resulting in a more focused, coherent, and centered stereo image. In this mode, TIME acts primarily as a temporal modifier without introducing spectral decorrelation between channels.

When SPLIT is ON, Medusa distributes its fixed filter bands alternately between the left and right channels, with each half-octave band assigned to one side. The lower row bands and upper row bands are therefore offset differently across the stereo field, introducing frequency-dependent decorrelation.

This alternating band distribution produces a wider and more animated stereo image, not by simple delay differences, but by allowing different portions of the filter bank to interact with time independently on each side. The result is increased width and motion that depends on the spectral content of the source, rather than on the TIME value alone.

In this mode, TIME and SPLIT work together to create spatial complexity through spectral interaction, not through conventional stereo delay or widening techniques.

4.8 TIME, Delta Mode, and Flanging Audibility

In Delta mode, the TIME circuit behaves differently than in Parallel Blend. Because Delta exposes the difference signal relative to the reference, time offsets can produce direct phase interaction.

Listening tests show that flanging becomes clearly identifiable only when DELTA is auditioned and BLEND is pushed to high values. Pronounced flanging typically emerges near the upper end of the BLEND range (approximately 80–100%). At lower BLEND values, the reintroduction of the reference signal partially fills phase cancellations, causing comb filtering to collapse into subtle coloration rather than a recognizable flanging effect.

This behavior is a direct consequence of Medusa's non-additive blend architecture and is intentional. TIME does not introduce flanging by default; flanging becomes audible only when Delta mode is active, BLEND is pushed high, TIME values are short, and sufficient band energy is present.

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5. DELTA and Parallel Blend

This section explains how Medusa's processing relates to the original signal, and how the **DELTA** signal and **Parallel Blend** are used to audition, judge, and integrate Medusa's contribution.

In **DELTA**, the contribution is mixed with the dry signal; in **PARALLEL**, the contribution is added to a full-level dry signal. In all cases, the dry signal remains unprocessed; conditioning and texture apply exclusively to the contribution path.

5.1 What DELTA Represents

DELTA represents Medusa's contribution alone, obtained as the difference between the processed output and the original signal.

When DELTA is monitored, you are not hearing a filtered version of the signal. You are hearing only what Medusa is adding or redistributing. This includes the cumulative effect of the fixed filter bank, global controls, and TIME when active.

DELTA is therefore a true difference signal. It allows Medusa's contribution to be examined in isolation, without the masking effect of the original signal.

5.2 Auditioning in DELTA

Auditioning in DELTA is primarily used to understand **where and how Medusa is acting**.

Listening to DELTA at or near full level reveals:

- which frequency regions are being emphasized,
- how energy is being redistributed,
- how TIME and SPLIT influence interaction.

In practice, a **small amount of original signal**, typically around **5–10% BLEND**, can be introduced while monitoring DELTA. This provides rhythmic and tonal reference, making it easier to judge timing, articulation, and musical relevance without losing the analytical clarity of the DELTA signal.

This approach was found to be especially effective during preset development.

5.3 Parallel Blend and Context Listening

In **Parallel Blend**, Medusa's contribution is combined with the original signal.

Unlike conventional EQ, increasing band gains in Medusa does not translate directly to proportional level increases at the output. Because Medusa operates in parallel and redistributes energy, even large band adjustments often result in **very small changes in peak level** once blended.

A practical starting point for context listening is a BLEND value around **30–40%**. At this range, Medusa's influence is clearly audible while remaining integrated with the original signal. 30–40% is a starting point, not a limit, pushing BLEND above 50% is appropriate when the track needs decisive reweighting.

When using this workflow, it is important to listen for **redistribution of energy**, not for isolated boosts. During development, it was observed that energy often shifts away from dominant regions and reappears elsewhere in the spectrum, contributing to balance and openness rather than prominence.

5.4 Contribution Polarity

Medusa includes a polarity inversion control that applies only to the contribution signal.
The dry signal is never polarity-flipped.

When the contribution is polarity-inverted, its interaction with the dry signal changes. Instead of reinforcing overlapping spectral regions, certain components partially cancel while others become more apparent. This can alter perceived weight, focus, and spatial impression without introducing level changes or additional processing.

In DELTA listening, polarity inversion reveals how much of the contribution overlaps with the original signal. In PARALLEL listening, it can be used to reduce density in specific regions, reshape balance, or create alternative interaction profiles that are not achievable through band adjustments alone.

Polarity inversion does not function as a corrective tool. Its effect depends on the spectral content and timing of the material, and should be evaluated by listening rather than by visual analysis.

5.5 Moving Between DELTA and Parallel Blend

DELTA and Parallel Blend are not separate modes of operation, but **complementary listening perspectives**.

A common workflow is to:

1. Use DELTA to identify which bands and controls are contributing musically.
2. Introduce a small amount of original signal for reference if needed.
3. Return to Parallel Blend to judge integration, balance, and overall musical impact.

This movement between perspectives allows Medusa to be shaped deliberately without relying on visual analysis or traditional EQ expectations.

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6. Practical Workflows and Use Cases

This section describes practical ways to work with P915 Medusa in real sessions. These workflows are not presets or rules, but intentional listening strategies that emerged during development and testing.

6.1 Two Practical Listening Workflows

Once DELTA and Parallel Blend are understood, Medusa can be approached using two practical listening workflows. These are not modes or settings, but ways of working that are often alternated during a session.

Workflow A: DELTA-First Discovery

Use this workflow when you want to locate musically relevant contribution.

- Monitor the DELTA signal.
- Optionally introduce a small amount of original signal (approximately 5–10% BLEND) to retain rhythmic and tonal reference.
- Adjust bands and global controls to shape the contribution deliberately.

This workflow is typically used early, or whenever direction needs to be clarified.

Workflow B: Parallel Blend Context Listening

Use this workflow when you want to judge integration and balance.

- Return to Parallel Blend.
- Use a conservative BLEND value, typically around 30–40% or push higher when you want the contribution to lead.
- Adjust controls while listening to the combined result.

This workflow is used to confirm musical impact in context and to finalize balance.

6.2 Working With Bands Musically

Medusa's fixed bands are designed to be used in combination.

When multiple bands are active:

- they interact rather than stack linearly,
- they rarely create sharp peaks or isolated emphasis,
- they can be pushed further than expected without destabilizing balance.

This behavior allows broader shaping without the need for surgical restraint. Band interaction should be judged by listening, not by visual expectation.

6.3 Fixed Bands as Pressure Points

Medusa's fixed bands are intentionally narrow, more like focused pressure points than broad tonal controls.

When you raise a band, you are not simply adding level in that region. You are applying localized pressure that can shift how energy is distributed, reduce dominance elsewhere, or bring forward detail that was previously masked.

Because the bands are tightly defined and interact in parallel, the most useful results often come from clear, deliberate moves. Pick one band, push it decisively, then listen for an improvement in weight, presence, or openness. If nothing improves, return it to neutral and try a different band.

In practice, treat the bands as exploratory touchpoints: apply pressure, listen for benefit, then release or move on. If a band does not improve balance, it is not meant to be "dialed in" further.

6.4 Energy Redistribution, Not Boosting

One of the most important observations during development was that Medusa does not behave like a gain-based processor.
Even when individual bands are pushed aggressively:

- peak level changes are often very small,
- perceived balance can change significantly,
- energy may shift away from dominant regions and reappear elsewhere.

This redistribution is a core characteristic of Medusa and should be listened for intentionally. Expecting linear gain behavior will lead to incorrect conclusions.

6.5 Use on Individual Instruments

Although Medusa is effective on buses and full mixes, it is also well suited to individual instruments.
Historically, fixed filter banks such as the Moog 914 were used to enhance the realism and character of synthesized instruments. Medusa continues this tradition.

Typical uses include:

- reinforcing the wooden body of an acoustic guitar,
- emphasizing breath and air in flutes or wind instruments,
- adding realism and articulation to synthesized brass or strings.

In these cases, Medusa is not "fixing" an instrument, but enhancing elements that already exist.

On individual instruments, Medusa can also be used before corrective EQ when the goal is to establish character rather than resolve problems. By reinforcing musically relevant spectral regions, such as the blowing range of a horn or the body and projection of a vocal, Medusa can help define how an instrument wants to sit before corrective decisions are made.

Once this character is established, corrective EQ can be applied more deliberately, addressing issues without undoing the intended balance.

6.6 Listening Over Visual Bias

Because Medusa operates through redistribution and parallel summation, visual analysis can be misleading.
Spectrum displays may suggest notches or dips that do not correspond to how the sound is perceived.

For this reason, decisions should be made by listening in context or in DELTA, rather than by attempting to interpret or match visual shapes.

6.7 Use in Mastering Contexts

P915 Medusa can be used effectively in mastering contexts when approached with its parallel nature in mind.
Because Medusa operates through redistribution, even substantial adjustments often result in very small peak-level changes once blended. This allows balance, openness, and perceived weight to be shaped without destabilizing overall level or introducing obvious artifacts.

In mastering applications, Medusa is typically used with conservative BLEND values, allowing subtle but meaningful changes to emerge through integration rather than emphasis. DELTA auditioning can be useful for understanding contribution, but final decisions are best made in context.

The FOCUS control is particularly effective in mastering, as it allows broad tonal repositioning of the entire signal without disturbing internal band relationships, making it possible to refine overall balance with minimal intervention.

Medusa is not intended for surgical correction or problem-solving in mastering. Its strength lies in broad tonal shaping, balance, and integration, especially when small changes need to remain musical and controlled.

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7. Level Behavior and Energy Redistribution

This section describes how P915 Medusa behaves in terms of level, loudness, and perceived impact. These behaviors differ from conventional equalizers and arise from Medusa's parallel structure and interactive filter bank.

7.1 Parallel Blend and Level Stability

Although Medusa operates in parallel, its contribution remains remarkably level-stable at musically useful BLEND values.

During development and testing, even large band movements, including multiple bands pushed simultaneously, resulted in only modest peak increases once blended back with the original signal. In practice, peak level changes typically remained close to 1 dB, even under stress conditions that would cause significant level buildup in conventional EQ designs.

This makes Medusa unusually forgiving when shaping tone, allowing decisive spectral moves without destabilizing overall level.

7.2 Redistribution Rather Than Accumulation

Medusa does not behave like an equalizer where boosting multiple bands causes energy to stack linearly.

Instead, reinforcing one or more bands causes spectral energy to redistribute across the sound. As bands interact, neighboring regions adjust perceptually, preventing individual frequencies from dominating or "poking out."

This behavior applies equally to:

- single-band reinforcement,
- multi-band reinforcement,
- and reinforcement in higher frequency regions.

Adding more bands does not proportionally increase loudness. It changes where energy is perceived, not how much energy is created.

7.3 Analyzer Readings and Redistribution

When multiple bands are active in Medusa, analyzer readings may suggest unexpected dips or interactions between bands. This behavior is normal and reflects redistribution of energy across the spectrum rather than cumulative boosting.

Because Medusa operates in parallel, changes in one band can influence how energy is perceived in neighboring regions once the contribution is combined with the original signal. As a result, increasing one band may appear to reduce another in visual analysis, even though the perceived balance remains intact or improves musically.

For this reason, analyzer readings should be interpreted as descriptive rather than diagnostic. They show how energy is redistributed at the output, not how much gain is being added in isolation.

7.4 Practical Implications

This behavior allows broader band movements to be explored without the immediate penalties typically associated with EQ boosting. Decisions can therefore be guided by tone, balance, and intent, rather than by peak meters or analyzer expectations.

7.5 Order in the Signal Chain

Medusa is typically placed **after corrective or surgical processing** and before dynamics or final limiting.

Used in this position, it can shape character and spectral balance without being constrained by precision tools earlier in the chain or masked by later dynamics processing. This is not a rule, but a reliable starting point.

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8. Common Misinterpretations and Clarifications

This section exists to **disarm incorrect mental models** that experienced engineers may bring to Medusa. It does not introduce new controls or workflows. Its purpose is to prevent misinterpretation based on familiar but inappropriate reference tools.

8.1 Medusa Is Not a Parametric EQ

Medusa is not designed to behave like a parametric equalizer.

Although individual bands resemble fixed EQ points, their behavior emerges from parallel interaction and redistribution. Attempting to treat Medusa as a corrective EQ, or to replicate its effect using parametric bands, will lead to misleading results.

Even when frequency plots appear similar, the audible result will not match.

8.2 Why Visual Analysis Can Be Misleading

Medusa's output is the result of parallel summation and interaction between the original signal and a shaped contribution. While a spectrum analyzer can describe the final magnitude response, it cannot explain how that response was produced or how individual bands contributed perceptually.

As multiple bands interact, energy may redistribute across the spectrum in ways that appear counterintuitive when viewed visually. Apparent dips, overlaps, or cancellations on an analyzer often correspond to perceptual balance rather than loss of energy or incorrect behavior.

For this reason, visual analysis should be treated as descriptive rather than diagnostic. It can show what the output looks like, but it cannot reliably predict how Medusa will sound or how it will integrate musically.

8.3 Why Curve Matching Does Not Work

Because Medusa operates through parallel summation and interaction, copying its apparent response curve into another EQ will not reproduce the same sound or behavior.

Matching magnitude does not reproduce:

- phase interaction,
- redistribution of energy,
- time-domain contribution when TIME is active.

For this reason, Medusa cannot be "matched" using conventional tools.

8.4 Comb Filtering Is Intentional (and Limited)

When the TIME circuit is engaged, Medusa can produce comb-filter-like effects.

This behavior is:

- intentional,
- controlled,
- dependent on spectral content.

Comb filtering does not arise simply from activating multiple bands. It occurs only when time interaction is introduced, and it can be used creatively or avoided entirely.

8.5 Medusa Is Forgiving by Design

Unlike conventional EQs, Medusa does not react aggressively to stacked adjustments.

Large band movements often result in subtle level change once blended, allowing users to explore without destabilizing balance. This is a consequence of parallel operation and redistribution, not a lack of effect.

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9. Summary and Recommended Starting Points

This section summarizes how P915 Medusa is intended to be approached and provides practical entry points for first use. It does not replace experimentation, but helps establish correct expectations.

9.1 How to Think About Medusa

P915 Medusa is a **parallel frequency balancer**, not a corrective equalizer.

Its behavior emerges from interaction, redistribution, and summation rather than from isolated boosts or cuts. The most reliable way to evaluate its effect is by listening in context or through the DELTA signal, not by relying on visual analysis.

Medusa rewards exploration and resists overprocessing by design.

9.2 Safe Starting Points

The following settings provide a reliable entry into Medusa's behavior:

- **BLEND**:
  Start around **30–40%** for contextual listening. Higher BLEND values (50–100%) are fully valid when you need heavy lift or deliberate texture, level-match and judge by feel.
- **DELTA audition**:
  Use DELTA with **5–10% BLEND** of the original signal for rhythmic and tonal reference.
- **Bands**:
  Activate only a few bands initially and adjust by ear. Multiple bands can be engaged without fear of harshness.
- **Global controls**:
  Set overall posture first (FOUNDATION, HIGH BLOOM, AIR, DEPTH) before refining with EDGE, DENSITY, or FOCUS.
- **TIME**:
  Introduce TIME only after spectral balance is established. Listen for smearing, extension, and interaction rather than delay or width.

9.3 Listening Before Measuring

Because Medusa operates through parallel summation and interaction, analyzer displays often misrepresent what is actually perceived.

When in doubt:

- listen in context,
- toggle DELTA to understand contribution,
- trust balance and feel over curves and numbers.

9.4 Final Note

Medusa is designed to encourage musical decision-making rather than technical correction. It is most effective when used deliberately, patiently, and with attention to interaction rather than isolation.

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10. Global Utilities and Output Controls

The controls in the horizontal utility bar operate outside Medusa's spectral balancing and interaction system. They manage contribution conditioning, contribution level, output gain, and engine quality, but do not alter the behavior of the fixed filter bank, global tone controls, or TIME circuit.

10.1 TX (Transformer Conditioning)

TX applies TX-dependent low-frequency conditioning to Medusa's contribution path. Higher TX modes progressively raise the DC blocker frequency, tightening low-frequency behavior and improving stability and headroom interaction. TX affects feel and stability rather than tonal balance, and operates only on the contribution path. The dry signal is never processed by TX.

10.2 DENSITY

DENSITY applies the saturation circuit to Medusa's contribution signal only. It operates after the contribution is generated, so it does not influence how DELTA is calculated. DENSITY never processes the dry signal, in either DELTA or PARALLEL BLEND listening.

10.3 GRAIN

GRAIN adds a fine, broadband texture to Medusa's contribution signal, increasing perceived surface detail and cohesion.

Its effect is easiest to identify in DELTA, then judged musically in PARALLEL BLEND.

10.4 Δ VOL (Delta Volume)

Δ VOL sets the level of Medusa's contribution signal. It operates independently of listening state:

- In DELTA, it controls the audible level of the contribution.
- In PARALLEL BLEND, it controls how strongly the contribution is added to the dry signal.

Δ VOL does not affect the dry signal and does not replace the BLEND control.

10.5 OUT

OUT provides final output gain adjustment after summation.

It has no tonal effect and is intended solely for gain staging and level matching.

10.6 Oversampling (OS)

Oversampling selects the internal processing resolution of Medusa.

The available modes offer different trade-offs between CPU usage and high-frequency precision. Oversampling affects engine quality and aliasing behavior, but does not change Medusa's balancing logic or interaction characteristics.

10.7 Bypass and Preset Management

- Bypass disables all Medusa processing.
- Preset controls handle loading, saving, and comparison of presets.

These functions do not affect Medusa's signal architecture.

10.8 Performance Slots

Performance Slots provide six internal recall positions for storing and comparing musical variations within a single preset.

Each Performance Slot captures the current state of Medusa's sound-shaping parameters, allowing rapid switching between different balances, band emphases, TIME behaviors, and listening configurations without creating multiple preset files.

Performance Slots are designed for workflow efficiency and comparison. They do not change Medusa's signal topology and do not affect sound unless recalled.

Stored Parameters

Performance Slots store the following user-level parameters:

- Fixed Filter Bank band gains
- Global tonal controls
- AIR and DEPTH enable states
- TIME circuit parameters and states
- DELTA / PARALLEL listening state
- BLEND
- GRAIN amount
- Δ VOL
- OUT

Engine and system parameters such as TX mode, oversampling, bypass state, preset selection, and Reload are not stored.

Saving Performance States

- The Save button stores the current parameter state into the selected Performance Slot.
- Performance Slots are saved within the preset and recalled when the preset is loaded.
- You can also save directly to a slot by pressing and holding the slot for about two seconds, the slot flashes to confirm the write.

Reload (R)

- The Reload (R) button reloads the current preset from disk.
- All parameters and Performance Slots return to their last saved state, discarding unsaved changes.

Reload is useful for reverting exploratory edits and returning to a known baseline.

Intended Use

Performance Slots are intended for:

- rapid A/B comparison,
- exploring alternate balances,
- auditioning TIME and interaction changes,
- preserving multiple decisions within a single preset.

They are a workflow utility, not a sound-shaping control.

10.9 Morph (State Interpolation)

The Morph control provides continuous interpolation between two endpoint states labeled **Source** and **Target**.

Each endpoint may be defined from:

- the current live/manual parameter state, or
- a recalled Performance Slot.

Once Source and Target are set, the Morph control smoothly transitions between them, allowing gradual movement across Medusa's sound-shaping parameters without abrupt switching.

Morph does not introduce new processing or modulation. It interpolates between two existing states.

Binary State Behavior

For binary sound-shaping controls that cannot be interpolated, such as AIR and DEPTH enable states, switching occurs at the midpoint of the Morph control.

- Below 50% Morph, the Source state is active.
- At or above 50%, the Target state is active.

Relationship to Performance Slots

Performance Slots define stable recall points.
Morph defines the continuous path between two states.

A common workflow is to:

1. Dial in a state manually and assign it as Source.
2. Recall or create a second variation and assign it as Target.
3. Use Morph to explore intermediate balances.
4. Save the preferred result into a Performance Slot.

Morph and Performance Slots operate on the same parameter set and are designed to work together as a unified exploration system.

NOTE: Morph automation (current limitation)

At this time, Morph automation is evaluated only while the plugin GUI is open. If the GUI is closed, the Morph slider may not update during playback. This will be addressed in a near-future update.

Plugin Design: Ziad Sidawi

Plugin Development: Mesut Saygıoğlu

GUI Development: Max Ponomaryov / azzimov GUI design – www.behance.net/azzimov

User Guide: Ziad Sidawi

Page Layout: Burak Öztop

Please kindly report any errors or omissions in this user guide to psupport@pulsarmodular.com.

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Pulsar Modular™
Unit 52, Building 348, Way 5001, Block 250
South Aludhaybah, Bawshar, Muscat
Sultanate of Oman
pulsarmodular.com