P252 MDN Diode

COMPRESSOR

User Guide

Version 1.0

Pulsar Modular

PULSAR™ MODULAR

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Foreword

Attitude, Aggression and Power. Freaking sweet...

As an extension of my previous plugin releases, the P455 MDN Sidecar and the P821 MDN Tape, I wanted to embark once again on a journey down memory lane to talk about my history and passion for the sounds within music.

It all started well over 26 years ago when I became obsessed with the magic and personalities of sonics, why some albums sounded powerful and unique, while others felt more intimate and organic.

In my search for unique, history-driven studio gear, I have found many things to be constant. Sometimes it's a piece of history, whether that be studio gear used on a historic album. Other times, it's something very familiar and easily accessible. My passions have always connected to one-of-a-kind gear. Things that are incredibly rare, both in design and in the number ever made. The secret weapon.

I purchased this 2252 from a former technician of the famous Wessex Studios in London, a studio renowned for producing many of the iconic punk albums of the 1970s and '80s for artists such as The Clash, The Sex Pistols, The Pretenders, Queen, and many others.

In 1968, the studio purchased Rupert Neve's third console ever built. Along with that console came two 2252 modules. Throughout the 1970s, the Neve console was eventually sold off, but the two compressors remained in racks at the studio, continuing to serve as the spearhead trailblazers of the facility's main tracking compressor chain.

Like the API console at Sausalito Record Plant or the Stephens 821 tape machines from Producer's Workshop, this new plugin of mine carries a massive history and represents something incredibly unique and rare.

The first Neve 2252 was introduced in 1968 and was designed by Rupert Neve himself. It was one of his earliest compressor designs and helped lay the foundation for legendary models such as the 2254 and the 33609. Unlike those later designs, however, the 2252 utilized a Germanium diode-bridge topology.

At the time, this was an unpredictable and aggressive design. It introduced distortion and artifacts into the signal, ultimately making it a very short-lived compressor. I believe it was a very limited, short run before Neve moved on to silicon diodes shortly afterward.

What makes this so special? My answer is simple: personality and character.

Unlike the more stable diode compressors that followed, this unique beauty used Gardner octal-based transformers, quite different from those found in the better-known 1073 modules. The combination of these transformers and the Germanium diode design gives this compressor a remarkably explosive and firm sound.

My love for unique-sounding gear has been a lifelong journey, and when I found this 2252 and learned its history, I instantly fell in love with it.

It is not only my go-to compressor for bass guitar, but also for rock vocals, drums with attitude, and piano, anything that needs a firm grip and some serious personality. It adds just the right amount of fur to the music and always puts a smile on my face.

No other compressor sounds like this.

After nearly two years of development, Pulsar Modular and I designed what I believe to be one of the most unique compressors on the market. What was once described as unusable in the early days of its life, during an era dominated by the stuffy British broadcast engineers of the 1960s, ultimately became a defining part of the sound of Attitude, Aggression and Power.

Freaking sweet...

— Marc Daniel Nelson

Preface

Marc's account captures why this unit is worth preserving. My task was to make that personality survive the move out of the rack and into a plugin, intact, across every setting, on every source. That turned out to be the hard part.

Emulating it is far more nuanced than capturing a static curve or a fixed harmonic signature. The unit is deeply non-linear, built around a feedback topology where the compressor output is routed back into its own detector. Threshold drive, ratio, release behavior, output level, and program material all interact continuously.

A compressor like this cannot be captured properly by static snapshots, impulse responses, or one-dimensional profiling. Those methods can document moments of behavior, but the 2252 is not a moment. It is a moving system. Its tone and gain reduction are shaped by the signal, the feedback path, the detector, the diode stage, the output level, and the timing behavior all reacting together. Algorithmic modeling, Pulsar Modular's core discipline, gave us the control and depth needed to follow those interactions across the full operating range of the unit. Paired with sharp, attentive listening at every stage of development, it is what made this emulation possible.

P252 preserves the character of the original hardware: early diode-era weight, transformer bloom, germanium-era forwardness, and the program-window behavior that defines how the unit holds onto sustained material.

That program-window behavior comes from the original detector's timing network: a resistor-capacitor stage that charges toward the incoming level rather than switching to it instantly. Turning that stage's timing knob does not change how fast the gain recovers. That is a separate, fixed ~40 ms stage inside the same detector, which P252 later exposes as Release. It changes how long the capacitor takes to settle onto the program's level, and with it, whether the compressor chases every hit or gradually rides the whole passage.

But faithful preservation alone is not enough for a plugin inside a modern DAW. Today's sessions demand visibility, repeatability, and control that the hardware was never asked to provide. P252 extends the original design where the modern user genuinely benefits, without compromising the character of the circuit.

Two extensions matter most: clear metering, and an exposed Release control that works with Response Time to open dynamic behaviors that were not accessible on the source unit.

P252 MDN Diode is built to be useful on a drum bus, vocal, mix bus, bass, or as a dedicated coloration slot. We cannot wait to hear what you do with it.

Ziad Sidawi
Audio Equipment Designer and CEO
Pulsar Modular

1. Get a Sound Quickly

1. Insert P252 on your track or bus.
2. The plugin opens on the Default preset: Ratio 5:1, Response Time 75 ms, Release 40 ms, Threshold 0, Output 0, and Mix 0%. Start there.
3. Turn on Tooltip help from the menu button, or click the wooden strip along the bottom. Every control you touch from here explains itself in the help bar.
4. Play a loud section of your session.
5. Turn MATCH on. Every change you hear is now tone, not volume.
6. Turn Threshold toward -25 for more compression, or toward +10 for less. Threshold is drive into the compressor.
7. If you want less character and less gain, lower Output. If you want more density and drive, raise it. Output is character and gain together.
8. When you like what you hear, click MATCH off; it commits the balance into Trim Out, the clean level control. Now compare against bypass.

The full mental models behind these three are in section 3.

> **TIP:** If a source seems to change character the moment it enters P252, lower Trim In until the sound settles, then set Threshold for the compression you want. The character does not disappear; it becomes a choice you make with Output and DRIVE rather than something the source level decided for you.

2. Choose a Starting Point

Use these as first moves, not presets carved in stone. P252 is level-sensitive, so the source level changes how the same settings behave. After choosing a starting point, adjust Trim In only if the signal is clearly arriving too quiet or too hot. Use Threshold, Output, Response Time, Release, Mix, and Trim Out for the main sound-shaping decisions.

Goal	Start here	Listen for
Punchy drums	Ratio 10:1 or Limit, Response Time 75 or 150 ms, Release 40 to 80 ms, Threshold -15 to -20, Mix 0 to 30%	Attack stays alive while ring, room, and body tighten.
Parallel drum weight	Ratio Limit, Response Time 150 ms, Release 40 to 100 ms, Threshold -20 or lower, Mix 50 to 70%	Dry transient on top, compressed body underneath.
Vocal control	Ratio 2:1 or 3:1, Response Time 75 or 150 ms, Release 40 to 120 ms, Threshold -10 to -15	Consonants stay present while the body becomes steadier.
Mix bus glue	Ratio 2:1 or 3:1, Response Time 2 s or 6 s, Release 80 to 200 ms, SC HPF 80 to 150 Hz	A stable floor that holds the mix without obvious pumping.
Bass leveling	Ratio 3:1 or 5:1, Response Time 150 or 350 ms, Release 80 to 200 ms, Threshold -10 to -20	More even note body without flattening the attack completely.
Color only	Ratio Linear, DRIVE on, Output to taste, Trim Out for final level	Signal-path tone without envelope control.

3. Read This First: The Mental Models

These are the four ideas that make P252 easier to use. If you understand these, the rest of the guide becomes straightforward.

3.1 Threshold is a preamp into a fixed detector

Think of Threshold like a microphone preamp feeding a compressor with a fixed detection point. Turn the preamp up, and the compressor catches more of the signal. Turn it down, and the compressor reacts less. Threshold on P252 behaves in that same way.

The detection point inside the circuit does not move. What changes is how hard you drive the signal into it.

Toward -25: more drive into the detector, more compression, more density, and the output level tends to rise.

Toward +10: less drive, less compression. At moderate input levels, the detector may not trigger at all.

> **NOTE:** The feedback topology means more compression can also mean more gain recycled through the circuit. This is why level can rise as you push harder. Use Trim Out or Gain Match to level-match before judging the setting.

3.2 Output is a send feeding the compressor back into itself

Think of Output like a send level feeding the compressor's own output back into the compressor. Turn it up, and the compressor sees more of itself. It works harder, colors more, and its level changes at the same time.

Output is not clean makeup gain. It sits inside the feedback loop, so raising it changes compression depth, harmonic density, and output level together.

That is Output with the sidechain set to FB. In FF, which is the factory default, the detector reads the driven input instead of the output stage, so Output never reaches it. The knob still sets level and still drives the output transformer, so weight and color move with it, but the compression itself does not. See 4.11.

Use Output when you want more density, drive, weight, push, or character.

Use Trim Out when you want clean level only.

Use Gain Match when you want a fair A/B against bypass.

3.3 Response Time is how far back the compressor's memory reaches

Response Time brings that switched timing to the front panel. Turn it fast and the compressor follows the music moment to moment. Turn it slow and it stops chasing individual events; a couple of seconds of sustained material is enough for it to take hold of the program's level, and the setting decides how long it keeps that hold once the material drops, riding the song rather than each hit.

The 2252's detector formed its gain-control envelope with capacitors charging and discharging through the sidechain. Changing the program timing changed that resistor-capacitor (RC) network, lengthening or shortening how long the capacitor took to settle, and with it how the gain reduction moved. Faster timing made the compressor react to each passing moment; slower timing let the capacitor charge gradually, so the unit settled onto the overall program level and held it.

Every compressor has to answer one question continuously: how loud is the program right now? Response Time controls how far back in time that answer reaches: how much of what just played still counts toward the reading the compressor reacts to.

You already have a feel for this from the Ballistics screw on the VU meter (§4.14). A fast meter needle reports each peak on its own; a slow needle blends those same peaks into a steady running average. Same signal, same circuit, different amount of memory in the reading. Response Time does exactly that to the signal the compressor reacts to, not just to what you see on the meter face.

75 ms through 750 ms: the reading forgets quickly and resets with nearly every hit. Gain reduction re-engages fresh each time, so the compressor breathes with the rhythm — slower settings in this range simply breathe more slowly than faster ones. It's the same tracking behavior throughout, just at different speeds, not a deepening memory.

2 s and 6 s: the reading genuinely holds. A couple of seconds of sustained level is enough to arm the hold, and once armed the compressor carries that grab forward for the full labeled time — 2 or 6 seconds — before it lets go, riding through normal musical gaps instead of resetting at each one. This is where Response Time stops behaving like a compressor's memory and starts behaving like the leveling amplifier the 2252 was originally built to provide for broadcast.

TIP: Response Time really comes in two families. From 75 ms through 750 ms, it's the same instinct at different speeds: at 75 ms the compressor breathes tightly with the track, letting go almost as fast as it grabs; at 750 ms that breath just loosens up, lingering a little longer between phrases — a real difference, but it's still breathing, never truly holding. Move to 2 sec or 6 sec and it stops breathing and starts holding: a couple of seconds of sustained level is enough to arm the grab, and once armed, it holds on for the better part of a phrase — riding through the ordinary gaps in the music instead of letting go at each one. Release is a different hand entirely: it doesn't decide what the compressor is holding onto, only how quickly that hand opens once it's already reacting.

How obvious that difference is depends on the material — it builds up noticeably across repeated hits on a drum bus, but on sustained pads or bass it settles out again in a couple of seconds and barely registers.

Response Time is not Release, and it does not show up on a single hit. Play one isolated transient at 75 ms and 6 s and they will sound nearly identical, because there is no history yet for a slow reading to have accumulated. The difference only appears across a sustained passage, and the clearest place to see it is the GR meter: watch it over several bars, not one hit. At a short Response Time the meter bounces with every transient and springs back between them; at a long Response Time it moves far less per hit and settles into a steadier reading, holding for a beat or two even through a drop to silence. Response Time decides what level the compressor thinks the program is at; Release decides how fast the gain reduction moves once it reacts to that reading. Use them together.

3.4 Release is the hand letting go

Think of Release like the speed of the compressor's hand opening once it reacts. Response Time decides how much of the recent history shapes what the compressor is reacting to. Release decides how quickly the gain reduction itself moves once the compressor starts to let go.

On the original hardware, this was fixed internally at 40 ms and was not a front-panel control. P252 exposes it as a user-facing control.

40 ms: original hardware behavior. Fast recovery, clean transient punch, and the most authentic response.

Toward 400 ms: slower recovery, smoother gain reduction, thicker sustain, and less obvious movement between hits.

Use Release together with Response Time. Response Time shapes how the compressor follows the material over time. Release shapes how quickly the gain reduction relaxes once the compressor starts letting go.

Release bridges the gap between hits; Response Time bridges the gap between sections. Dense material gives Release nothing to bridge; a steady loop gives Response Time nothing to hold across.

4. Controls

4.1 Trim In

Trim In adjusts the level entering P252 before the modeled circuit. It changes how hard the unit is driven, so it changes compression depth, harmonic density, and the way Threshold reacts. On the panel, Trim In is the screw labeled IN under TRIM.

For example, a bus averaging -20 dBFS RMS will not behave like a bus averaging -12 dBFS RMS at the same Threshold setting. Trim In lets you bring both into a similar working range, so your settings stay more portable from track to track.

Trim In is not a clean volume control. Raising Trim In and lowering Trim Out by the same amount will not give you the same sound at a different level. It will drive the compressor harder, create more gain reduction, and usually add more character.

P252 is calibrated the way the original was. The 2252 was built in 1968 for studio line level and tape, a world where 0 dBu sits near -18 dBFS in modern digital terms, and where signals simply never arrived as hot as digital tracks routinely do today. Feed the plugin a source peaking well above that region and the input side of the circuit begins to grip and thicken the sound before you have asked for any compression at all. When that happens, lower Trim In until the sound settles; see the note in section 1.

Raise Trim In when the source is too quiet to make the compressor react.

Lower Trim In when the unit is too aggressive even at gentle Threshold settings.

For clean level matching, use Trim Out or Gain Match.

> **TIP:** Trim In is preparation. Use it to bring the source into a sensible working range. Once the source is prepared, reach first for Threshold, Output, Response Time, Release, Mix, and Trim Out to shape the result.

Range: -24 to +12 dB. Default: 0 dB.

4.2 Threshold

As described in §3.1, think of Threshold like a microphone preamp feeding a compressor with a fixed detection point. Turn the preamp up and the compressor catches more signal. Turn it down and the compressor reacts less. Threshold on P252 is that preamp.

The detection point inside the circuit does not move. What moves is how hard you are driving signal into it.

+10 to 0: little to gentle compression, depending on input level.

-5 to -15: useful working range for bus, vocal, and general compression.

-20 to -25: stronger compression, density, saturation, and tone-box behavior.

> **NOTE:** As you push Threshold lower, the output level tends to rise. Always use Trim Out or Gain Match to level-match before judging the sound.

Range: -25 to +10 dB, in 5 dB steps. Default: 0 dB.

4.3 Ratio

Ratio changes the compression curve and the feel of the knee. Because this is a feedback compressor, the effective slope is softer than the label suggests. Do not read the ratio labels like a modern VCA compressor. Treat them as musical positions.

Linear: no compression curve, but the signal path remains active. Use for color.

2:1 and 3:1: soft control for vocals, bass, and mix bus.

5:1: the main working position.

10:1: firm compression without brick-wall behavior.

Limit: maximum attitude, density, and diode-era character.

Default: 5:1.

4.4 Response Time

Response Time sets how much of the recent program history factors into the compressor's reading of the current level, not how long a single note rings out, and not how fast the gain reduction lets go (that's Release, §4.5). Short settings make the reading forget quickly, judging each hit mostly on its own. Long settings make the reading carry the sustained level of the passage forward, so the compressor answers to the section instead of the individual hit.

Setting	Feel	Use it for
75 ms	Reacts to almost every hit fresh	Drums, percussion, rhythmic vocals
150 ms	Still hit-by-hit, slightly more carryover	Drum bus, hip-hop drums, vocals
350 ms	Same hit-by-hit tracking, just slower to let go	Bass, vocal control, smoother bus work
750 ms	Same tracking behavior, slower still — not yet holding a phrase	General-purpose slow tracking, program material
2 s	Genuinely holds: arms within about two seconds of sustained level, then keeps that grab for the full two seconds before releasing	Mix bus glue, sustained music, moderate leveling
6 s	Genuinely holds: arms within about two seconds of sustained level, then keeps that grab for the full six seconds before releasing	Specialized leveling and very sustained material

Default: 75 ms keeps the compressor reacting to individual hits. Move to 2 s or 6 s for genuine holding — 150 ms through 750 ms stay in the same tracking family, just slower.

4.5 Release

Release sets the actual gain-reduction release time. On the hardware it was fixed internally at 40 ms with no front-panel control; P252 makes it adjustable to 400 ms.

40 to 80 ms: punch, articulation, quick recovery, closest to the source unit.

100 to 200 ms: smoother bus, vocal, or bass control.

250 to 400 ms: heavier smoothing, thicker sustain, less obvious movement between hits. On fast or closely-spaced hits, gain reduction may not fully recover before the next transient, softening the attack itself and not just the sustain. It is also the only part of the range where Release takes more off the peaks than off the level.

Range: 40 to 400 ms. Default: 40 ms.

4.6 Attack

There is no Attack control. Attack is set by the circuit. Fast transients can pass before the gain reduction fully settles, which is why the unit can stay punchy even under heavy compression. Because the very fastest peaks slip through while the body is compressed, the processed signal can show higher peak levels than the source even when the GR meter reads heavy reduction. See the Troubleshooting and FAQ section if your DAW peak meter reads higher than the dry signal.

This transient pass-through depends on the compressor having time to recover between hits. Push Release far enough on closely-spaced material (fast drum patterns, doubled hits), and the gain reduction from one hit can still be active when the next one lands, so the transient itself starts to soften rather than just the tail. If a fast pattern feels less punchy than expected, bring Release down before reaching for anything else.

4.7 Output

Output is part of the compressor behavior, not just final loudness. Think of it as the level being fed back into the compressor's own control path. Raising output makes the unit see more of itself, so density, saturation, compression activity, and level can all change at the same time.

That description is the FB sidechain. On FF, the factory default, sweeping Output across its whole range leaves gain reduction exactly where it was: the detector never sees it. Level and the output transformer's color still follow the knob, so the sound does change. Check which mode you are in before reading a GR meter that will not move.

Use Output when you like what the feedback is doing to the sound: more weight, more push, more harmonic density, or more attitude. Do not treat it only as a makeup-gain control after Threshold. If the sound gets better when Output is raised, keep that Output setting and use Trim Out to rebalance the final level cleanly.

-2 to +2: normal working range.

+4 to +8: obvious color, drive, and effect behavior.

After changing Output: use Trim Out or Gain Match before comparing.

Range: -12 to +8 dB, in 2 dB steps. Default: 0 dB.

4.8 Trim Out

Trim Out is clean level after the entire P252 emulation. It does not drive the compressor, change the detector, or add character. It simply moves the final wet level up or down. On the panel, Trim Out is the screw labeled OUT under TRIM.

Use Trim Out to bring the red VU needle back near the black input needle after you adjust Threshold, Output, Ratio, Response Time, or Release. This is the safest way to compare settings fairly.

Trim Out is also where Gain Match writes its correction when you switch MATCH off.

P252 has no output limiter and no ceiling of its own. Nothing inside the plugin clamps its level, so on transient-rich material the output can pass 0 dBFS while the average level still reads low (§4.6, and the FAQ).

If what bothers you is the peaks standing out rather than the overall level, Trim Out is not the control that fixes it.

To hit a target peak, RMS, and crest factor, put the tool for that job after P252: a brickwall limiter, or a soft or hard clipper, set to your delivery ceiling.

Range: -24 to +12 dB. Default: -9.5 dB.

4.9 Mix

Mix blends dry DAW input back into the fully processed P252 signal. The readout shows how much dry is blended in. Use it for parallel compression or for keeping heavy settings under control. The blend is equal-gain (linear): level stays steady and predictable across the whole range, with no loudness bump in the middle of the blend. On the panel, Mix is the screw labeled MX.

0%: full processed signal, no dry blended in.

50 to 70%: common parallel-compression zone.

100%: dry signal, unprocessed.

Default: 0%.

4.10 Link

Link controls how the left and right detector signals are shared before compression is applied. On the panel, Link is the screw between the two gain reduction meters, and its percentage is shown as you adjust it. In mono, the Link screw is hidden because there is nothing to link.

At 100%, both channels listen to a shared detector signal and compress together. This keeps the stereo image stable because a loud event in one channel will not pull only that side down. Use higher Link settings on mix bus, drum bus, mastering, and any stereo source where center image stability matters.

At 0%, the left and right channels react independently. This lets each side breathe on its own, which can feel wider and more animated, but it can also shift the stereo image if one side triggers more compression than the other. Use lower Link settings on wide stereo instruments, room mics, effects returns, or material where left and right contain different information.

Middle values blend those behaviors. A setting around 50% to 80% can be useful when you want some stereo stability without clamping the whole image from one loud event.

> **TIP:** If the stereo image wobbles or pulls to one side, raise Link. If the compression feels too flat or locked in the center, lower Link slightly so the channels breathe more independently.

Default: 100%.

4.11 SC HPF

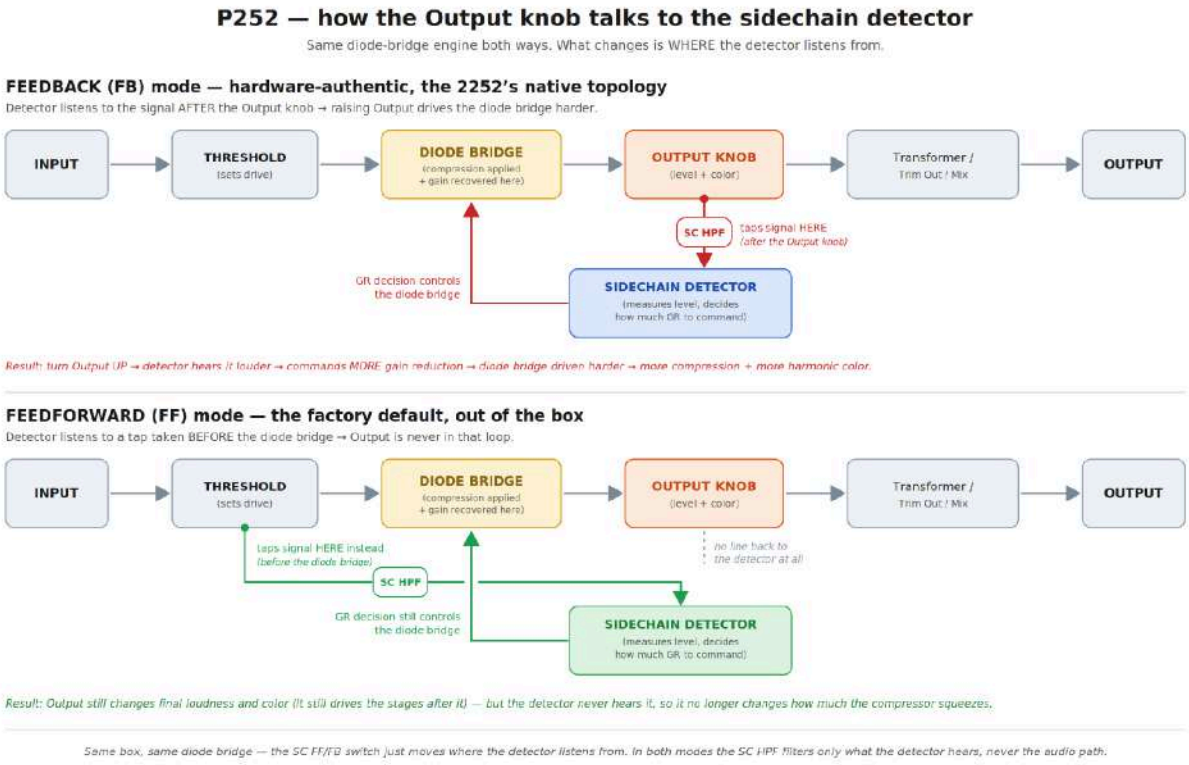
SC HPF filters the detector only. It does not filter the audio path. Use it when kick, bass, or low-end energy makes the compressor pull the whole signal down.

FF (feedforward): The filter acts on the input as driven by Threshold, before the detector. The low band is genuinely excluded from the compressor's decision. Clean low-end pass-through. This is the default.

FB (feedback): The filter acts on the compressor's own output, tapped from the feedback loop. The low band still contributes to gain reduction, so the compression stays integrated with the sound. FB breathes with the low end at any cutoff; that is the 2252 character.

The mode difference exists at any cutoff, including 0 Hz. FF and FB read from different points in the signal path: even with the filter bypassed, the two modes do not sound the same. The two modes are calibrated to produce the same gain reduction with the meter's RAW+IN arc at -12 dBFS, the unit's operating point (§6.2). Below that point FB compresses a little more; above it FF grabs deeper, by several dB once Threshold is well into its lower half, so re-match level before judging a mode change.

The switch also decides what the Output knob does. In FB the detector reads the compressor's own output, so Output feeds it and becomes part of the compression; in FF the detector reads the driven input, so Output sits downstream of it and moves level and color only (4.7). An external key is a feedforward tap and behaves like FF in this respect.



TIP: Choose cutoff by mode, not by target frequency. Set FF and FB independently by ear on the material; the two react differently and settings from one do not carry over to the other.

Range: 0 to 200 Hz. Default: 0 Hz.

Mode: FF or FB. Default: FF.

> **NOTE:** You can switch between the two SC topologies, FF and FB, by clicking on the SC label.

External key (EXT): route any signal to P252's sidechain input in your DAW and engage the EXT button in the top bar. The compressor is then keyed by that signal instead of its own detector tap, and the FF / FB modes are bypassed while EXT is on. Threshold sets how hard the key drives the detector and is the only sensitivity control for it: Trim In deliberately does not touch the key. The SC HPF filters the key, and the key is delay-aligned and follows the oversampling setting, so key and audio stay in time. A mono key (some hosts deliver mono sidechains) feeds both channels.

Classic EXT use: the kick keys P252 on the bass, so the bass ducks on every hit. The same routing works for pumping effects keyed from any rhythmic source.

Default: INT (internal key).

> **NOTE:** EXT needs the sidechain routing set up in the host. If EXT is on and nothing is routed to the sidechain input, the key is silent and P252 stops compressing; if compression seems dead, check EXT first. In hosts that provide no sidechain bus at all, P252 falls back to its internal key instead.

4.12 STOCK / DRIVE

STOCK is the faithful model of the original unit. DRIVE brings out the unit's own analog grit and harmonic edge, so you can hear that character even at light compression or in Linear mode.

The DRIVE screw, set into the panel beside the DRIVE side of the switch, sets how much. It runs from 0 to 100% and ships at 0%. Turning it up adds grit and edge; turning it down is cleaner and smoother, but never all the way back to STOCK. The current percentage is shown as you adjust the screw.

The DRIVE screw only affects the sound when the switch is set to DRIVE. In STOCK, turning the screw does nothing.

STOCK and DRIVE are level-matched closely, so flipping between them lets you hear the change in character rather than a jump in loudness. For a precise A/B, use the MATCH button on Gain Match.

DRIVE works in any Ratio, including Linear.

Default: STOCK, with the DRIVE screw at 0%.

4.13 NORM / HEFT

NORM / HEFT sets the low-end voicing. NORM is the standard low end. HEFT adds weight and fullness to the low end.

Use HEFT when you want a fuller, weightier bottom end. Use NORM for the standard balance.

Default: NORM.

4.14 Ballistics Screw / VU Speed

The screw under the VU needles changes meter movement only. It does not affect audio.

Clockwise: faster meter response for transient and rhythmic material.

Counterclockwise: slower, steadier response for sustained material and average level reading.

Middle: general-purpose behavior. See §6.5 for a fuller description.

4.15 Bypass

Bypass is aligned with the processed path, including oversampling latency. This lets you compare without timing smear.

5. Gain Match

Think of Gain Match like a reference engineer standing next to you, constantly telling you how much louder or quieter the plugin is making the signal. The number is always available. MATCH can compensate live while you explore; when you land on a setting you like, clicking MATCH off commits that correction into Trim Out for you.

Use it whenever you are deciding whether a setting is better, not just louder.

5.1 MATCH

MATCH applies live compensation so the processed output stays closer to the raw input level while you tweak.

Use it while exploring settings.

Do not treat it as the final gain stage.

> **TIP: MATCH is for exploring, not your final gain stage. On very dynamic music it follows the song's loudness. When you land on a setting you like, click MATCH off: it commits the correction into Trim Out and disengages in one move. Do this on a representative section, after the readout settles.**

5.2 Committing to Trim Out

1. Dial the sound.
2. Let the Gain Match readout settle during a representative section.
3. Click MATCH off.
4. A/B against bypass and make any final Trim Out adjustment by ear.

5.3 Transient and Sustained Modes

The SUSTAIN / TRANSIENT button next to MATCH sets how the Gain Match measurement responds. Click it to flip between the two modes. Default: Transient.

Mode	Best for	Why
Transient	Drums, percussion, plucky sources, vocals with hard consonants	A steadier reading on material with sharp peaks and spaces between hits.
Sustained	Bass, pads, mix bus, mastering, continuous material	A faster useful reading on material that stays present.

6. Meters

The meter face has two scales, and clicking anywhere on the meter switches between them. The choice belongs to that instance and returns with the session; a newly inserted P252 starts on whichever face you last picked. It is not stored in presets, so loading one never changes what you are looking at. It changes the display only, not the sound.

Use the VU face to watch how the music rides. Use the dBFS face to check how hard peaks hit the unit, especially when introducing a hot source.

Default: dBFS.

6.1 VU Face

The Simpson-style VU meter is the main visual guide for gain staging P252. It does not only show level. It shows where the signal is before the model, how hard the model is being fed, and where the processed output lands afterward.

Black needle: raw DAW input before processing.

RAW+IN arc: the level going into the modeled unit, set by Trim In. Only Trim In moves this arc. Threshold and Output do not.

Red needle: processed wet level after Trim Out, before Mix.

VU: the classic Simpson face. An averaged reading that shows how the material sits and breathes. The scale is calibrated the way the era's studios ran it: a reading of -18 sits at 0 VU, the old-world operating level. A modern source staged into the compressor's working range therefore rides the upper half of the scale and leans on +3 when you drive it, the same picture the hardware meter gave. That is the meter behaving like 1968, not the meter reading hot.

The circular dots marked 20, 40, 60, 80, and 100 are the percent scale. In P252, this scale is especially useful for reading the RAW+IN arc. That arc tells you how hard the modeled unit is being fed, not just how loud the track is coming from the DAW. On this scale, 100 aligns with 0 VU.

Use Trim In to place the RAW+IN arc in a useful working area before making serious compression decisions:

20 to 40: light drive. Cleaner control, or useful when the source is already hot.

60 to 80: normal working area for many sources.

80 to 100: stronger drive. More compression, density, and character.

Above 100: pushed behavior. Useful for attitude or effect, but level-match carefully. If a source arrives here on its own and its character changes before you have compressed anything, lower Trim In first (see 4.1).

The black needle and red needle are your level-matching pair. The black needle shows what came into the plugin. The red needle shows what P252 is sending out after processing and Trim Out. When judging a setting, bring the red needle close to the black needle, or keep the two moving in tandem. That keeps your decision focused on tone, punch, density, and movement instead of simple loudness.

On fast material like drums, the needles and the arc move slower than the real peaks. The boxed readouts always show the true value.

> **TIP: The percent dots are not a rule. They are a starting reference for the RAW+IN arc. A quiet vocal, drum bus, and full mix will not all want the same meter position. Use the dots to land the modeled unit in a sensible range, then use your ears.**
>
> **If the red needle sits far above the black needle, you may be hearing loudness more than tone. Keep the sound if you like it, especially if Output is adding the color, then use Trim Out or Gain Match to rebalance before comparing.**

6.2 dBFS Face

dBFS: a peak scale, for when you need to see how close the signal is running to the ceiling. The numeric readouts follow the scale and show true peak in this mode. The needles are mechanical by design and will not always catch the fastest peaks; the numeric readouts always show the true value. The RAW+IN arc shows the same thing here: blue up to -12, the P252 sweet spot, then red as you push past it and drive the modeled unit harder. A -12 dBFS test tone lands the needle right where the arc turns.

6.3 Gain Reduction Meters

The GR meters show compression and gain addition. Downward movement means gain reduction. Upward movement means the modeled circuit is producing net gain in that operating region.

There is one meter per channel, with a numeric dB readout under each. The screw between the two meters is the Link control. In mono, a single meter is shown and the Link screw is hidden.

If the meters show upward movement and you do not want that behavior, lower Output, lower Trim In, or use Gain Match to compensate the level.

6.4 Digital RMS Readouts

The RMS readouts give a practical in/out level reference. They are useful for manual level matching, but Gain Match is faster when you want one-button compensation.

6.5 Ballistics Screw

As introduced in §4.14, the screw under the needles sets the VU meter ballistics, meaning how quickly the needles react. A traditional Simpson-style VU meter is intentionally slow, which is good for reading average level. P252 lets you speed that up when you want to see more detail.

Turn the screw clockwise for a faster response. Fast settings show brief level changes and short transients more clearly, useful on drums, percussion, brass, electric guitar, and other attack-heavy material.

Turn the screw counterclockwise for a slower, steadier response. Slow settings emphasize average level, making the meter easier to read on vocals, bass, mix bus, mastering, and other continuous material.

Middle is general-purpose.

> **NOTE:** The Ballistics screw changes the VU needles only. It does not affect the compressor's attack, release, or detector, the separate gain-reduction meters, or the audio in any way.

7. Oversampling and Modes

7.1 Oversampling

Oversampling runs the nonlinear stages at a higher internal rate. Higher settings reduce aliasing artifacts but use more CPU.

Mode	Use it when
Off	Lowest CPU, zero added oversampling cost. Good for tracking or light settings.
1	You want a gentle, always-on analog character. The difference is subtle and sits mostly up top.
2	You want cleaner, tighter highs when driving the unit hard on bright material. A solid mixing default.
3	You want the cleanest top and most headroom for hot or heavily driven sources and final renders.

If your host sample rate already meets the target of an adaptive mode, that mode may be disabled because there is nothing useful to add.

7.2 Linear Ratio as a Color Mode

Linear turns off the compression curve but keeps the signal path active. With DRIVE engaged, this becomes a simple way to use P252 as a character processor.

7.3 NOISE

NOISE adds the modeled self-noise of the hardware unit, reproduced at a lower level than the original, which we deemed more musical. The original 2252 has a clearly audible noise floor; NOISE brings in that character without the full weight of the hardware hiss. With NOISE off, the output is clean.

Use it when you want the full vintage presentation, on material where a touch of noise reads as character. Leave it off for quiet sources, mastering, or chains where noise build-up across plugins matters.

Default: off.

8. Workflow Recipes

Each recipe lists Response Time and Release together. Response Time sets how much of the recent program history factors into the compressor's reading of the material. Release sets how quickly the gain reduction relaxes once it starts letting go.

8.1 Hip-hop drums: density without losing the hit

Start with Ratio Limit, Response Time 150 ms, Release 40 to 80 ms, Threshold around -20, Output 0, and Mix 0 to 30%.

Move Threshold toward -25 for more density and compression, or back toward -15 if the hit starts losing too much impact. Raise Output if you want more feedback color and attitude, then use Trim Out (or switch MATCH off) to rebalance.

What to expect: at moderate Threshold settings the transient comes forward. As you push harder, the body becomes denser and the crest factor collapses. At -25, the unit becomes more of a tone box than a transparent compressor.

8.2 Drum bus: parallel weight

Set Ratio to 10:1 or Limit, Response Time 75 or 150 ms, Release 40 to 100 ms, Threshold -20 or lower, then bring Mix down to 30 to 50%.

Raise Output if you want more aggression, then pull Trim Out down if needed.

What to expect: the dry signal keeps the first hit and edge, while the compressed path adds body, density, and room weight underneath.

8.3 Mix bus: slow hold and glue

Set Ratio to 2:1 or 3:1, Response Time 2 s or 6 s, Release 80 to 200 ms, Threshold around -5 to -10, Output 0, and SC HPF around 80 to 150 Hz.

The goal is not obvious pumping. The goal is a steady compression floor that holds the mix together. If the kick pulls too much, raise SC HPF. If the mix feels too controlled, shorten Response Time, lower Threshold drive, or bring Release closer to 40 ms.

What to expect: the image should feel more connected and settled, not obviously clamped. If it gets smaller or duller, reduce Threshold drive or use Mix to blend in more dry signal.

8.4 Vocals: control the body, keep the consonants

Set Ratio to 2:1 or 3:1, Response Time 75 or 150 ms, Release 40 to 120 ms, Threshold -10 to -15, and Output 0.

If the vocal is not being controlled enough, move Threshold toward -15 or -20 before reaching for Trim In. Use 75 ms Response Time for more movement, or 150 ms when you want the body to sit more steadily.

What to expect: consonants and breath detail stay present while the sustained body of the voice becomes more even. If the vocal starts to feel pinned, move Threshold back toward -10 or lengthen Release slightly.

8.5 Bass: steady without flattening

Set Ratio to 3:1 or 5:1, Response Time 150 or 350 ms, Release 80 to 200 ms, Threshold -10 to -20. Use Sustained mode in Gain Match if you are calibrating a steady bass part.

If low notes trigger too much compression, use SC HPF gently. If you want more harmonic audibility on small speakers, engage DRIVE or raise Output slightly.

What to expect: note body becomes steadier while the front of the note still speaks. Slower Release gives thicker sustain; faster Release gives more motion and articulation.

8.6 Coloration without compression

Set Ratio to Linear, engage DRIVE, and keep Threshold between 0 and -10 (around -5 is a good start). Adjust Output for more color and Trim Out for final level.

What to expect: signal-path tone without envelope control. Use this as a tone slot when you want the unit's character without changing the shape of the source.

9. Presets

Presets are starting points. Because P252 is level-sensitive, the same preset can behave differently on a quiet track and a hot bus. After loading a preset, check Trim In, Threshold, and Gain Match before judging it.

If a preset feels too aggressive, lower Trim In only if the RAW+IN arc is already too high, or move Threshold toward +10.

If a preset feels too clean, move Threshold toward -25, raise Output slightly, or engage DRIVE.

If a preset sounds good but too loud, switch MATCH off or use Trim Out before comparing.

VU Speed is remembered per instance with your session and is not saved per preset.

9.1 Factory and User Presets

When installing an update, the installer will overwrite factory presets unless you deselect the “Install Presets” option during installation. Your own user presets are never affected by updates.

To protect any modifications you have made to factory presets, save them with new names using the “Save As” option in the preset browser before updating.

9.2 Backing Up Presets

Presets are stored as files on your computer and can be backed up by copying them to any location you choose.

- **Windows:** C:\Users\Public\Documents\Pulsar Modular\P252 MDN Diode\Presets
- **macOS:** /Users/Shared/Pulsar Modular/P252 MDN Diode/Presets

9.3 A | B Compare

The A | B area on the toolbar gives you two temporary setting slots for quick comparisons. Click the A | B area to alternate between them. The click target does not move, so you can flip back and forth without moving the mouse and keep your attention on the sound.

The arrow button copies the active side to the inactive side. A useful workflow: dial in a sound, press the arrow to copy it, then push the settings further on the active side. Flipping between A and B now compares the safe version against the experiment.

Presets can be loaded into either the A or B placeholder, so two presets can be compared directly on the same material.

A and B are temporary working storage to facilitate comparison. They are not stored within the preset.

10. Uninstalling P252 MDN Diode

10.1 Windows

- **VST3:** C:\Program Files\Common Files\VST3\Pulsar Modular: delete P252 MDN Diode.vst3
- **AAX:** C:\Program Files\Common Files\Avid\Audio\Plug-Ins\Pulsar Modular: delete P252 MDN Diode.aaxplugin
- **Shared files:** C:\Users\Public\Documents\Pulsar Modular: delete the P252 MDN Diode folder

10.2 macOS

- **AU:** /Library/Audio/Plug-Ins/Components: delete P252 MDN Diode.component
- **VST3:** /Library/Audio/Plug-Ins/VST3/Pulsar Modular: delete P252 MDN Diode.vst3
- **AAX:** /Library/Application Support/Avid/Audio/Plug-Ins/Pulsar Modular: delete P252 MDN Diode.aaxplugin
- **Shared files:** /Users/Shared/Pulsar Modular: delete the P252 MDN Diode folder

11. Specifications

Item	Value
Plugin formats	AU, VST3, AAX
Channel modes	Mono, Stereo
Internal precision	64-bit floating point throughout the DSP path
Threshold	-25 to +10 dB, 5 dB steps
Ratio	Linear, 2:1, 3:1, 5:1, 10:1, Limit
Response Time	75 ms, 150 ms, 350 ms, 750 ms, 2 s, 6 s
Release	40 ms to 400 ms
Output	-12 to +8 dB, 2 dB steps
Trim In	-24 to +12 dB
Trim Out	-24 to +12 dB
SC HPF	0 to 200 Hz, detector path only
SC Mode	FF (feedforward) or FB (feedback), click SC label to toggle. Default: FF
External sidechain	EXT button keys P252 from the host sidechain input. Default: INT
Link	0% to 100%
Mix	0% to 100% dry
Oversampling	Off, 1, 2, 3
STOCK / DRIVE	Switch, default STOCK
DRIVE amount	0% to 100%, default 0% (active in DRIVE only)
NORM / HEFT	Low-end voicing switch, default NORM
NOISE	Modeled hardware self-noise at reduced level, default off
VU Speed	Meter ballistics only, no effect on audio
Latency	Oversampling-dependent; zero with OS Off

12. Troubleshooting and FAQ

Q. Why does turning Threshold lower create more compression?

A. Because Threshold acts like drive into a fixed detector. Lower settings push the signal harder into the compression circuit.

Q. Why does Output change the tone?

A. It depends on the SC mode. In FB, Output feeds the compressor back into itself, so raising it can increase level, compression activity, harmonic density, and attitude. In FF, the factory default, the detector never sees Output: compression stays where it is, and what moves is level and the output transformer's color. If you like that color, keep the Output setting and use Trim Out for clean level rebalance.

Q. Hot sources distort even in STOCK. Do some sources just not work with P252?

A. Every source works; hot sources need to be introduced at the right level. The 2252 was designed around 1960s studio line level, so a modern track peaking far above that range drives the input of the modeled circuit into its character zone before compression even begins. Lower Trim In until the source keeps its identity, then set Threshold for the gain reduction you want and rebalance with Trim Out or Gain Match. The same track that seemed unusable will pass clean.

Q. Why does a hot source sound brighter and more forward, not just more distorted?

A. When a source runs in hot, the unit does not just get dirtier, it gets brighter in a specific way: the character it adds lands above the body of the music, in the presence range. That is why an over-driven source reads as a forward, crispy upper midrange rather than as obvious distortion, and why lowering Trim In brings the tone back rather than just cleaning it up.

Q. Is Response Time the same as Release on other compressors?

A. No. Response Time controls how much of the recent program history the compressor factors into its reading of the current level. Release controls how fast the gain reduction itself moves once the compressor reacts to that reading. Response Time shapes what the compressor is responding to; Release shapes how quickly it responds.

Q. What does Release do?

A. It sets the real gain-reduction release time from 40 ms to 400 ms. Use 40 ms for the source-unit response. Raise it when you want smoother recovery, thicker sustain, or less chatter on difficult material.

Q. Why is there no Attack knob?

A. Attack is determined by the circuit. This is part of why the compressor can keep drum transients alive while controlling sustain, provided Release has time to recover between hits. Push Release long enough on fast, closely-spaced material and that protection erodes. See §4.5 and §4.6.

Q. Why do I sometimes see positive movement on the GR meter?

A. In some operating regions the modeled circuit produces net gain addition rather than only gain reduction. This is why the meter is bidirectional.

Q. My DAW peak meter reads higher than the dry signal, even though the GR meter shows heavy gain reduction. How?

A. This is the unit working as intended, and it is a big part of its sound. The GR meter shows how much the body of the signal is being held down. The fastest drum and percussion transients rise far quicker than any compressor can react, so their leading edges pass through almost untouched while everything behind them is compressed. The result is a sound with a controlled, dense body and peaks that stand out even more sharply than in the source. Add Output or Trim Out on top and those surviving peaks can read higher than the dry signal in your DAW. It is not a fault and the compressor is not amplifying transients on its own. If you need the peaks under a ceiling, place a limiter or clipper after P252. If you like the punch, leave it and level-match with Gain Match before comparing. Release and Response Time can each reduce peaks, on the material each suits (§3.4). Threshold cannot: going deeper raises the transient along with the gain reduction, so the peaks get taller, not shorter.

Q. The RMS readouts show about 3 dB higher than my DAW's RMS meter. Why?

A. On the VU face, the readouts follow the meter's calibration, which reads 3 dB above plain RMS. This is how VU metering works, not an error. For values that match your DAW, click the meter face to dBFS mode; the peak readouts there are true peak with no offset.

Q. The plugin sounds better when louder. What should I do?

A. Use MATCH while adjusting, then switch it off to commit the compensation into Trim Out. This keeps A/B decisions honest.

Q. What should I do if the stereo image moves or leans to one side?

A. Raise Link. A higher Link value makes both channels listen to a more shared detector signal, which stabilizes the stereo image.

Q. When should I lower Link?

A. Lower Link when compression feels too locked in the center or when you want the left and right sides to breathe more independently. This can work well on wide stereo instruments, room mics, and effects returns.

Q. CPU usage is high. What should I change?

A. Set OS lower. Higher oversampling modes are cleaner at heavy nonlinear settings, but they use more CPU.

Q. Does P252 support external sidechain input?

A. Yes. Route the key signal to P252's sidechain input in your DAW and engage the EXT button in the top bar. The SC HPF then filters the external key, and Threshold sets its sensitivity. See section 4.11.

Q. I switched from FF to FB at the same SC cutoff and the compression changed a lot. Why?

A. FF filters the raw input; FB filters the compressor's already-compressed output. Even at the same cutoff, and even at 0 Hz, the two modes read different signals and produce different compression. Set each mode by ear on the material; cutoffs do not carry over. See §4.11.

Q. Why do 75 ms through 750 ms Response Time settings all sound so similar?

A. Because they're the same tracking mechanism at different speeds — none of them hold a level the way 2 s and 6 s do. On steady material the difference can be subtle; on drums and rhythmic sources, slower settings in this range keep a little more body between hits while faster ones feel more separated, but none of them settle into a true hold. For genuine holding character, use 2 s or 6 s instead.

Q. I hear a low hiss when nothing is playing. Is something wrong?

A. Check the NOISE button. When engaged, P252 reproduces the hardware unit's self-noise at a reduced, musical level as part of the vintage character. Turn NOISE off for a clean output.

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