

# P22 RAIL

STABILIZING A/D CLIPPER

User Guide

Version 1.0

**Pulsar Modular**



## P22 RAIL

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## Preface

When we shipped P21 Atlas, we knew what the next step had to be. Atlas stabilizes the program and leaves headroom intact by design. For material that demands commercial loudness beyond that clean ceiling, the chain needs one more stage, and that stage is a clipper, not a limiter. P22 RAIL was built to be that stage, carrying the DNA of Atlas, formulated within an A/D clipper.

There are not many bells and whistles in RAIL, and that is deliberate. Our target was the workflow and behavior of a hardware A/D converter being clipped. A converter driven past full scale does not ask for attack, release, or knee settings. It has a character, and the engineer drives into it. RAIL works the same way. Choose a flavor, set DRIVE, listen.

The three flavors are three converters in spirit. MODERN is the clean path, transparent peak control with minimal coloration. SHARP has a defined edge, presence and transient focus. VINTAGE brings asymmetric warmth and harmonic richness.

If we did not believe we could bring something fresh to a clipper, we would not have developed P22 RAIL. What is fresh is not on the panel. It is in how each flavor holds its character as the material changes, peak after peak, so the engineer commits to a sound rather than babysitting a threshold.

*Ziad Sidawi*

*Pulsar Modular*

## 1. About P22 RAIL

P22 RAIL is a stabilizing A/D clipper for the final loudness stage of a master, a stem, or a group. It is named for the way a hardware analog-to-digital converter behaves when it is driven past full scale, with a stabilizing engine ahead of the rail that prepares peaks before they are clipped. It takes a program that has already been mixed or stabilized and shapes its peaks into a clipper curve, delivering commercial loudness and density with a chosen sonic character. RAIL is the stage you reach for when a clean ceiling is no longer enough and the material asks for the loudness and edge that only clipping provides.

RAIL pairs naturally with P21 Atlas. Atlas stabilizes the program and leaves headroom; RAIL drives that stabilized program into the clipper for the final push. RAIL also works on its own at the end of any chain, and on stems and groups where character and loudness are wanted on part of the mix rather than the whole.

### The stabilizing clipper

RAIL is a stabilizing clipper. Ahead of the clipping stage sits a stabilizing engine, the same thinking that drives P21 Atlas, working here in a narrow window just below the rail. As peaks approach the clipping point, the engine rides them down, so the clipper shapes only what the engine could not catch rather than flattening everything that crosses the rail.

This is what it means for RAIL to carry the DNA of Atlas, and the benefit shows up in three ways. Transients keep their impact instead of being shaved flat, because the engine prepares peaks rather than slamming them. The character stays consistent peak after peak as the material changes, so a setting that sounds right in the verse still sounds right in the chorus. And the program holds together as you drive it, gaining loudness and density without coming apart.

What you hear as RAIL's sound is the work of three stages together. The stabilizing engine shapes how peaks arrive. The flavor sets the tone going into the clipper. The clipping itself adds the final harmonic character at the rail. The engine and the flavor carry the identity across the whole program, while the clip is the fingerprint at the peak.

## Clipping is character, not damage

A clipper exists to add harmonics. At the rail it reshapes peaks, and that reshaping is distortion by design. In a clipper this is not a fault to be minimized; it is the instrument. Each RAIL flavor is a different distortion signature, a different color to reach for, and having that range on tap is what lets you choose a sound rather than settle for whatever is least objectionable.

Because the distortion is the point, the useful question is never which clipper distorts least. It is whether the distortion is the character the music wants, applied with intent. A few habits keep that judgment fair:

- **Match loudness before you compare.** Louder almost always reads as better, or as more distorted, depending on what you are listening for. Press MATCH, then toggle BYPASS, so you are judging character and not level. MATCH is detailed in 3.4.
- **Compare at a musical drive.** Around 2 to 3 dB of CLIP DEPTH is where character lives. Pushed far past that, every clipper is in audible failure, and you are comparing how tools break rather than how they sound in use.
- **Judge on your own material.** The genres and transients you work on every day tell you more than any torture-test signal.

## Editions

**Two editions, one engine.** RAIL Stereo operates on mono and stereo buses. RAIL Immersive operates on every channel format RAIL supports, from mono through 9.1.6 (see chapter 5 for the full list). The edition is set at purchase, and RAIL Stereo can be upgraded to RAIL Immersive at any time. On a multichannel bus, RAIL Stereo's behavior depends on the DAW: many hosts offer it only as a multi-mono insert and never present the surround or immersive layout, and a host that does allow the insertion will not process the audio through RAIL, usually showing a message to that effect. Multichannel and immersive work needs RAIL Immersive.

**Upgrading from Stereo to Immersive.** The upgrade is purchased on the P22 RAIL page at [pulsarmodular.com](http://pulsarmodular.com), which provides your new Immersive license. To apply it:

- Buy the Stereo-to-Immersive upgrade on the P22 RAIL webpage.
- Open RAIL, click the menu at the top right, and choose License Status.
- Deauthorize the Stereo edition, then paste in the new Immersive license.
- Restart your computer. RAIL then opens as the Immersive edition, with every supported layout available.

## Getting started

RAIL installs as VST3, AU, and AAX on macOS and Windows. After installation and authorization, instantiate RAIL at the end of your chain, on the master bus, a stem, or a group.

The clipper works against the rail, which is the clipping point, fixed at 0 dBFS. Any part of the program that crosses the rail is shaped by the clipper; everything below it passes through. DRIVE pushes the program into the rail: the more you raise it, the more of the program reaches and crosses the rail, and the louder and more characterful the result becomes.

RAIL opens with VINTAGE selected and DRIVE at 0. If the incoming program already has peaks above 0 dBFS, RAIL is clipping them even at DRIVE 0, and the readouts will show it; DRIVE 0 means RAIL adds no drive of its own, not that nothing is happening. On a program that sits below the rail, DRIVE 0 passes it through untouched. Either way, raise DRIVE while listening until the program reaches the loudness and character you want. The five-minute walkthrough below is the fastest way to get there on your first session.

For installation help, license activation, and system requirements, see the support pages at [pulsarmodular.com](http://pulsarmodular.com).

## Your first five minutes

The result: in one short pass on familiar material, you will hear what RAIL does and land a strong, loud setting you can trust. Run it on a mix you know well, ideally one whose sound you can picture before you press play.

- Place RAIL last in the chain and bypass anything after it, so what you hear is RAIL alone.
- Start playback on a loud section of the material.
- Leave DRIVE at 0 and listen. Watch the readout panel settle so you know where the program sits before you drive it.
- Raise DRIVE slowly. As you go, watch CLIP DEPTH climb. Aim for roughly 2 to 3 dB of CLIP DEPTH on the loud peaks; that is the strong, musical working range. The inner ring around the dial fills as depth grows, so you can set it by sight as well as by ear.
- Step through the three flavors with the left and right arrow keys, listening at this DRIVE setting. MODERN stays transparent, SHARP adds edge and presence, VINTAGE adds warmth. Leave it on the one that serves the music.

- Press MATCH, then toggle BYPASS a few times. MATCH holds a level-matched snapshot, so you are comparing RAIL's character, not just louder against quieter. This is the moment RAIL reveals itself.
- If RAIL is your last stage, set the output with TRIM to your delivery level, and check LUFSS-I and TP MAX against your target.

That is the whole workflow. Everything else in this guide deepens these seven steps.

## A note on clipper habits

RAIL is a clipper, and most engineers arrive with clipper habits. A few of those do not serve RAIL well. Now that you have made one pass, these are worth keeping in mind:

- **Pick the flavor first, then drive.** The flavor is the sound. DRIVE only decides how far into that sound the program goes. Auditioning DRIVE before settling on a flavor means tuning depth against a character you have not chosen yet.
- **DRIVE is how you reach the clipper, not just how hard you hit it.** On a quiet stem or group the program may never approach the rail on its own. DRIVE is what brings it there. There is no separate threshold to lower.
- **A low CLIP % does not mean RAIL is idle.** CLIP % counts the share of the program touching the clipper, and around one percent or below is the normal working range even when every peak is being clipped firmly. The number you set by is CLIP DEPTH, not CLIP %. A low percentage with a healthy depth is RAIL working exactly as designed.
- **The alarm dot is guidance, not a fault.** It lights when a readout goes past a conservative point, and deliberate clipping can light it. Read it as a prompt to confirm what you are hearing is what you intend, not as an error.

## Where RAIL fits

RAIL is a time-domain clipper. It works sample by sample against a fixed rail, in the way a hardware A/D converter behaves when it is driven past full scale, and it adds almost no delay to the signal. This is one of two broad approaches to clipping, and knowing the difference helps you reach for the right tool.

The other approach works in the frequency domain. It analyzes the signal across a window of time, distributes the clipping across frequency bands, and reconstructs the result. That method is built to drive hard while holding tonal balance, and it does that well. Its cost is inherent to the approach: it must buffer a window of audio to do its analysis, which adds significant latency and acts over a span of time rather than instant by instant.

Neither approach is better in the abstract; they answer different questions. The frequency-domain approach favors transparent loudness and tonal preservation. A time-domain clipper like RAIL favors characterful peak control and transient integrity. Two consequences of RAIL's near-zero latency are worth calling out:

- **Transients stay intact.** Acting instant by instant, with the stabilizing engine riding peaks rather than buffering and inspecting them, leaves the leading edge of a transient where the recording put it. A large analysis window tends to soften that leading edge as the cost of looking ahead.
- **It belongs in fast signal paths.** At three samples of delay, RAIL can sit across many subgroups at once without delay piling up, and it is fast enough for live front-of-house use, where the latency of a windowed processor would not be acceptable.

RAIL stays a characterful clipper rather than a true-peak safety device, so keep a true-peak limiter on the master for delivery. What the low latency buys you is freedom of placement and the transient feel that comes with acting in the moment.

## 2. Chain Topology

RAIL sits at the end of the signal path. Three placements cover almost everything engineers do with it. In each one, the result you want comes first, then the way to reach it.

### 2.1 RAIL after Atlas on the master bus

The result: a master that is stabilized and coherent, then driven to commercial loudness with a deliberate clipper character. This is the recommended chain.

Atlas does the stabilization work and leaves the program with headroom. RAIL follows and takes that program into the clipper. DRIVE sets how deep the program goes into the curve, and it is the primary control for that depth. You do not need Atlas to push level into RAIL; DRIVE reaches the clipper on its own, and RAIL's PK IN readout confirms the level arriving at the clipper input.

There is a second, equally valid way to set the feed. If you want to watch the handoff from the Atlas side, raise Atlas's TRIM and read its TRIM PEAK, which updates live and shows exactly how much level is passing into RAIL. Both approaches end in the same place. The difference is only which panel you read while setting it: RAIL's PK IN, or Atlas's TRIM PEAK.

### 2.2 RAIL standalone

The result: a final clipping stage at the end of any chain, with no dependence on Atlas upstream.

Place RAIL last. DRIVE does all the work of taking the program into the clipper, exactly as it does after Atlas. Choose a flavor, raise DRIVE to the depth the material rewards, and set the output with TRIM. The workflow is identical whether or not Atlas precedes RAIL, because drive depth belongs to RAIL.

## 2.3 Atlas and RAIL on stems and groups

The result: a stem or group made louder and given character, then returned to the level it held in the mix, so the balance of the session is unchanged.

Stems and groups often sit well below 0 dBFS, and on their own they may never approach the rail, so DRIVE alone might not bring the program to the clipper. The fix is a short, repeatable gain-staging loop:

- Stabilize and enhance the stem or group with Atlas.
- Raise Atlas's TRIM until the signal sits near 0 dBFS, so it arrives in RAIL's working range.
- Set RAIL's DRIVE to find the sweet spot for the flavor.
- Bring the stem or group back to its previous level with RAIL's TRIM.

This is why RAIL's TRIM only attenuates. DRIVE adds level into the clipper; TRIM gives that level back at the output. Together they let you clip a quiet stem hard and still seat it at its original level in the mix.

### NOTE

A quiet stem will not reach the rail by itself; DRIVE brings it there, and with up to 18 dB available DRIVE can lift even a quiet source into the clipper on its own. Lifting the feed toward 0 dBFS upstream first is optional, and keeps your working settings in the fine part of the dial.

## 3. Controls

RAIL has three controls: FLAVOR, DRIVE, and TRIM. The order to use them in is the order this chapter follows: choose the character, drive into it, set the output. Two buttons complete the panel, MATCH and BYPASS, which never touch the sound and exist for one job: a fair, level-matched comparison. They close the chapter.

### 3.1 FLAVOR

The result: the sonic character of the clipping. Flavor is the most important choice in RAIL, because everything the listener identifies as RAIL's sound comes from the flavor, not from DRIVE.

Three flavors are available, selected by clicking the circle or label below the DRIVE dial, or with the left and right arrow keys.

- **MODERN.** The cleanest response, with minimal coloration and transparent peak control. Reach for it when loudness is wanted without added character.
- **SHARP.** A defined edge that adds presence and transient focus. Reach for it when the program wants snap and a sense of forward energy.
- **VINTAGE.** Asymmetric warmth and harmonic richness. Reach for it when the program wants body and a wider perceived character.

Chapter 4 describes the three flavors in detail and how to choose between them. Because flavor is the sound, audition flavors before tuning DRIVE; depth set against the wrong character has to be redone once the character changes.

#### TIP

Pick the flavor first, then drive. The flavor is the sound; DRIVE only sets how far into that sound the program goes. Auditioning DRIVE before choosing a flavor means tuning depth against a character you have not settled on yet.

## 3.2 DRIVE

The result: how deep the program goes into the clipper. DRIVE is the single performance control in RAIL. At DRIVE 0, RAIL adds no drive of its own: a program sitting below the rail passes through untouched, while a program whose peaks already cross 0 dBFS is clipped at those peaks even here. As you raise DRIVE, more of the program reaches and crosses the rail, increasing loudness and the chosen flavor's character together.

DRIVE is the large dial at the center of the panel. Drag vertically to change it. Hold Shift while dragging to keep the output level steady as you drive, so you are judging character and not loudness; hold Ctrl for fine adjustment; double-click to return it to 0. The value reads in dB at the center of the dial.

**How deep to drive.** Set DRIVE by watching CLIP DEPTH in the readout panel, which shows how far peaks are going past the rail. Around 2 to 3 dB of CLIP DEPTH on the loud peaks is the strong, musical working range for most material. RAIL flags CLIP DEPTH beyond 3 dB as a prompt to consider easing off, so think of 3 dB as the upper edge of everyday use rather than a target to exceed. Heavier depths are available when a deliberately crushed sound is the goal.

### TIP

Set DRIVE by CLIP DEPTH, not by CLIP %. Aim for 2 to 3 dB of CLIP DEPTH on the loud peaks. A low CLIP % alongside a healthy CLIP DEPTH is RAIL working as designed, not RAIL sitting idle.

**One DRIVE range for every flavor.** DRIVE sweeps the same range on all three flavors, from 0 up to 18 dB, with no per-flavor stop. The dial does not decide where a flavor stops sounding good; you do, by ear and by the CLIP DEPTH readout. The dial is weighted so the first few dB, where everyday mastering lives, take up most of the travel, with the heavier settings reached by a shorter push toward the top. Flavors do differ in how much drive they tolerate before their character breaks down, MODERN the least and VINTAGE the most, but that is guidance for your ears and the readout, not a limit built into the dial.

**Reading the dial while you drive.** Two rings around the dial tell you what the program is doing. The outer signal arc shows peak level approaching the rail, with the marked point being 0 dBFS, the rail itself. The inner ring lights only when the signal crosses the rail and shows how deep into the clipper it is going. Raise DRIVE until the inner ring shows the depth the material rewards, then confirm by ear.

### 3.3 TRIM

The result: the output level leaving RAIL, set without changing how hard the clipper is working.

TRIM attenuates only, from unity down to 30 dB of attenuation. It applies after the clipper and does not feed back into the clipping, so lowering TRIM changes the level that leaves the plugin while the character and depth you set with DRIVE stay exactly as they were.

#### NOTE

TRIM never changes the clipping. It only attenuates the output after the clipper, so use it to set delivery level or to seat a stem back in the mix without touching the character and depth you dialed in with DRIVE.

TRIM is the small knob inside the readout panel. It has a full sweep from unity at fully clockwise to maximum attenuation at fully counter-clockwise. Drag to change it, hold Ctrl or use the right mouse button for slow motion, use the mouse wheel to nudge, and double-click to return to unity. When you Shift-drag DRIVE, TRIM moves on its own to hold the output level steady. You can also click the TRIM value in the readout panel to type a level directly.

Reach for TRIM in two situations:

- **Returning a stem or group to its mix level.** After driving a stem into the clipper, attenuate with TRIM until it sits where it did before, as described in 2.3.
- **Setting a final delivery level.** When RAIL is the last stage, use TRIM to land the output where the delivery target wants it.

### 3.4 MATCH

The result: a level-matched snapshot for before-and-after comparison, so what you hear when you toggle BYPASS is RAIL's character and not a change in loudness.

MATCH is the button to the left of BYPASS in the bottom row. Pressing it captures a snapshot of the loudness difference between RAIL's output and the dry input at that instant and applies it to the comparison, so toggling BYPASS switches between two equal-loudness states. MATCH never moves TRIM, and the readouts keep showing RAIL's true output, so your working settings and your delivery numbers stay exactly as you left them. What MATCH does apply is a comparison attenuation on the louder path, audible while it is engaged; that attenuation is what makes the A/B fair. You can keep TRIM wherever you want it and still get a level-matched comparison. The button goes solid when engaged and stays solid until you press it again. MATCH needs signal to measure, so pressing it during silence or before playback will not engage it.

Because the snapshot is held, it goes stale as the program plays and its loudness moves. The DRIFT  $\Delta$  row in the readout panel shows how far the held snapshot has drifted: it reads 0.0 the moment you press MATCH and grows from there. The solid button tells you only that MATCH is engaged, not whether the snapshot is still accurate, so read DRIFT  $\Delta$ , not the button, to judge staleness. To take a fresh snapshot at the current settings, press MATCH off and then on again. See 7.2 for the comparison workflow.

### 3.5 BYPASS

The result: RAIL is taken out of the signal path so you can compare the program with and without it. BYPASS is the toggle at the far right of the bottom row. Used together with MATCH, it gives a level-matched before-and-after, which is the fair way to judge what RAIL is contributing rather than hearing louder as better.

## 4. The Three Flavors

Choosing a flavor is choosing a sound. Each one behaves like a different converter being clipped, with its own character and its own useful drive range. This chapter describes the result each flavor delivers and the material it suits, so the choice can be made by intent and confirmed by ear.

### 4.1 MODERN

The result: loudness with as little audible character as possible. MODERN is the transparent choice, the flavor to reach for when the goal is a louder, denser master that still sounds like the mix that went in.

MODERN's identity is consistency. It engages the same way peak after peak, and that uniformity is what the ear reads as transparency. Of the three it tolerates the least drive before clipping becomes audible, because its character depends on staying within the window where it stays clean; pushing past that window is where transparency gives way to audible clipping. Use MODERN on material that is already well balanced and simply needs to be brought up, and where any added color would be a liability rather than an asset.

### 4.2 SHARP

The result: loudness with a defined edge, presence, and transient focus. SHARP is the flavor to reach for when the program wants snap, forward energy, and a sense of being firmly in the front of the speaker.

SHARP's character is a quicker, more decisive bend into the clipper than MODERN, which develops audible presence and edge as you drive. As you drive it, its edge moves from a light seasoning to a clear, intentional effect, and it tolerates a moderate amount before that effect takes over. Use SHARP on rhythmic and produced material that benefits from added definition, where you want the clipper to contribute energy rather than disappear.

### 4.3 VINTAGE

The result: loudness with warmth, body, and a wider perceived character. VINTAGE is the flavor to reach for when the program wants richness and a fuller, rounder sound as it gets louder.

VINTAGE is asymmetric, which is the source of its warmth and its harmonic richness. It shapes the program over a wider zone than the other two flavors before the program reaches the rail, and it tolerates the most drive of the three, because more drive deepens the warmth without losing the identity, until eventually the warmth would begin to turn thick. Use VINTAGE on material that rewards character, where the goal is not transparency but a louder program that also sounds bigger and more pleasing.

### 4.4 Choosing between them

	<b>MODERN</b>	<b>SHARP</b>	<b>VINTAGE</b>
<b>Character</b>	Transparent, uncolored	Defined, edged, present	Warm, rich, wide
<b>Reach for it when</b>	loudness with no added color is wanted	the program wants snap and energy	the program wants body and warmth
<b>Drive tolerance</b>	Lowest, clips soonest	Moderate	Highest, holds longest

The fastest way to choose is to audition. Set a modest DRIVE, step through the three flavors with the arrow keys at matched level using MATCH, and listen for which character serves the music. Then tune DRIVE for that flavor.

## 5. Immersive Operation

**For RAIL Stereo users:** this chapter applies only to RAIL Immersive. The rest of the guide covers stereo operation in full; readers working on stereo material can move to chapter 6.

RAIL Immersive treats every main channel of a multichannel bus as one program and clips them consistently, so the spatial image is preserved as the program is driven into the rail. The result an engineer wants on immersive material is the same loudness and character available in stereo, delivered without the soundfield shifting as the clipper works.

### 5.1 Supported channel layouts

RAIL Immersive supports the following channel formats. The DAW determines which layouts are available at instantiation based on the bus the plugin is opened on, and RAIL adapts its readout panel to match.

Mono, stereo, LCR, quad, 5.0, 5.1, 7.0, 7.1, 7.1.2, 7.1.4, and 9.1.6.

Mono and stereo behave as they do in RAIL Stereo. The surround and immersive formats are unique to RAIL Immersive. The listed formats cover the layouts used in commercial music and cinema immersive deliveries. A layout the running edition does not support is handled by the DAW, which either does not present it or reports that the plugin will not process it.

### 5.2 Channel layout indicator

The current layout is shown next to the P22 RAIL name at the top of the plugin, for example STEREO, 5.1, or 7.1.4. This confirms at a glance which format RAIL has detected and which readouts are active on the panel.

### 5.3 What changes in the readout panel

The panel adapts to the bus format. Two additions appear on the formats that call for them:

- **LFE PEAK** appears on every layout that carries an LFE channel. It shows the peak level of the LFE channel, which RAIL passes through untouched, with a reference cue at minus 3 dBFS. The LFE channel is monitored but not clipped, so the value is a level check, not an indication of RAIL's work. Verify the platform-specific LFE target before delivery.
- **CLIP BAL** appears on surround and immersive layouts. It shows how clipping is distributed across the front, surround, and height groups, labeled F, S, and H. The height group appears only on layouts that carry height channels. Use it to confirm that the clipping is landing where you expect across the soundfield rather than concentrating in one group.

### 5.4 The LFE channel

RAIL does not clip the LFE channel. The low-frequency channel is passed through unchanged and kept time-aligned with the clipped main channels, so the bass management of the delivery is left to the mix and to the platform's requirements. The LFE PEAK row lets you watch its level; band-limiting and content rules for the LFE remain an upstream concern, as the relevant immersive music specifications require.

#### NOTE

RAIL monitors the LFE but never clips it. The LFE PEAK row is a level check on a channel RAIL passes through untouched, not a sign of RAIL working.

### 5.5 Working tips for immersive material

- **Commit on the reference reproduction system, confirm on binaural.** Set DRIVE and flavor on the full reproduction system, then use binaural as a quality-control pass before delivery, since most listeners hear immersive music on headphones.
- **Watch CLIP BAL.** If clipping concentrates in one group in a way the program does not call for, the issue usually lives upstream in the level of that group, not in RAIL.
- **Verify delivery loudness on the readout panel.** The LUFS-I and TP MAX readouts describe the program leaving RAIL. Confirm them against the delivery target for the platform before sign-off.

## 6. Reading the Panel

The readout panel shows what the clipper is doing at each stage. The values are diagnostic, not decorative. They are organized into three groups that follow the signal: what reaches and crosses the clipper, the output level, and the program leaving the plugin. On immersive buses, two further rows describe the LFE and the clip balance across the soundfield.

### 6.1 The DRIVE dial rings

Two rings around the DRIVE dial give a live picture of the program against the rail, so you can set DRIVE by sight as well as by ear.

- **Signal arc.** The outer ring shows peak level approaching the rail. The marked point is 0 dBFS, the rail itself. As the program gets louder the arc fills toward that mark.
- **Clip ring.** The inner ring is dark until the signal crosses the rail, then lights to show how deep into the clipper the program is going. It is the quickest confirmation that RAIL is clipping and by how much.

### 6.2 Clipper group

These rows describe what is happening at the clipper itself.

- **PK IN.** The peak level reaching the clipper input after DRIVE. This is the level you are driving into the rail.
- **CLIP DEPTH.** How far the signal is going past the rail on the loud peaks. This is the number you set DRIVE by: around 2 to 3 dB is the strong, musical working range, and RAIL flags depths beyond 3 dB as a prompt to ease off. Greater depth means more aggressive clipping and more character.
- **CLIP %.** The share of the program touching the clipper. This number is small by nature, around one percent or below in normal use, because the clipper catches only the tips of peaks that cross the rail while the rest of the program passes below it. A low CLIP % alongside a healthy CLIP DEPTH is the sign that RAIL is shaping peaks cleanly rather than saturating the whole program. Read CLIP DEPTH for intensity and CLIP % as a transparency gauge.

### 6.3 Output Level group

These rows describe the output stage.

- **TRIM.** The current attenuation, from 0.0 dB at unity down to minus 30 dB.
- **TP.** The current true-peak level at the output.
- **TP MAX.** The highest true-peak recorded since the last reset.

### 6.4 Program group

These rows describe the file leaving RAIL.

- **LUFS-I.** Integrated loudness of the output since the last reset. This is the headline number for matching a delivery target.
- **LRA.** Loudness range of the output. Lower values mean more compressed dynamics.
- **MATCH  $\Delta$  / DRIFT  $\Delta$ .** A single state-aware row tied to the MATCH button. With MATCH off it reads MATCH  $\Delta$ , the current loudness difference between the output and the dry input, a preview of what engaging MATCH would compensate. With MATCH on it relabels to DRIFT  $\Delta$ , reads 0.0 at the moment you pressed MATCH, and grows as the held snapshot drifts from the moving program. The row flashes briefly on engage so you notice it is live. See 3.4 and 7.2 for the comparison workflow.

### 6.5 Immersive rows

On immersive buses the panel adds LFE PEAK and CLIP BAL, described in 5.3.

### 6.6 The alarm dot

A single dot above the readout panel lights when any readout goes past a conservative point, and the row that tripped renders brighter so you can see which one it is at a glance. It watches three readouts: clipping depth going beyond the everyday range, the true peak rising above 0 dBFS, and integrated loudness running hotter than typical delivery targets.

The alarm is guidance, not a fault. Deliberate clipping can light it. Treat it as a prompt to confirm that what you are hearing is what you intend, and to check the downstream chain when the true-peak row is the one that tripped. The one number worth remembering is the everyday upper edge for CLIP DEPTH, around 3 dB; the others simply catch a setting that has drifted well past normal use.

## 6.7 Reset and transport behavior

A single reset control in the readout panel clears every accumulating value at once: LUFS-I, LRA, TP MAX, and the held peak readouts. RAIL uses one global reset rather than per-row resets. Reset does not disengage MATCH: if MATCH is engaged when you reset, it stays engaged and keeps its snapshot.

Pressing play in the DAW also clears the accumulating readouts and starts a fresh measurement. Pressing stop freezes the readouts at their last values, giving a stable reference to read. In editing and mastering hosts that do not report a running transport, the readouts continue to accumulate while signal is present, so the measurements stay live during audition.

## 6.8 Interface conventions

A few interactions are consistent across the interface:

- **Double-click any control to return it to its default.** DRIVE returns to 0, TRIM returns to unity.
- **Shift-drag holds output level; Ctrl-drag fine-tunes.** Holding Shift while dragging DRIVE moves TRIM the opposite way, and vice versa, so the output level holds steady while you change how hard the clipper is working. Holding Ctrl while dragging any dial reduces sensitivity for precise tuning, and TRIM also accepts the right mouse button as a fine-adjust modifier.
- **Click the TRIM value to type a level directly.** Useful for matching a reference level exactly.
- **Arrow keys.** Left and right step through the flavors; up and down change DRIVE by 1 dB, with Shift for 0.1 dB steps.
- **INTENSITY.** The slider at the top adjusts the brightness of the panel's glow. It is a display preference and does not affect audio.

## 6.9 Preset management

Although RAIL's sound lives in the flavor and DRIVE, the preset system lets you save and recall complete settings, including TRIM, for recurring material and delivery targets.

**The preset browser.** Click the preset name at the top of the plugin to open the browser, or use the previous and next arrows to step through saved presets without opening it. The browser has two panes: folders on the left, including a Favorites folder, and the presets inside the selected folder on the right, each with a star to toggle its favorite status.

Controls along the bottom of the browser let you create a New Folder, Save the current settings into the selected preset, Save As a new preset under a name you enter, Rename, Delete a user preset, and Close the browser.

**Backing up presets.** Presets are stored as files on the local machine and can be backed up by copying them to any location:

- **Windows:** C:\Users\Public\Documents\Pulsar Modular\P22 Rail\Presets
- **macOS:** /Users/Shared/Pulsar Modular/P22 Rail/Presets

## 6.10 A and B comparison slots

The bottom row carries an A and B comparison pair. The single A|B control flips between two settings slots, and the copy control writes the current slot onto the other so you can start a comparison from a common point. A small indicator lights when the two slots differ. Use the slots to hold two candidate settings, for example two flavors or two DRIVE depths, and switch between them while listening.

## 7. Workflow

This chapter is organized around the results engineers usually want from RAIL, with the steps that reach each one. Tune RAIL with anything after it bypassed, so every judgment is about RAIL alone.

### 7.1 Reaching commercial loudness with a chosen character

The result: a louder, denser master that sounds the way you intend.

- Choose the flavor that fits the material (chapter 4).
- Raise DRIVE while listening, watching CLIP DEPTH climb toward 2 to 3 dB on the loud peaks, until loudness and character are where you want them.
- Set the output with TRIM if a specific delivery level is required.
- Confirm LUFs-I and TP MAX against the delivery target on the readout panel.

### 7.2 A fair before-and-after comparison

The result: hearing what RAIL is actually doing, without louder simply sounding better.

- Set the flavor and DRIVE you are considering.
- Press MATCH to take a level-matched snapshot at the current settings.
- Toggle BYPASS and listen. With levels matched, the difference you hear is the clipper's character, not its loudness.

MATCH holds the snapshot from the moment you press it, and the button stays solid whether the snapshot is fresh or stale. As the program plays, watch DRIFT  $\Delta$  climb; when it has grown enough that the match feels stale, or after you change DRIVE, press MATCH off and on again to take a fresh snapshot. Flavor switches at the same DRIVE barely move the level, so one snapshot usually holds across a flavor audition, and DRIFT  $\Delta$  will tell you if it does not.

### 7.3 Loud character on a stem or group

The result: a stem or group made louder and given character, then seated back at its mix level.

This is the gain-staging loop from 2.3. Stabilize and enhance with Atlas, raise Atlas's TRIM to bring the signal near 0 dBFS so it enters RAIL's working range, set RAIL's DRIVE to the sweet spot for the flavor, then attenuate with RAIL's TRIM until the stem sits where it did in the mix. Because TRIM only attenuates, the level you added with DRIVE is given back cleanly at the output.

## 7.4 Driving RAIL from Atlas

The result: a metered handoff from Atlas into RAIL, when you want to set the feed from the Atlas side.

Leave RAIL's DRIVE modest and raise Atlas's TRIM, reading Atlas's TRIM PEAK to see exactly how much level is passing into RAIL. This is useful when you are balancing how much work Atlas does against how much RAIL does, and you want a live number for the level crossing between them. The alternative, driving entirely with RAIL's DRIVE and reading RAIL's PK IN, reaches the same result; choose the panel you prefer to watch.

## 7.5 Tips and observations

Starting points for exploration, not prescriptions.

- **Audition flavors at matched level.** Use MATCH and the arrow keys to step through MODERN, SHARP, and VINTAGE at the same loudness before committing. The right flavor is often obvious once loudness is taken out of the comparison.
- **Read CLIP DEPTH for intensity, CLIP % for transparency.** Set the strength of the effect with CLIP DEPTH, aiming around 2 to 3 dB on peaks. Let CLIP % simply confirm transparency: it stays small by nature, around one percent or below, and a low CLIP % with a healthy CLIP DEPTH means RAIL is shaping peaks cleanly.
- **Set the flavor before the depth.** Re-tuning DRIVE after a flavor change is normal, because each flavor reaches its sweet spot at a different depth.
- **Use the A and B slots to decide.** Park two candidates in the slots and switch between them in context rather than from memory.

## 8. Quick Reference

### 8.1 Diagnostic checklist

- Want more loudness and character: raise DRIVE.
- Not sure how far to drive: watch CLIP DEPTH and aim for 2 to 3 dB on the loud peaks.
- Want a different character: change FLAVOR, then re-tune DRIVE.
- Result sounds too colored or harsh: lower DRIVE, or move to MODERN.
- Want a transparent push: choose MODERN; CLIP % stays low by nature, so trust CLIP DEPTH.
- Want snap and presence: choose SHARP.
- Want warmth and body: choose VINTAGE.
- Quiet stem not reaching the clipper: drive harder, DRIVE reaches up to 18 dB, or raise the feed into RAIL for finer dial control, then seat the stem back at its mix level with TRIM (see 2.3).
- Need the output at a specific level: set TRIM, or click the TRIM value to type it.
- Comparison sounds unfair: press MATCH before toggling BYPASS, watch DRIFT  $\Delta$ , and press MATCH off and on to refresh the snapshot after changing DRIVE.
- Bouncing or rendering: disengage MATCH first; its comparison attenuation is applied to the output while engaged.
- Alarm dot lit: read the brighter row to see which readout tripped, and confirm the result is intended.
- True-peak alarm with no downstream stage: lower TRIM or DRIVE until the output is within target.

### 8.2 Output safety

RAIL's output level is set by TRIM. The clipper shapes peaks at the rail, and TRIM sets where the result lands. When RAIL is the last stage before delivery, confirm TP MAX and LUF5-I against the platform target and use TRIM to bring the output within it. If the true-peak alarm lights, it is a prompt to check that the output sits where the delivery requires.

#### NOTE

RAIL reports true-peak on the TP and TP MAX readouts but does not guarantee it. Like any clipper, it can leave inter-sample peaks above the ceiling. For delivery, place a dedicated true-peak limiter after RAIL. If RAIL is the last stage in the chain, lower TRIM or DRIVE until TP MAX sits within the platform target.

## 9. Uninstalling P22 RAIL

### 9.1 Windows

- **VST3:** Open C:\Program Files\Common Files\VST3\Pulsar Modular and delete P22 Rail.vst3.
- **AAX:** Open C:\Program Files\Common Files\Avid\Audio\Plug-Ins\Pulsar Modular and delete P22 Rail.aaxplugin.
- **Shared files:** Open C:\Users\Public\Documents\Pulsar Modular and delete the P22 Rail folder.

### 9.2 macOS

- **AU:** Open /Library/Audio/Plug-Ins/Components and delete P22 Rail.component.
- **VST3:** Open /Library/Audio/Plug-Ins/VST3/Pulsar Modular and delete P22 Rail.vst3.
- **AAX:** Open /Library/Application Support/Avid/Audio/Plug-Ins/Pulsar Modular and delete P22 Rail.aaxplugin.
- **Shared files:** Open /Users/Shared/Pulsar Modular and delete the P22 Rail folder.

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