P821 MDN TAPE

ANALOG TAPE MACHINE EMULATION

User Guide

Version 1.5

Pulsar Modular

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Marc Daniel Nelson

Marc Daniel Nelson is a Grammy-winning, French Academy Award-nominated mixing engineer, music producer and creative director. He has been mixing, producing and managing creative content for over 23 years.

His music credits include Fleetwood Mac, Jason Mraz, Joni Mitchell, Colbie Caillat, Eric Burdon, Ben Harper, Need To Breathe, Robert Duvall, Ozomotli, John Fogerty, Reik and more. As protégé for both legendary producer/engineer Bill Schnee and Ken Caillat, Marc has carried the torch for impeccable quality sound and production.

His film credits include Solo, Blade Runner, The Vietnam War, Mulan, The Expanse, Wild Horses, Point Break, No Manches Frida, Fractured, Amanda, Father Figures, Ya, Ty, Vin, Vona and more.

His creative management credits include executive producing the 13-episode PBS television series, creating and executive producing the national video campaign for Guitar Center, and creative directing for Alcon Sleeping Giant, ArtistMax, Produce Like A Pro, Inside Blackbird and Warner Chappell.

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Foreword

by Marc Daniel Nelson

As an extension of my previous plugin release, the P455 MDN Sidecar, I wanted to embark once again on a journey down memory lane to talk about my history and passion for the sounds within music. This all started well over 25 years ago when I became obsessed with the magic and personalities of sonics: why some albums sounded more three-dimensional and dreamlike, while others felt more intimate and organic.

Albums like Pink Floyd's The Wall, Steely Dan's Aja, and Fleetwood Mac's Rumours all shared an incredibly open and beautiful sound. Though the music itself couldn't be more different, and each album was engineered by different people, there was a sense of space, character, and sheer sonic beauty that united them. Even before I learned that the same studios and tape machines were used on these projects, I could sense something uniquely captivating in their character and sonic landscape, something that moved me, even at a very young age.

In 2007, I was at The Mastering Lab in Hollywood with Bill Schnee, wrapping up a mastering session with Doug Sax. As we left through the back door into the parking lot, Bill pointed to a long, narrow building tucked to the side. "That was the Producer's Workshop," he said. "I recorded Aja in there." My jaw hit the ground. Not only was Aja recorded there, but so were Pink Floyd's The Wall, Ringo Starr's Goodnight Vienna, Fleetwood Mac's Rumours, and countless other historic albums. A small, unassuming room just off Hollywood Boulevard, yet it was filled with so much history and magic. Who would've thought?

My dear friend Clay Blair, who owns Boulevard Recording (formerly Producer's Workshop), and I have spent years tracking down every detail we could about the studio's storied past. His meticulous dedication to preserving its legacy continues to shine through to this day.

I had the opportunity of a lifetime to purchase one of the historic Stephens 821 24-track tape machines that lived at the Producer's Workshop throughout the '70s and '80s. People often say, "If these walls could talk." I'd say, "If this machine could talk..."

So, what is P821 MDN Tape exactly? After nearly two years of development, Pulsar Modular and I designed what I'd consider the closest emulation of an analog tape machine on the market. The Stephens 821's massive, expansive soundstage, a result of its minimal electronics and transformerless design, is perfectly captured in this plugin. With no aggressive compression or clamping down, this is the first plugin of its kind where you're truly hearing how tape reacts. Pure size for miles.

With all the choices of tape plugins out there, one has to consider why the P821 is so special. As Ken Caillat said about the Stephens 821 while producing Fleetwood Mac's Rumours, "This thing made me sound like a genius, and this new P821 plugin is just incredible."

Additional Foreword

by Clay Blair

The Stephens tape machines have a long history with Producer's Workshop. In fact, when I took over the studio in 2010, that was one of the first things I was told by engineers who had worked there in its heyday. Bob Ezrin mentioned it was one of the main reasons he chose to do The Wall with Pink Floyd there. He had already worked on Lace and Whiskey with Alice Cooper in the early '70s, as well as with Roberta Flack, at the same studio. At some point during that era, he even purchased his own Stephens machine. It was a sound he became known for alongside his sleek rock productions.

To many, these records changed the pop world forever, and a Stephens machine was used on them all. The studio was renowned for its clean electronics, consoles stripped of transformers, transformerless line amp tube mics, and the neighboring Mastering Lab, which released many cuts on its Sheffield Labs label for hi-fi aficionados to test their setups.

I've often been told the Stephens 821 is "the best sounding tape machine ever made," and now I understand why, though not for the reasons you might expect. Every tape machine up until that point used a discrete or tube design, loaded with transformers and complex electronics. These were the "Rolls Royce" of tape machines, representing the best money could buy. But with so many components in the audio path, John Stephens set out to create something much more pure and unique.

Using rejected parts from NASA and other local aerospace manufacturers, he pursued a vision to build one tape machine to rule them all. He started by modifying 3M machines, pushing them to meet his standards. Some of the earliest models even used 3M Isoloop transports. Eventually, he developed his own take on the Isoloop design. This design removed the capstan and pinch rollers, which were often harsh on tape after prolonged use, and instead relied on light sensors, which allowed the tape to move much more freely. Additionally, Stephens designed a proprietary input/output amp that worked without transformers.

The result was the 821A, the first transformerless multitrack tape machine without a capstan or pinch roller: a free-flowing tape path with no resistance and nothing to degrade the audio signal.

For the first time, engineers and producers could hear the physics of the recording process without interference from excessive electronics. They experienced the unaltered sound of tape and could present their clients with a clearer representation of what was captured on the studio floor.

Hearing this plugin recreate that same experience, without any electronics interfering with the sound, is a joy. It's truly incredible and unlike anything else out there.

Preface

Emulating tape is a complex challenge. It is far more nuanced than even the most advanced application of frequency response and harmonic distortion; there is an expansive world of dynamic interplay that takes place between machine, medium, and signal. Tape speed, head alignment, and the physical properties of the particular tape itself shape its character. Despite major advancements in DSP, true tape emulation has remained elusive. Many attempts capture snapshots of its sound but break down under varying signal levels and source material.

Our approach is different. Rather than relying on static sampling techniques, we used algorithmic modeling, which we honed over the years, to recreate tape's complex behaviors in real time. The result is a more faithful and responsive reproduction of its subtle intricacies.

P821 MDN Tape is the culmination of extensive R&D, hands-on experience and long listening sessions. Our goal has been to distill the essence of the tape machine and the tape formula (transient shaping, saturating, limiting, and subtle non-linearities) into an experience that feels both authentic and unwaveringly musical across a wide range of sources and signal levels.

Its creation was a collaborative, iterative process. Every feature was designed, tested, and refined to create a tool that is both musically inspiring and technically precise. Getting the emulation right required more than technical precision; it demanded a deep, almost instinctive connection to the tape era. That connection, shaped by firsthand experience with reel-to-reel machines, was amplified through the collaboration between Marc Daniel Nelson and myself. We trusted each other fully, even through uncertainty, approaching development as if crafting a record rather than coding a plugin. We brainstormed, tested, listened, refined, and repeated the process until we captured the spirit of tape.

The result is a plugin that integrates seamlessly into modern production workflows while preserving the timeless qualities of tape. Whether you're seeking subtle enhancements or bold transformations, the P821 MDN Tape is designed to provide a reliable and versatile tool for your creative process.

P821 MDN Tape is certain to become a permanent fixture in studios around the world. We can't wait to hear how it shapes your unique creative signature. Share your work with us; there's nothing more fulfilling than hearing your creativity come to life.

Ziad Sidawi

Audio Equipment Designer & CEO, Pulsar Modular

How to Read This Guide

This guide is built for musicians and engineers who would rather hear a control than read about it. Every chapter on the panel follows the same shape: you do something and listen first, then we explain what happened. If a control can be heard in ten seconds, you hear it before we describe the physics.

See it → Hear it: a quick, concrete move and the result you should hear.

Try these presets → factory presets that demonstrate the control in context.

Engineer tip: a shortcut or caution from people who used real tape machines for decades.

1. Quick Start

Welcome to P821 MDN Tape. You can get an authentic tape tone with only three controls: Tape Formula, Tape Speed, and INPUT. Everything else refines what those three set in motion. The deck starts in TAPE, running your audio through the modeled Stephens 821 transport, so you're hearing tape from the first note. (The THRU setting is a separate color; see Chapter 3.)

> **See it → Hear it.** Insert P821 on a mix or a single track. Leave every control at default and play. The sound already changed, a touch denser, a little rounder on the transients. That's the tape path working before you've touched anything.

1.1 Choose a Tape Formula

456: at a given INPUT, hits saturation sooner, richer harmonics, earlier compression. The classic rock, pop, blues and country sound.

900: takes more INPUT to saturate, higher headroom, lower noise, more transparency. Jazz, classical, acoustic and clean mix-bus work.

> **Engineer tip.** Start on 900. Switch to 456 whenever you want the tape itself to become part of the sound.

1.2 Select Tape Speed

15 ips: fuller bass, smoother highs, earlier saturation, stronger vintage character.

30 ips: tighter lows, extended highs, lower noise, more headroom.

1.3 Set the Meter, then Drive the Tape

Pick the VU scale you prefer (dBFS, or the classic dBU theme). Watch the RAW+IN needle and raise INPUT until the loud passages average around −18 dBFS RMS (≈ 0 VU). From there, more INPUT means progressively more harmonics, gentle compression, transient rounding, and density, up to the tape's sweet spot.

1.4 Match the Output

As you drive harder, level grows. LINK is on by default, so OUTPUT tracks INPUT automatically and the level stays put while only the tone changes, letting you A/B honestly at equal loudness. With LINK off, set OUTPUT by hand.

Try these presets → *00 Start Here → Default, Pure Tape, Mix Bus Starter*

2. Input, Output and Metering

> **See it → Hear it.** Solo a drum bus. With LINK on (the default), raise INPUT a few dB, the level stays put because OUTPUT tracks it automatically when LINK is enabled, so you hear only the tone change: the drums get fatter, the peaks gently tamed. That's the tape's sweet spot. Now keep pushing INPUT well past it and the sound hardens and turns harsh. Back it off. That's the line you're learning to find.

What you're hearing, and what you're not: The Stephens 821 was solid-state and transformerless, no capstan or pinch roller. P821 gives you the sound of tape itself, saturation, compression, size, motion, without the tube warmth or transformer grit that softened other machines when overdriven. That has a consequence: tape has a saturation sweet spot, but solid state has no pleasing "past the edge." Drive into the tape's range and it flatters the source; drive far beyond it and you get hard distortion, not warmth. Aim for the sweet spot, not the ceiling. (It's also why the 821 was unusually light and portable for a pro 24-track, while competing Studer and Ampex decks ran into the hundreds of pounds.)

2.1 INPUT

Sets how hard you hit the tape. Low is clean and faithful; raising it adds harmonics, rounds transients, compresses gently, and thickens, up to the tape's sweet spot. Past that there's no extra magic to chase; it just gets harsh. Find the spot where the track sounds best and stop.

2.2 OUTPUT

Sets the level leaving the plugin. With LINK on it moves automatically to cancel INPUT's level change; with LINK off you set it by hand. Either way the point is to judge tone at matched loudness, not to be fooled by "louder sounds better."

2.3 LINK

Ties OUTPUT to INPUT in counter-motion: drive harder and output drops to compensate automatically. On by default so you can explore drive without the level running away.

2.4 The VU Meter

The needle shows how hard the tape is being driven. The dBU theme reads like hardware VU; dBFS reads in digital terms. Watch the RAW+IN needle while gain-staging, it reflects your INPUT setting. Calibration sits at −18 dBFS RMS ≈ 0 VU. The meter glass also glows brighter as the signal gets hotter, a quick visual cue for how hard you're driving the tape, without even reading the needle.

> **Engineer tip (Bob Olhsson).** On bass-heavy material a VU over-reads the lows. Pull the meter screw down about −5 so the needle stays honest and you don't under-drive.

Try these presets → *00 Start Here → Drum Bus Starter • 99 Learn P821 → Tape Compression Light / Heavy*

3. Tape and Thru

See it → Hear it. Click the deck from TAPE to THRU. The tape compression and saturation drop away, but you're not back to dry, it's a different color: open and direct. Click back and forth to hear the two flavors the machine offers.

3.1 What THRU is

THRU is the machine's electronics and signal path without tape compression, not a bypass to clean. You still hear the 821's character. It's a second usable color, not an off switch.

3.2 When to reach for it

Use TAPE when you want the tape working on the dynamics, glue, saturation, transient rounding. Use THRU when the source already sits well and you want the 821's openness without compression: delicate acoustic material, or already-controlled busses.

Try these presets → *90 Legacy → Thru Clarity, Thru Love*

4. Tape Formula (456 vs 900)

> **See it → Hear it.** On a full mix, switch between 456 and 900 while it plays. 456 thickens the midrange and softens the top; 900 opens back up, cleaner with more headroom. Toggle a few times, that's the machine's two personalities.

4.1 456

At a given INPUT setting, 456 hits saturation sooner than 900, so the same drive gives more harmonic color and earlier compression. It's the glue heard on decades of rock, pop and country records. Reach for it when you want the tape to be part of the sound.

4.2 900

Takes more INPUT to reach the same saturation, so it stays clean further up, more headroom, lower noise, and the transparency and air that suit acoustic, orchestral and mix-bus work where you want size without obvious coloration.

4.3 Which to choose

Character → 456. Clean enhancement → 900. Switch while the music plays and pick the one that flatters the source. The genre associations are tendencies, not rules, 900 isn't "better," it's a different job.

Try these presets → *99 Learn P821 → Formula 456 Colour and Formula 900 Clean*

5. Tape Speed (15 ips vs 30 ips)

> **See it → Hear it.** On a drum loop, switch from 30 ips to 15 ips. The low end blooms and the cymbals smooth over, the kit feels bigger and a little vintage. Switch back to 30 and it tightens and clarifies.

5.1 15 ips

Slower tape adds a low-frequency bump (centered around 20–25 Hz) and gently softens the highs, reaching saturation sooner. The sound of big vintage rock and soul records: fuller, rounder, more obviously tape.

5.2 30 ips

Faster tape tightens the lows (the bump moves up to ~40–50 Hz), extends the highs and lowers noise, with more headroom before saturation. The cleaner, more modern, more accurate end of the machine.

5.3 Choosing the speed

15 ips for weight and vibe; 30 ips for clarity and headroom. Speed pairs with formula: 456 at 15 ips is maximum character, 900 at 30 ips is maximum transparency, and the two crossovers sit in between.

Try these presets → *99 Learn P821 → Speed 15 ips and Speed 30 ips*

6. Bias

> **See it → Hear it.** Drive a source into the tape's sweet spot. Raise HI bias, the top end opens up and brightens. Lower it, the highs roll back, darker. Now LO bias: up fills and lifts the low end; down thins it out.

6.1 What bias is

On a real machine, bias is a high-frequency signal added during recording to make the tape respond linearly. Trimming it is the classic way to fine-tune the tape's tone. P821 gives you two trims, each ±10:

- LO bias shapes the low end, a bass shelf hinged around 50–100 Hz. Positive boosts and fills the lows; negative thins them.
- HI bias shapes the top, a treble tilt hinged around 1–2 kHz. Positive brightens; negative darkens.

6.2 Bias vs the shelves

Bias and the shelving EQ both tilt lows and highs, but bias is part of the tape circuit, it interacts with how hard the tape is driven and works the same on both formulas. Use bias to voice the tape itself; use the shelves (Chapter 7) for clean tone shaping or to push the tape harder.

Why it's subtle: Bias reacts to drive. If you're not hearing much, raise INPUT into saturation first, then bias has something to work on.

Try these presets → *30 Bass → Deep Electric Bass • 99 Learn P821 → Low Bias Demo / High Bias Demo*

7. Shelving Equalizer (PRE and POST)

> **See it → Hear it.** Boost the HI shelf a few dB in POST, clean added brightness. Switch the same boost to PRE: now it also drives the tape harder up top, so it saturates and thickens instead of just brightening. Same knob, two different jobs.

7.1 The LO and HI shelves

Two gentle shelving bands, each ±10 with its own engage. The low shelf hinges around 200–300 Hz, the high shelf around 1–2 kHz. They're broad and musical, a setting of ±10 is roughly ±5–8 dB, not surgical.

7.2 PRE vs POST

PRE places the shelves before the tape; POST places them after. In a frequency analyzer the two look identical, the difference is what the EQ does:

- PRE, a boost pushes more energy onto the tape in that band, so it saturates and compresses there. PRE changes how the tape behaves.
- POST, shapes the final tone cleanly, with no change to how the tape was driven. POST changes how the result sounds.

How engineers used it: On real tape these were two different jobs. POST EQ was compensation, after a reel had been played and overdubbed many times, the high frequencies literally wore off the tape, so engineers added top back after playback to restore it. PRE EQ was a creative print, EQ before the tape let the machine record the boosted signal, so you captured that EQ as the tape interpreted it: saturated, compressed, and committed. The same split applies here: PRE drives and commits the tape's reaction; POST shapes the result cleanly.

Try these presets → *10 Mix Bus → Warm, Vintage • 11 Mastering → Air Master*

8. Tape Hiss

> **See it → Hear it.** Solo a quiet passage and raise HISS slowly. A bed of tape noise fades up under the music. A little adds air between the notes; a lot becomes an obvious lo-fi effect.

8.1 Hiss is a texture, not a defect

Treat hiss as a creative parameter, not noise to avoid. A very small amount makes reverb and delay tails feel continuous, softens the transition into digital silence, and adds a perception of air, loosely the way dither smooths the bottom of a fade, though it isn't dither. Used with intent, it's part of what makes a recording feel like a recording.

8.2 Hiss belongs to the transport

Hiss reads best alongside the rest of the machine's condition, bandwidth, wow, flutter, rather than on its own. That's the logic behind the Transport presets, where hiss rises with wear: Factory Fresh has barely any, Studio Veteran a little, Road Worn more. The rule for your own presets: never add hiss at random. If a preset has hiss, it should support the illusion of the recording medium.

8.3 Hiss does not build up in the delay

With high delay feedback, hiss settles to a stable floor instead of accumulating per repeat. You can run it freely in feedback-heavy patches without it snowballing.

8.4 Hiss Dim

The Hiss Dim menu option pulls hiss down during silent passages, so the floor isn't constant when nothing's playing.

Try these presets → *80 Tape FX → Old Broadcast, Worn Reel, Studio Veteran • 99 Learn P821 → Hiss Demo*

9. Modulation: Wow and Flutter

Modulation is the motion of tape, the small pitch movements of a physical reel. It's on by default at a gentle setting, because a perfectly steady “tape” doesn't sound like tape.

> **See it → Hear it.** On a sustained pad or held vocal note, turn WOW up. You'll hear a slow, seasick drift in pitch, a reel breathing. Turn it down, bring up FLUTTER, and the motion gets faster and finer, a shaky transport.

9.1 Wow

Slow pitch drift, around 1.9 Hz. Raising WOW deepens the drift. Most audible on sustained, exposed material, pads, held vocal notes, piano tails. Its rate stays slow regardless of the Slow/Fast switch; WOW sets its depth.

9.2 Flutter

Faster pitch movement. Raising FLUTTER increases its depth, and in Fast mode its rate climbs too. A little adds shimmer and life; a lot sounds unmistakably worn.

9.3 Slow and Fast

The switch sets the intensity of the whole motion. Slow stays gentle and realistic, about one cent of pitch movement even at full Wow and Flutter, the sound of a well-maintained machine. Fast is dramatic, reaching extreme pitch swings (up to ±124 cents at maximum) for obvious effects. The default, Slow, Wow and Flutter low, is the believable tape motion most mixes want.

Why it's on by default: A real transport is never perfectly stable. That tiny, constant motion is part of what separates tape from a clean digital copy, so P821 ships with a gentle amount engaged.

> **Engineer tip (Hilton Stroud).** When stacking several tape instances across a session, switch Wow and Flutter off on most of them. Many independent pitch movements stack into a chorus-like wobble you usually don't want.

Try these presets → *99 Learn P821 → Wow Demo / Flutter Demo • 80 Tape FX → Studio Veteran, Road Worn*

10. Flanger

> **See it → Hear it.** Turn FLANGE on over a snare or full kit. Now, without touching the flanger, raise WOW. The sweep widens. Switch to Fast and it turns into a jet. The flanger has no knobs of its own; Wow, Flutter and Slow/Fast are its controls.

10.1 Same engine, different destination

The flanger doesn't add a new modulator. It takes the same Wow/Flutter/Slow-Fast motion from Chapter 9 and feeds it into a short comb filter (around 1 ms) instead of into pitch. That's why FLANGE only does something when Modulation is on, turn Modulation off and the flanger has nothing to drive it.

10.2 Your modulation settings shape the flange

- WOW sets how far the comb sweeps, the depth of the flange.
- FLUTTER sets how fast it sweeps.
- Slow/Fast scales the whole thing: Slow is a subtle reel swirl, Fast is a wide jet sweep.

There's no single “flanger sound”, there's the one your modulation settings build.

10.3 Where it lands

The ~1 ms comb (notches spaced around 940 Hz) reads brightest on cymbals, hats and snares. Slow with modest Wow is a vintage swirl on guitars and snare; Fast with high Flutter is a dramatic sweep across a whole kit.

The origin: Tape flanging came from running two synced machines and an engineer pressing a finger on the flange of one reel to slow it slightly, drifting the two copies in and out of phase. P821 recreates that motion electronically.

Try these presets → *80 Tape FX → Classic Flange, Jet Sweep, Cymbal Jet • 99 Learn P821 → Flanger Demo*

11. Tape Delay

> **See it → Hear it.** Engage the delay at 15 ips, a tight ~125 ms slap, the 1950s vocal echo. Raise Offset and the slap lengthens; drop to 7.5 ips and it stretches toward a long, dubby 350 ms. Add Feedback and the single slap becomes a train of repeats that fades out.

11.1 Setting the time: IPS + Offset

The delay has no single "time" knob. Like a real tape echo, time comes from two things, the delay tape speed (7.5, 15 or 30 ips) sets the base, and OFFSET adds to it:

Delay time delay time (ms) = 1875 ÷ IPS + 10 × Offset

Range runs from about 62.5 ms (30 ips, Offset 0) to 350 ms (7.5 ips, Offset 10). Common slaps fall out naturally:

Speed	Offset	Time	Use
30 ips	0	62.5 ms	tight doubling
30 ips	~0.8	70 ms	vocal thickening
15 ips	0	125 ms	50s vocal slap
15 ips	2.5	150 ms	rockabilly slap
15 ips	7.5	200 ms	classic tape echo
7.5 ips	0	250 ms	vintage echo
7.5 ips	10	350 ms	long dub echo

These are fixed millisecond times, not tempo-synced. At 120 BPM the Offset-0 bases happen to land on note values (125 ms ≈ 1/16), but they won't follow tempo changes. Use Offset to fine-tune into the exact pocket you're after, pick your IPS for the ballpark, then move Offset to land the delay right where the track wants it.

11.2 Feedback

Sets the number of repeats. Zero gives a single slap; higher gives more repeats with a longer tail. It's voiced so that even at maximum it never runs away, no self-oscillation, so you can push it for a long, dissolving tail safely.

11.3 Blend

How much delay you hear against the dry. Low Blend is a subtle thickening; higher Blend brings the echo forward as an obvious effect.

11.4 Delay HPF and LPF

Two filters shape the repeats only, not the dry signal. The high-pass (up to 2 kHz) thins the echoes so they tuck under the source; the low-pass (down to 500 Hz) darkens each repeat. Together they give the classic tape-echo behavior where every repeat is duller and smaller than the last, roll the low-pass down with high feedback for a dub-style fading tail.

Try these presets → *80 Tape FX → 50s Vocal Slap 120ms, Classic Tape Echo 200ms, Long Filtered Echo • 99 Learn P821 → Delay 125ms / 350ms Max*

12. Lo-Fi and Range

> **See it → Hear it.** Engage LO-FI. The sound immediately narrows, like it moved into a smaller box. Now sweep RANGE: at the minimum it's dark and full (a worn cassette), in the middle it's at its widest, and at the maximum it thins to a telephone/broadcast voice.

12.1 What Lo-Fi does

Lo-Fi collapses the signal into a narrower, lower-fidelity band, the sound of consumer tape, cassettes and old broadcast gear. It's a character effect, not a subtle one, and it pairs naturally with hiss and heavier modulation. It runs on its own switch, independent of the Modulation circuit.

12.2 Range is voiced, not a plain filter

Range doesn't move like a single filter opening and closing. It was voiced by ear, with lo-fi artist MAS, so each position lands on a recognizable real-world sound:

Range	Character
Minimum (−10)	Dark and full, highs roll off heavily, lows stay. Worn VHS / consumer reel.
Centre (0)	Widest and most open of the lo-fi voicings, with a gentle presence lift. Plain cassette.
Maximum (+10)	Thin and mid-focused, lows cut away, a narrow band in the upper mids. Telephone / broadcast.

The presence peak slides upward as you raise Range, so higher settings sound progressively more “small speaker in another room.”

Credit: The Range voicing was developed together with lo-fi artist MAS, whose own lo-fi presets are included in the 90 Legacy folder.

Try these presets → *80 Tape FX → Compact Cassette, Dark VHS, Telephone • 99 Learn P821 → Lo-Fi Range Min / Max*

13. Stage Focus and CENTER

These two aren't effects, they're workflow controls. The Stephens 821's native stereo image is exceptionally wide, and these let you fit that width to a modern production instead of fighting it.

> **See it → Hear it.** On a stereo mix, move Stage Focus from Full toward Off, the image pulls in from very wide toward narrow. Set it back to Full and enable CENTER, the sides stay wide, but the low end and center lock into focus.

13.1 Stage Focus

Setting	Meaning
Full	Original Stephens spaciousness (default)
Half	Controlled, reduced width
Off	Preserve your existing mix image

It exists because the native width is big. If you insert P821 late on a mix that's already balanced, Full can throw off your placement, so dial toward Half or Off to rein it in. On acoustic, jazz and orchestral material, leave it on Full. It's a gentle control: the more already-wide the source, the subtler it is; the more centered the source, the more room it has to open up.

13.2 CENTER

CENTER anchors the low end and center of the image to mono while the sides stay wide. Measured, it pulls the bottom band to near-mono (about 5% side energy) while the mids and highs stay open, a locked center under a wide field.

This is the setting for any genre built on a powerful, dead-center low end:

- EDM, house, techno, kick and sub stay mono and rock-solid so they translate on big systems, while synths and pads stay wide.
- Hip-hop and rap, the 808 and kick stay centered and mono for maximum weight and club/phone translation; vocals and samples keep their width.
- Modern pop and trap, centered lead vocal, kick and bass with a wide production around them.
- Bass-heavy mix bus / electronic masters, guarantees a mono low end so it keeps punch and behaves on vinyl and PA systems.

Turn it on whenever a wide tape image is thinning or de-centering your low end. Leave it off on acoustic, jazz and orchestral material, where you want natural width all the way down.

Why this matters: A wide stereo low end sounds impressive on headphones but loses power on a club system and can cause problems on vinyl. Centering the lows is standard practice in bass-driven genres, CENTER does it without sacrificing the width of everything above.

Try these presets → *70 Orchestra → Film Strings (Full, no CENTER) • 30 Bass → Sub Focus (CENTER on) • 99 Learn P821 → Stage Focus Off / Full, CENTER On*

14. Practical Recipes

Starting points, not rules. Each pairs a quick recipe with a factory preset that takes it further. Dial the recipe by ear, then load the preset to compare.

Rock Drum Bus. 456, 15 ips, drive INPUT for fatness, a little positive LO bias, Stage Focus Half.

Try these presets → *20 Drums → Drum Bus Punch*

Mix Bus Glue. 900, 30 ips, gentle drive, POST high shelf for air, Stage Focus Half.

Try these presets → *10 Mix Bus → Glue*

Lead Vocal. 900, 30 ips, moderate drive, small PRE high shelf, a touch of hiss.

Try these presets → *50 Vocals → Modern Lead Vocal*

Bass Guitar. 900 or 456, 15 ips, Stage Focus Off, CENTER on, positive LO shelf, modulation off.

Try these presets → *30 Bass → Deep Electric Bass*

Acoustic Guitar. 900, 30 ips, light drive, gentle PRE high shelf, Stage Focus Half.

Try these presets → *40 Guitar → Fingerpicked Acoustic*

Piano. 900, 30 ips, very light drive, Stage Focus Full.

Try these presets → *60 Keys → Grand Piano*

Electric Guitar. 456, 15 ips, harder drive for crunch, a little hiss.

Try these presets → *40 Guitar → Vintage Crunch*

Strings / Orchestra. 900, 30 ips, light drive, Stage Focus Full for width.

Try these presets → *70 Orchestra → Film Strings*

Vintage Lo-Fi. 456, 15 ips, Lo-Fi on, Range to taste, heavier hiss and modulation.

Try these presets → *80 Tape FX → Compact Cassette*

Tape Echo Lead. 456, 15 ips, delay on at 15 ips with Offset, Feedback and Blend to taste.

Try these presets → *80 Tape FX → Classic Tape Echo 200ms*

General workflow: Set Formula and Speed first, gain-stage with INPUT and OUTPUT, then refine with bias, EQ and modulation. Use THRU to compare the tape against its cleaner color. Trust your ears over the meter.

15. Presets, Menu Functions and Workflow

15.1 The Preset Browser

The v2 factory library is organized into nested folders by job: Start Here, Mix Bus, Mastering, Drums, Bass, Guitar, Vocals, Keys, Orchestra, Tape FX, Legacy (the original v1 presets), and Learn P821 (one preset per concept). Browse by category, or start in 00 Start Here. A Signature set list points to the ten presets that best demonstrate the machine.

15.2 Loading, Saving and Backing Up

Load a preset to recall every control at once. Save your own with the save command; user presets live in P821's preset folder, which you can back up by copying that folder. Importing and exporting individual presets lets you share settings between machines and sessions.

15.3 A/B Comparison

The A and B slots hold two full states. Set up a sound in A, copy to B, change it, and switch between them to compare at a click, the fastest way to judge whether a change is actually an improvement.

15.4 Menu Functions

- Audio Dimming Transition, a global preference (not stored per preset) that smooths the level change when toggling Tape/Thru or bypass.
- Hiss Dim, automatically reduces hiss during silent passages so the noise floor isn't constant.
- Colorblind / theme options, adjust interface colors for accessibility, plus the VU meter theme (dBFS or classic dBU).

15.5 Pro Tools (.tfx) Presets

P821 works with Pro Tools .tfx presets in addition to its own format, so AAX users can manage settings the Pro Tools way if they prefer.

16. Modifier Keys and Interface

These shortcuts make precise work fast.

Action	macOS	Windows
Fine adjustment	Hold ⌘ while dragging	Hold Ctrl while dragging
Reset control to default	Double-click the control	Double-click the control
Numeric entry	Double-click value / right-click	Double-click value / right-click
Mouse-wheel adjust	Hover and scroll	Hover and scroll
Resize interface	Drag the resize corner	Drag the resize corner

16.1 Resizing and Panels

Drag the interface to the size that suits your screen; the layout scales cleanly. The FX panel and the transport/reel display can be expanded or collapsed to save space.

Multi-instance note: Each instance runs its own tape model. Running many adds up in CPU, and, as in Chapter 9, stacking many with modulation on can create a combined wobble. Switch modulation off on most stacked instances.

17. Installation, Activation and Updates

17.1 Installing

Run the installer for your platform and choose the formats you need. P821 supports VST3, AU and AAX (and the relevant host architectures).

17.2 Activating Your License

Authorize using your Pulsar Modular account credentials or license file as prompted on first launch. Once activated, the plugin is ready in every supported host.

17.3 Updating

Install a new version over the old one; your user presets and settings are preserved. Back up your user preset folder before any major update.

17.4 Troubleshooting and Support

If the plugin doesn't appear, rescan plugins in your host and confirm the format is installed. For activation or technical issues, contact Pulsar Modular support through the website.

18. Uninstalling P821 MDN Tape

Windows

- **VST3:** Open C:\Program Files\Common Files\VST3\Pulsar Modular and delete the P821 MDN Tape.vst3 folder.
- **AAX:** Open C:\Program Files\Common Files\Avid\Audio\Plug-Ins\Pulsar Modular and delete the P821 MDN Tape.aaxplugin folder.
- **Shared files:** Open C:\Users\Public\Documents\Pulsar Modular and delete the P821 MDN Tape folder. This folder contains the user guide and presets. If no other folders exist under Pulsar Modular, this can be deleted as well.

macOS

- **AU:** Open /Library/Audio/Plug-Ins/Components and delete the P821 MDN Tape.component file.
- **VST3:** Open /Library/Audio/Plug-Ins/VST3/Pulsar Modular and delete the P821 MDN Tape.vst3 folder.
- **AAX:** Open /Library/Application Support/Avid/Audio/Plug-Ins/Pulsar Modular and delete the P821 MDN Tape.aaxplugin folder.

Shared files: Open /Users/Shared/Pulsar Modular and delete the P821 MDN Tape folder. This folder contains the user guide and presets. If no other folders exist under Pulsar Modular, this can be deleted as well.

19. FAQ and Common Mistakes

Why doesn't P821 sound like tape?

You're probably not driving it. Raise INPUT until the meter sits around −18 dBFS / 0 VU and you hear the tape engage, but stop at the sweet spot; this is solid state, so pushing far past it gets harsh, not warmer.

456 or 900?

456 for character, 900 for clean enhancement. At the same INPUT, 456 saturates sooner.

15 or 30 ips?

15 ips for weight and vibe, 30 ips for clarity and headroom.

Why doesn't bias make a huge difference?

Bias is a trim, most audible when the tape is driven hard. Push INPUT first.

Should I always aim for 0 VU?

No. It's a reference, not a target. Use more or less drive for more or less character.

Tape or Thru?

Tape for the squeezed, saturated sound; Thru for the 821's open color without tape compression.

Does turning Modulation off remove Lo-Fi?

No, Lo-Fi is independent and keeps working. Only Wow, Flutter and the Flanger need Modulation on.

Common Mistakes

- Leaving INPUT low and wondering where the tape went.
- Driving past the sweet spot expecting warmth, and getting harshness instead.
- Judging the effect at unmatched loudness, LINK or OUTPUT keep levels matched.
- Stacking many modulated instances and getting an unwanted combined wobble.
- Treating bias as a tone control instead of a trim.

> **Engineer tips worth remembering.** P44 Magnum trick: place a limiter after P821 to catch the few peaks the tape lets through, for loud, clean masters.

Bob Olhsson: pull the meter screw down ~−5 on bass so the VU reads honestly.

Hilton Stroud: switch Wow/Flutter off when stacking multiple instances.

20. Appendix and Glossary

20.1 Nominal Calibration

P821 is calibrated so −18 dBFS RMS reads ≈ 0 VU. Use the RAW+IN needle while gain-staging, and the meter theme that matches how you think about level.

20.2 Technical Terms

Bias. A high-frequency recording trim; in P821, LO/HI bias tilt the tape's low and high response. + boosts, − cuts.

Blend. The balance of delayed (wet) signal against dry in the tape delay.

CENTER. Anchors the low end and center image to mono while the sides stay wide.

Feedback. The amount of delayed signal fed back to create repeats; in P821 it never self-oscillates.

Flutter. Fast pitch variation from tape motion.

Formula. The tape stock model, 456 (character) or 900 (clean, high-output).

ips. Inches per second, the tape speed. Higher is cleaner and tighter; lower is warmer.

Lo-Fi / Range. A voiced narrow-band character effect; Range selects the flavor from dark/full to thin/telephone.

PRE / POST. Whether the shelving EQ sits before the tape (drives saturation) or after it (clean shaping).

Stage Focus. Stereo width control: Off, Half, Full (Full = widest, the native Stephens stage).

THRU. The machine's path without tape compression, a second color, not a bypass to clean.

Wow. Slow pitch drift from tape motion.

21. Understanding Analog Tape

21.1 Why tape still matters

Tape was never a neutral recorder. It shaped transients, added harmonics, glued elements together and gave records a sense of depth and size. Those qualities are why engineers still chase the sound decades after digital made tape optional.

21.2 From audio to magnetism

A tape machine doesn't store your sound directly. It converts the signal into a magnetic pattern on a moving strip, then reads it back. Every quirk people love comes from that conversion being imperfect in musical ways: it can't capture the loudest peaks linearly, so it softens them; it adds its own low-level texture; and the moving medium is never perfectly steady, which adds subtle pitch motion.

21.3 Why the Stephens sounds 'larger'

The 821's minimal, transformerless design gave it an unusually open, expansive stage. With nothing clamping down on the signal, you hear the size of the recording. That openness, and the very wide stereo image, is the quality P821 is built around (and what Stage Focus lets you tame when a mix doesn't want it).

21.4 Gain staging is everything

Because the tape reacts to level, where you set INPUT is the most important decision you make. Everything else refines what the drive sets up. And because this is a solid-state design, the reward lives in the sweet spot, not above it.

22. Testimonials

Listed alphabetically, as we value each story equally.

Dale Becker

Grammy-winning Producer / Mastering Engineer

Billie Eilish, Doja Cat, Katy Perry, Kanye West

“There’s a lot of plugins that come close. There’s a lot of things that get us nearly there, but this is the first time that I feel like the soul of tape is represented in a plugin. No other tape plugin has come close to this. The P821 MDN Tape is really remarkable.”

Clay Blair

Producer / Engineer

The War on Drugs, Counting Crows, The Redwalls, Andrew Bird

“The Stephens 821 is the best-sounding tape machine ever made, and the P821 MDN Tape is the best tape machine in a plugin and unlike anything out there by far. It was a joy to hear this plugin doing the scientific process as it was designed. What more is there to say? It’s that good. No need to hype with silly marketing; just listen to it.”

Ken Caillat

Multi Grammy-winning Producer / Engineer

Fleetwood Mac, Joni Mitchell, Paul McCartney, Pink Floyd

"I know this machine well, as I used it to record and mix Fleetwood Mac's Rumours album at the old Producer's Workshop. Finally a tape emulation that doesn't sound like a mess. Reminds me of that beautiful sound of the original Stephens tape machine. That thing made me sound like a genius and the plugin is just incredible."

Ryan Freeland

Multi Grammy-winning Producer / Engineer

Ray LaMontagne, Aimee Mann, Bonnie Raitt, Morrissey

"Not only is the P821 MDN my new favorite analog tape plug-in, it's also my new favorite lo-fi, flange, and slap delay effect, all with an intuitive user interface and great graphical feedback. I find myself using it as much for the lo-fi, flange, and delay as I do for the tape saturation, which itself adds a wonderful, glued finish to my mix and gives me that glorious 15 ips low end bump if I need it. Marc has done it again, giving us engineers another great tool to elevate our mixes and our creativity."

Mark Linett

Record Producer / Audio Engineer

Brian Wilson, Randy Newman, The Beach Boys, Rickie Lee Jones

"I used to own the actual Stephens 821 deck used to create the P821 MDN Tape plugin and agree it was the best-sounding tape machine ever made. The P821 sounds amazing and adds an analog quality I have never gotten with any other plugin."

Bob Olhsson

Legendary Motown Producer / Engineer

“Wow! Pro Tools at 96k, it sounds as transparent and huge as I remember hearing from the wonderful Stephens in Armin Steiner’s Sound Labs mix room. It is utterly amazing to hear a plugin take me back to that experience.”

Alex Pasco

Grammy-winning Producer / Engineer

Paul McCartney, Adele, Beck, Foo Fighters

“I had a chance to try out the P821 plugin and it was fantastic! It really opened up the mix in a crazy way. I was expecting your standard tape plugin thing, but it is totally its own thing. My mix sounds bigger and with more depth than before, but without any tonal change. The P821 MDN Tape really blew me away. It feels like you’re actually working with tape: huge sound, tons of depth, and it reacts to input in a way that’s super organic. It’s the closest I’ve heard. It’s now a go-to in my mixes, and I can already tell it’ll be a part of my sound moving forward.”

Dave Pensado

Multi Grammy-winning Producer / Engineer

Beyonce, Justin Timberlake, Mariah Carey, Shakira

“This sounds insane! If you want to make a sound come to life, use the P821 MDN plugin. Effortless magic. Marc did it again!”

ROC.am

Producer / Engineer

Rihanna, H.E.R, Mariah Carey, Erykah Badu, The Roots

“I put this on a kick drum and instantly was like, what the hell! The low end dropped way lower but got way more clear. How on earth did you do this? This on background vocals too is just dope. This plugin sounds incredible.”

Darrell Thorp

Multi Grammy-winning Producer / Mixer / Engineer

Radiohead, Beck, Paul McCartney, Foo Fighters

“This new Pulsar Modular P821 Tape plugin is absolutely magic. I have had the pleasure and privilege of working on several Stephens tape machines, and the 821 MDN is the best representation of tape I have ever heard.”

Dweezil Zappa

Musician, Producer / Engineer

“When I tell you that the P821 MDN tape machine plug-in offers the very best 456 emulation in the game and instant access to authentic creamy tape flange, it’s because I heard it for myself in the first 5 minutes. We all know that tape machine plug-ins offer the illusion of access to the imperfect world of analog colors that paint the audio pictures we love, but some are better than others and this one rises above. You will see for yourself that the P821 MDN delivers on everything we all love about tape: transient control, saturation, modulation, delays and tonal character. Run to test it on individual tracks, groups and your final master.”

GUI Concept:	Marc Daniel Nelson
Plugin Engine Design:	Ziad Sidawi
Plugin Development:	Mesut Saygıoğlu with Marc Daniel Nelson
GUI Development:	Max Ponomaryov / azzimov (behance.net/azzimov)
User Guide:	Ziad Sidawi
Page Layout:	Burak Öztop

Testers: Leo Alvarez, Paul Godfrey, Niklas Silen, Clay Blair, Gus Granite, Brad Smith, Kevin Eagles, Matt Gray, Marc Smith, Alex Elliot, Ry Herma, Hilton Stroud, Thomas Etholm-Kjeldsen, Ilpo Kärkkäinen, Stephen Wright, Jason Fernandez, Matthias Klein.

Special Thanks: Clay Blair, owner of Boulevard Recording (formerly Producer's Workshop).

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

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Specifications and information are subject to change without notice.

P821 MDN Tape is a product name of Pulsar Modular™.

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