P440 Sweet Spot

User Guide

Version 1.4

Foreword

To those who are on the outside looking in, mastering can appear as an elusive dark art. You have very likely heard, uttered many times, words similar to the following… it makes the music come to life... it is the final polish that transitions something great into something breathtaking; it is like... magic!

The wizardry lies in the hands of the practitioner of course, but surely as all wizards wield a device that is a conduit between their mystical knowledge and the physical world, so does the mastering engineer. To the wizard this is the venerable wand. To the mastering engineer this is the equalizer.

In both hardware and software form, new audio equipment design often embraces and extends previous designs. It takes established norms, be it curves, interactions or even aesthetic choices like shape or position of knobs and switches and recreates them. This can result in an incremental improvement over the previous design, a clone copy or at worst, a regression. At times however, a new design comes along that breaks away from the norm and approaches everything from a different angle, unshackling itself from preconceived notions of what is supposed to be, rejecting how things are supposed to behave and ignoring how sound is supposed to 'look' based on conformance to analysis driven expectations.

The design, development and fine tuning of P440 Sweet Spot has been nothing short of an exploratory journey. Our adventurer is audio equipment designer Ziad Sidawi and the guide on this journey is mastering engineer Robb Robinson. Robb is a Grammy winning mastering engineer with 20 years of engineering experience across all genres. Together, Ziad and Robb traded ideas and experiences while spending untold hours cross-referencing countless samples and trials against Robb's many hardware units. On numerous occasions, Robb would share that P440 had surpassed this or that plugin, but Ziad was not satisfied with that. It was promised that P440 would not be released until Robb sincerely believed that it could sit side by side with his mastering hardware. Over the course of development and fine tuning, Robb mastered hundreds of songs using P440.

Since you are reading this user guide and you have P440 in your hands, you know what became of that promise.

A sweet spot can refer to many things: the optimal listening position; the optimal microphone setup in a room; or the sonically exciting operating point of a preamplifier or compressor. In any case, it's about achieving the pinnacle within the given frame of possibilities. In this case, the optimal EQ pocket. P440 Sweet Spot is not based on any previous hardware EQ designs or topologies, nor does it copy the curves of any existing EQ. Instead, it is an entirely new and liberated design that is not constrained by the physical limits of hardware. It unleashes what the EQ designer heard in his ears, imagined in his mind and felt in his soul.

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Pulsar Modular set out to design and build the musical equivalent of the elusive wand so that you may experience musical behavior that up until now has not been achievable in the purely digital or hardware realm. Feel the magic. Never lose a punch. Never alter the original timbre. Never feel like there is a tradeoff to anything that is boosted or attenuated. Never compromise again. There is no longer a need to give in to great expense and loss of efficiency to have it all. Now, here, you can finally experience the respect, organic binding and new sense of openness that was only previously attainable through mastering grade analog equalizers.

Pulsar Modular – **The sound is unbelievable.**

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Annotations

TX – Transformer Selection

OS – Oversampling

Bypass

Polarity

Routing
Mono/stereo, mid, side, left or right. Solo (S) isolates the audio.

A/B Compare

VALUE
Displays the value of the control currently under the mouse pointer.

Preset Browser

IN/OUT Meter

RMS/PEAK
Meter type.

Dual Mono
Selective independent channel processing.

HW – Hardware
Hardware tone variations.

MOD
Alternate modified circuit.

Main Out Slider
Clean output gain.

Options Menu
About / License Status / User Guide / Options and Preferences

Save – Saves the size and position of the current instance.

Interface Controls

OS TX LM S A B →B VALUE Default IN -60.0 OUT -60.0 RMS HW MOD OUT 0.00

RES — Hz — TREMOR — GAIN

LOW — MID — HIGH

FINE Q — FINE Q — FINE Q

FREQ — FREQ — FREQ

FINE Hz — FINE Hz — FINE Hz

GAIN — GAIN — GAIN

FINE dB — FINE dB — FINE dB

RES — % — O₂ — SOUL

BIAS — P440 — TIBO — S — SAT

INV — FINE TUNE

FREQ — GAIN

SWEET SPOT EQ — SCALE

FINE TUNE — INV

FREQ — GAIN

Low / TREMOR
Low frequency filters and features.
See page 7

Middle Bands
Proportional Q stepped bell filters with optional fine-tuning controls.
See page 11

High / Full Range
High frequency filters and full frequency features.
See page 15

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Bypass allows the unaffected audio signal to pass through without being processed.

Polarity inverts the audio signal.

Oversampling applies to MOD, SOUL and O_2 circuits and operates at an internal sample rate of ~384 kHz by default (see Options Menu for additional OS options). This is a high-quality option that is equally suitable for mastering duties or for key tracks when mixing.

When the above-mentioned specially designed circuits are engaged, they can produce a lot of harmonics, resulting in aliasing that can accumulate in the midrange. Oversampling cleans up these reflections, leaving the midrange and upper midrange open and free of artifacts.

If you toggle OS off to compare non-oversampled with oversampled audio, you may perceive a level increase in the lows through the low mids. To avoid this, we recommend committing to an OS choice and setting SOUL and O2 early in your process to effortlessly compensate with the EQ.

Note: Switching OS on/off while audio is playing might cause low audible clicks that are harmless to your system.

Transformer selection changes the characteristics of the low end. Set to Low for more bottom end, set to High for tighter Bass. Options are Low, Low Mid, Mid, High Mid and High. The default is LM (Low Mid).

Left click cycles forward, right click cycles backward.

Tip: Focus on the sound of TX when adjusting SOUL and O_2 to understand how these circuits interact. The higher the values of SOUL and O_2, the clearer the TX characteristics.

The **routing switch** sets the channel processing option between MONO/STEREO, MID, SIDE, LEFT or RIGHT.

Sweet Spot does not do M/S or L/R channel processing within the same plugin instance. As such, you will need to insert two instances if you decide to process channels independently.

When working in MID or SIDE, Sweet Spot outputs the combined channels (one being processed while the other is not) so as to hear the processing in context of a stereo mix. If you want to isolate the channel, press the S button.

Left click cycles forward, right click cycles backward.

The **S (Solo)** button functions as follows:

- If STEREO is selected when on a stereo track, the image will collapse to mono.
- If LEFT or RIGHT is selected, the chosen signal is routed to both channels.
- If MID or SIDE is selected, the chosen signal is routed to both channels.

The S button will blink while engaged to remind you that it is soloing the channel.

A/B allows for temporary storage of different settings for quick comparison. The arrow button allows for copying the active side to the inactive side.

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Tip: When comparing settings, clicking the A/B button will perform the toggle. This is a single button, so it is not necessary to move the mouse to alternate back and forth. This makes it easy to compare without knowing which one is selected. We recommend doing this with your eyes closed for maximum focus.

`VALUE` The VALUE field displays the value of the control currently under the mouse pointer. Units of measurement are dependent on the selected control (e.g. dB for GAIN, Hz for frequency selection, % for SOUL or O_2, stepped position where appropriate).

The preset browser allows for modification of the currently selected preset using the save icon to the left of the browser (direct save) or for creation of new presets using the save icon to the right of the browser (save as…). A red asterisk* will appear beside the left save icon indicating the loaded preset has been modified and can be overwritten.

Keep in mind that *you* can control the default preset by simply overwriting Default with settings of your choice (the save icon to the left with the red asterisk*). If you find yourself always making the same changes each time you load Sweet Spot before getting to it, consider saving those changes as your custom Default.

Tip: Modified factory presets will be preserved when updating the software if the presets box is unchecked in the P440 installer. This is the default update version installer setting.

`IN` `-60.0` `OUT` `-60.0` IN / OUT metering. Whether this displays RMS or PEAK values depends on the selection of the RMS / PEAK switch.

`PEAK` `RMS` The RMS / PEAK switch toggles between RMS or PEAK metering.

Dual Mono applies to a stereo track, delivering analog emulation for left and right channel tolerance variations. Experience a naturally wide and dynamic image delivering better results than using dual mono plugin insertion (for DAWs that support it). TREMOR does not vary between the left and right channels, ensuring a solid foundation.

Note: If you use a DAW that uses stereo tracks with mono material, enabling Dual Mono will introduce randomization between the left and right channels and potentially affect stable positioning in the stereo field. Generally speaking, this should remain off in such situations, however it can be used for creative purposes.

`HW` Hardware utilizes crosstalk, applying it to stereo material.
`HW1`
`HW2` Digital summing performed by a DAW is mathematically
`HW3` perfect, often with unmusical results. Analog summing is
`HW4` naturally imperfect, resulting in combined audio that has
`HW5` more definition and separation of elements within the stereo image, which the listener perceives as a wide and open sound. P440 HW features 5 custom designed hardware emulation circuits that impart these characteristics. This feature is effective on all stereo sources, but enabling Dual Mono noticeably enhances the effect.

Left click cycles forward, right click cycles backward. Pressing CTRL+ALT (Windows) or CMD+OPTION (Mac) while the mouse is positioned over this control will bypass it until the keys are released.

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`MOD` `MOD` MOD enables alternate modified circuits within P440. This circuit excites transients, intensifying energy without clouding the signal or increasing the volume, but instead delivering weight, low/mid transient expansion and punch.

`OUT` `0.00` The MAIN OUT slider features -12 dB to 12 dB of clean gain.

Options Menu

About
License Status
User Guide   >
OS Settings   >
Set Default Size
Theme Settings   >
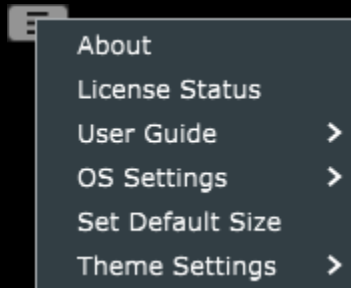
About – Check the version number or demo expiration date.

License Status – Manage your license and unlock upgrade options.

User Guide – Open the user guide.

OS Settings – Sets oversampling options:
- OS Skips Soul: If this option is selected, SOUL is not processed by the oversampling routine, saving CPU cycles.
- OS Skips O2: If this option is selected, O_2 is not processed by the oversampling routine, saving CPU cycles.
- OS at X2: Sets oversampling to x2 the host sample rate instead of being calculated internally to ~384 kHz.

Set Default Size – Use the window size of the current P440 instance as the default size for new P440 instances.

Theme Settings – Switches the faceplate and controls to a desired visual theme based on the following choices:
- Bright: The Bright theme is always used.

- Dark: The Dark theme is always used.
- Preset: The choice of Bright or Dark will be stored and recalled with each preset. When this option is used, a theme selection icon is shown on the faceplate directly below the Options Menu.

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RES – HPF Resonance
Positive for a resonant peak, negative to smooth the curve.

TREMOR Hz
Frequency selection for our unique, floor shaking peak filter. Enable or disable with the red light.

High Pass Filter Frequency
Ranges from 7.83 Hz to 90 Hz. Enable or disable with the green light.

TREMOR GAIN
Circuit intensity expressed as a percentage.

Linked Feature Toggle
Links HPF and TREMOR together so enabling or disabling one causes the other to do the same. Click the lock icon to toggle.

TIBO – Tight Bottom
Program dependent low-end folding circuit. Influences side and center imaging, positioning and directionality.

BIAS Trim
Influences Sweet Spot's non-linear behavior. Push (clockwise) will tighten lows and bring elements forward. Pull (counterclockwise) will impart depth and dimension.

TIBO SAT
Controls the amount of saturation applied to the TIBO circuit.

INV – Invert Shelf
The shelving filters boost by default. When INV is enabled, these unique shapes are inverted and the low shelf filters cut. Enable or disable with the green light.

TIBO Side Filter
Click to engage side filters for a TIBO flavored mono-maker.

FINE TUNE GAIN
Positive or negative gain adjustments relative to the gain of the signature shelf selection. The relative range is -5 dB to 5 dB.

FINE TUNE FREQ
Positive or negative frequency adjustments relative to the center point of the signature shelf selection. The relative range is -20 Hz to 30 Hz.

Low Shelf Selector
Selects a signature custom designed shelf. Enable or disable with the green light.

High/Low Arrows
Shifts the center point of the signature shelf selection.

RES

Hz

TREMOR GAIN

BIAS

P440

TIBO

INV

FINE TUNE

S SAT

FREQ GAIN

PULSAR MODULAR

The signature high pass filter features a 12 dB/oct 2-pole filter in the default RES position, marked by the dot as shown below.

Enable or disable with the green light.

The RES knob controls the Q factor, which defines the sharpness of the resonance. From the default position, when turned clockwise, the filter is increasingly augmented with a resonant peak. When turned counterclockwise, the filter transforms into smoother shapes with softened phase, reaching to a 1-pole 6 dB/oct slope.

Pressing CTRL+ALT (Windows) or CMD+OPTION (Mac) while the mouse is positioned over this control will bypass it until the keys are released.

The HPF slider allows for tuning the filter to the desired frequency. The starting point is Earth's frequency, 7.83 Hz.

Most high pass filters improve woofer efficiency but may compromise the deep low end heard through full range monitors, subs and headphones. If a mix is high passed too aggressively, the lows come forward with punch as intended but lose their natural connection to the ground. TREMOR, in conjunction with the HPF, allows you to tighten up woofers while adding support underneath the mix.

Pressing CTRL+ALT (Windows) or CMD+OPTION (Mac) while the mouse is positioned over this control will bypass it until the keys are released.

Tip: To help locate the HPF sweet spot, turn RES fully clockwise and sweep the slider until you hear the low end as clean, inflated and punchy. Back off RES to taste (listen for appropriate size and punch as you adjust RES but don't be afraid to leave it wide open). You may find that you often land somewhere between 14 Hz to 34 Hz while doing this. Once you are happy here, head over to the TREMOR knob for something really special.

TREMOR is a band filter based on the idea of Earth's "heartbeat" fundamental frequency of 7.83 Hz and the derived series of 14.3, 20.8, 27.3, etc. This series is known as Schumann resonances. Studies have shown linked similarities between this series and human brain activity, suggesting an almost tangible auditory link between humans and the Earth.

In combination with the design of the HPF, TREMOR brings a beautiful solid foundation to your track.

Take note of the line encircling the TREMOR knob. The dashed, solid and thick regions correspond with infrasonic frequencies up to 20 Hz (dashed), sub-bass up to 60 Hz (solid) and bass up to 90 Hz (thick) frequency regions.

Pressing CTRL+ALT (Windows) or CMD+OPTION (Mac) while the mouse is positioned over this control will bypass it until the keys are released.

Enable or disable with the red light.

Tip: TREMOR provides punch and power ranging from the infrasonic to the bass regions. Instead of always cutting and filtering those beautiful low-lows, embrace and extend them.

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Note: 7.83 Hz has a wavelength equal to the circumference of the earth. Its musical note is very close to B$_{-2}$, two octaves below the lowest B note on the piano. The 9th resonance in the Schumann resonance series beginning at 7.83 Hz is 59.8 Hz, the lower limit of the 60 Hz hum operating frequency of the North American power grid.

The TREMOR GAIN slider influences the intensity of the circuit.

Tip: Push the TREMOR GAIN slider up, then turn the Hz knob clockwise until the sweet spot is clearly heard. Back off the GAIN until the foundation is just right. Once a sweet spot is found, doubling the Hz will reveal another sweet spot so you will now have options when finding what serves the track best. Be careful with this! Since there are many sweet spots, there are many equally good choices and there may not be a 'best' choice. Listen for a flattering combination of contrast and complement while considering the whole mix, pick one quickly and move on!

The Linked Feature Toggle (lock icon) allows for the HPF and TREMOR circuits to be simultaneously enabled or disabled. These circuits are so complementary and so closely related that we provided a convenient way to do this quickly. These can be independently enabled or disabled with their respective indicator lights when the features are unlinked.

The status is indicated with either an open lock icon (unlinked) or a closed lock icon (linked).

BIAS trim affects the non-linear response of several circuits.

P440 is designed with an ideal neutral bias sweet spot that ranges from -10 dB to -3 dB peak dbFS. With BIAS in the default position, Sweet Spot strikes a natural balance between a big low end and an open top end. Pushing or pulling BIAS allows for driving or backing off the internal circuitry to adjust between slightly more aggressive, forward tone on one hand and more relaxed depth and clarity on the other.

Pressing CTRL+ALT (Windows) or CMD+OPTION (Mac) while the mouse is positioned over this control will bypass it until the keys are released.

Note: SOUL and O2 are heavily impacted by where the BIAS is set. With BIAS trimmed down (pulled), these circuits are more nuanced and can be pushed harder themselves without collapsing. With BIAS trimmed up (pushed), these circuits become more overtly colorful and aggressive.

Tip: If you want even more aggression then gain stage HOT into P440 because SOUL and O$_2$'s harmonics increase disproportionately to incoming level. More level results in even more harmonics when SOUL and O$_2$ are engaged.

TIBO stands for Tight Bottom.

TIBO grabs hold of spread-out low end in the stereo field and folds them into the center without losing any of the existing side information. The result is an uncompromised sense of solidity and focus in the center low imaging. Used in this manner, TIBO complements modern low-end stereo mixing techniques targeted towards car sound systems, headphones, hi-fi systems and quality bookshelf systems alike.

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Engaging the high-pass side filter by clicking on the S HPF indicator shifts TIBO into mono-maker territory. TIBO continues to fold the now filtered side information into the center, retaining and enhancing the tight imaging as described above. When used in this manner, TIBO becomes very friendly towards vinyl and club releases.

The SAT trim pot provides an additional TIBO color. This very targeted low-end saturation works in combination with the main TIBO circuit, bringing out additional grit, girth and presence when it is needed.

Pressing CTRL+ALT (Windows) or CMD+OPTION (Mac) while the mouse is positioned over either TIBO or SAT will bypass it until the keys are released.

The Low Shelf Selector knob runs though custom signature frequency points, slopes, gain and curves that were fine-tuned by ear. Each step respects the timbre of the source material and is made up of complementary and compensated combinations of parameters.

Each of the High/Low arrows (found beside the on/off light) shifts the center point frequency and bends the curve in ways that are unique to each frequency selection.

INV inverts the shelves, transforming the default shelf boost into a mirror opposite shelf cut. The meticulously tuned shape of the filter is maintained, so whereas with a boost you have a shelf that is accompanied by a complimentary dip, with a cut you have a shelf that is accompanied by a flattering bump.

The FINE TUNE FREQ and FINE TUNE GAIN sliders respectively allow for adjusting the frequency or gain relative to the current chosen step. Default 0 positions are marked by the triangle indicators.

Pressing CTRL+ALT (Windows) or CMD+OPTION (Mac) while the mouse is positioned over the Selector knob will bypass it until the keys are released.

Enable or disable with the green light.

Tip: Each shelf step has unique gain, frequency and curve characteristics. Whether boosting or cutting, be very aggressive with GAIN initially to help pinpoint the edge of the frequency you want to highlight. Follow up with FINE TUNE FREQ adjustments if needed, drop FINE TUNE GAIN all the way down, then raise it back up to your ideal level. See Tips, Tricks & Techniques for more.

LOW Band
Enable or disable with the green light.

MID Band
Enable or disable with the green light.

HIGH Band
Enable or disable with the green light.

Q Selectors
Choice of predetermined proportional Q stages from low (wide) to high (narrow).

FINE Q
Positive or negative 0.1 Q adjustments relative to the selected stage.

FREQ Frequency Selector
Stepped sweet spot frequency points.

LOW FREQ FINE Hz
Positive or negative frequency adjustments relative to the center point. The relative range for LOW is -10 Hz to 10 Hz.

MID FREQ FINE Hz
Positive or negative frequency adjustments relative to the center point. The relative range for MID is -200 Hz to 200 Hz.

HIGH FREQ FINE Hz
Positive or negative frequency adjustments relative to the center point. The relative range for HIGH is -1000 Hz to 1000 Hz.

GAIN
The GAIN knob is stepped at predetermined intervals. Interacts with the proportional Q, narrowing as gain is boosted or attenuated.

FINE dB
Positive or negative gain adjustments relative to the GAIN knob. Adjusting this does not affect the proportional Q. The range is -5 dB to 5 dB.

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LOW ● The LOW band spans sub bass and bass regions, providing overlap and interaction with TREMOR and the MID band.

Enable or disable the EQ band with the green light. Activating the EQ band will result in the signature sound of the circuitry becoming enabled, even if GAIN is not adjusted.

The Q factor defines the width and slope of the boost/cut. The LOW Q selector allows for choice of one of three individually tuned proportional Q designs.

Left click on a Q shape to select, right click to cycle backward.

The FINE Q slider provides +/- 0.1 adjustments.

Tip: Go narrower to remove undesirable tones, ringing or unwanted resonance or to create focal points to help define a feature. Go wider to have a less defined area of focus and shape the tone gently and musically.

Each stepped position on the FREQ knob features a meticulously chosen sweet spot that will generally work well with any audio source.

Right clicking the FREQ knob or the FINE Hz slider triggers a hunt resonance mode where the Q gets tight and a medium boost is temporarily applied until you release the right click. This is a better approach than having a solo band mode, which can throw the ear off with too much abrupt contrast.

Holding shift while right clicking the FREQ knob or the FINE Hz slider triggers a hunt attenuation mode that operates similarly, but uses deep, narrow band cuts for quickly finding ideal frequencies to cut.

For situations where the sweet spot is determined to be in between two of the stepped positions, the FINE Hz slider provides +/- 10 Hz of adjustment in the LOW band.

Note: Each Sweet Spot step is tuned to be musical and natural, while the fine-tune sliders, when needed, are precision tools to nail that sweet spot based on the source audio.

The GAIN knob is stepped at predetermined intervals.

The FINE dB slider provides continuously variable gain adjustments of up to +/- 5 dB.

Note: Sweet Spot is a proportional EQ, so GAIN knob adjustments result in a narrower Q as boost or attenuation is increased. Unlike GAIN, the FINE dB slider boosts or attenuates without causing the Q to adapt. This gives you the choice to make adjustments that maintain the width and slope if you like it or to have them adapt to gain changes if it's not quite there. You are either in the sweet spot or you are about to be.

MID ● The MID band spans bass, midrange and high regions, providing overlap and interaction with the LOW band and the HIGH band.

Enable or disable the EQ band with the green light. Activating the EQ band audibly enables the signature sound of the band circuitry.

The MID Q selector allows for choice of one of three individually tuned proportional Q designs.

Left click to cycle forward and right click to cycle backward through the options.

The FINE Q slider provides +/- 0.1 adjustments.

Tip: Auditioning with your eyes closed allows for greater focus and better judgment. To audition a Q factor, play your music, select a Q, close your eyes, then without moving your mouse, right click to hear the left Q choice, then left click to return to the original choice.

Each stepped position on the FREQ knob features a meticulously chosen sweet spot that will generally work well with any audio source.

For situations where the sweet spot is determined to be in between two of the stepped positions, the FINE Hz slider provides +/- 200 Hz of adjustment in the MID band.

Tip: P440 Sweet Spot has ample headroom, impressively low CPU and meticulously realized respect for the timbre and imaging of your source audio. As a result, feel completely free to insert multiple instances in series on the same track. For example, have one instance doing attenuation while another instance handles boosting and filtering, or have one instance doing the MID and another instance handling the SIDE.

Tip: Right click for resonance hunting, hold shift and right click for attenuation hunting. See the LOW FREQ control in this section for details.

The GAIN knob is stepped at predetermined intervals.

The FINE dB slider provides continuously variable gain adjustments of up to +/- 5 dB.

Tip: Balancing the MID band against TREMOR to experience a very complementary punch in the lows and openness in the mids. For an even deeper and more expansive experience, ensure the SOUL and O_2 circuits are enabled and open up O_2 to taste.

The HIGH band spans high mid and high regions, providing overlap and interaction with the MID band. Enable or disable the EQ band with the green light. Activating the EQ band audibly enables the signature sound of the band circuitry.

The HIGH Q selector allows for choice of one of three individually tuned proportional Q designs.

Left click to cycle forward and right click to cycle backward through the options.

The FINE Q slider provides +/- 0.1 adjustments.

PULSAR MODULAR

Each stepped position on the FREQ knob features a meticulously chosen sweet spot that will generally work well with any audio source.

For situations where the sweet spot is determined to be in between two of the stepped positions, the FINE Hz slider provides +/- 1000 Hz of adjustment in the HIGH band.

Tip: Right click for resonance hunting, hold shift and right click for attenuation hunting. See the LOW FREQ control in this section for details.

The GAIN knob is stepped at predetermined intervals.

The FINE dB slider provides continuously variable gain adjustments of up to +/- 5 dB.

Tip: To create a focal point that requires a narrow Q at low amplitude, try narrowing the Q, increasing the GAIN to have the proportional nature of the curve really kick in, but then back off the FINE dB to bring the whole bell down to the level you wish it to be at in unison. This behavior is possible because the FINE dB slider does not influence the proportional Q. The result is a proportionally narrow Q that you have complete control over. Sweet Spot.

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SOUL
SOUL encompasses the signature sound of P440. Enable or disable with the red light.

RES – LPF Resonance
Positive for a resonant peak, negative to smooth the curve.

Low Pass Filter
Lower bounds is 10 kHz, upper bounds is determined by sample rate. Enable or disable with the green light.

O₂
A unique signature internal engine that breathes life into audio. Enable or disable with the blue light.

SCALE
Increases or decreases the relative magnitude of the GAIN and FINE dB settings for the LOW, MID and HIGH bands.

Linked Feature Indicator
O₂ is dependent on SOUL, so disabling SOUL will disable O₂. O₂ can be independently enabled or disabled when SOUL is enabled.

INV – Invert Shelf
The shelving filters boost by default. When INV is enabled, these unique shapes are inverted and the high shelf filters cut. Enable or disable with the green light.

High Shelf Selector
Selects a signature custom designed shelf featuring ear-tuned complementary curve, frequency, gain and slope characteristics. Enable or disable with the green light.

FINE TUNE FREQ
Positive or negative frequency adjustments relative to the center point of the signature shelf selection. The relative range is -1 kHz to 1 kHz.

FINE TUNE GAIN
Positive or negative gain adjustments relative to the gain of the signature shelf selection. The relative range is -5 dB to 5 dB.

High/Low Arrows
Shifts the center point of the signature shelf selection.

RES

SWEET SPOT EQ

O₂ SOUL

SCALE

INV

FINE TUNE

FREQ GAIN

%

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O₂ is a signature Pulsar Modular circuit algorithm that works to subtly and beautifully separate, sharpen and enhance elements in the audio signal, unearthing hidden gems in your mix.

Pressing CTRL+ALT (Windows) or CMD+OPTION (Mac) while the mouse is positioned over this control will bypass it until the keys are released.

Enable or disable with the blue light.

Tip: SOUL and O₂ are very tightly integrated. Start by finding the SOUL setting that works with the goals you have for your audio. Thereafter, enable O₂ and adjust to taste. If SOUL is later adjusted, don't forget that further adjustments to O₂ might be needed. See Tips, Tricks & Techniques for more.

SOUL is the signature sound imprinted on the audio passing through P440 without any of the parameters being engaged.

The SOUL knob ranges from 100% where the full device signature is experienced, through to 0% where the signal nears a pristine digital state while still retaining the essence of the device character. In between these extremes, there is a whole universe of variation to explore.

Pressing CTRL+ALT (Windows) or CMD+OPTION (Mac) while the mouse is positioned over this control will bypass it until the keys are released.

Enable or disable with the red light.

The signature low pass filter features a 12 dB/oct 2-pole filter in the default RES position, marked by the dot as shown below.

Enable or disable with the green light.

As with other aspects of Sweet Spot, the RES knob, which controls the Q factor, is heuristically tuned to a default starting position that accounts for its effects on the full audio spectrum. The default position is much gentler than what you likely find in most equalizers, so as it reigns in the top end, it allows for subtle breath and punch to develop in the low end.

Turning the knob counterclockwise smooths the shape and softens the phase until it gradually reaches a 1-pole 6dB/oct slope. As it is turned clockwise from the default position, the filter is increasingly augmented with a resonant peak.

Pressing CTRL+ALT (Windows) or CMD+OPTION (Mac) while the mouse is positioned over this control will bypass it until the keys are released.

The LPF slider allows for tuning the filter to the desired frequency.

The upper bounds of the range depends on the host sample rate. At 44.1 kHz and 48 kHz sample rate, it is 21 kHz. At 88.2 kHz and higher sample rate, it is 33 kHz.

Pressing CTRL+ALT (Windows) or CMD+OPTION (Mac) while the mouse is positioned over this control will bypass it until the keys are released.

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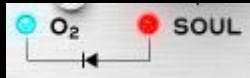
The Linked Feature Indicator signifies the tight relationship between the O_2 and SOUL circuits. These circuits are dependent in that O_2 requires SOUL to be enabled to operate.

Since O_2 is dependent on SOUL, disabling SOUL will disable O_2, but O_2 can be enabled or disabled individually as long as SOUL is enabled.

SCALE allows you to simultaneously adjust your GAIN and FINE dB settings for the LOW, MID and HIGH bands.

The default middle position leaves GAIN and FINE dB values unaffected. Turning SCALE clockwise will increase boosts and cuts, while turning SCALE counterclockwise will decrease boosts and cuts.

Pressing CTRL+ALT (Windows) or CMD+OPTION (Mac) while the mouse is positioned over this control will bypass it until the keys are released.

Note: SCALE does not influence the proportional Q, so adjustments will very smoothly and naturally increase or decrease gain without affecting the shape of the curve.

Tip: Consider automating SCALE in different song sections to introduce subtle contrast and interest.

The High Shelf Selector knob allows for selection of one of a series of custom signature designed shelving filters.

Each step in this painstakingly designed set of filters dips, steps, bends, leaps and rolls in beautiful and unexpected ways.

Each of the High/Low arrows (found beside the on/off light) shifts the center point frequency and bends the curve in ways that are unique to each frequency selection.

INV inverts the shelves, flipping the default shelf boost into a mirror opposite shelf cut. The shape of the filter is maintained, so whereas with a boost you have a shelf that is accompanied by a complimentary dip, with a cut you have a shelf that is accompanied by a flattering bump.

The FINE TUNE FREQ and FINE TUNE GAIN are continuous sliders for adjusting the frequency or gain relative to the custom designed filter. The default neutral position of each slider is marked by the triangle indicators.

Pressing CTRL+ALT (Windows) or CMD+OPTION (Mac) while the mouse is positioned over the Selector knob will bypass it until the keys are released.

Enable or disable with the green light.

Tip: See Tips, Tricks & Techniques for helpful information on effectively working with P440 shelves.

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Tips, Tricks and Techniques

.: On stepped EQ knobs :.

The whole experience using Sweet Spot is very natural and efficient. Start by listening and deciding how you want to shape your sound. Move through the stepped Q, frequency and gain bands to translate what you are imagining to what you are hearing. You may often find that you hit the sweet spot without the need to touch any FINE adjustments, but that flexibility is there at your fingertips when you need it. [RR]

.: On low and high shelf :.

There is no need to use combinations of tools or instances to do complementary adjustments (e.g. dip compensating for a lift or vice-versa) due to the advanced integrated design. We will warn you that if you insist upon looking at what you are hearing using an analytical tool, what you see is not going to correspond to what you hear. You are working on audio. Are you going to trust your ears or your eyes? No graphs, no visual aids, just audio and a keen, experienced ear. Sweet Spot is about feelings and auditory exhilaration. Visuals have no place here. [ZS]

.: On TREMOR :.

There is overlap in range and interaction between TREMOR and the LOW Band filter. TREMOR can be used as foundational infrasonic support or as an additional cumulative gain EQ band that sums with the LOW bell band. [RR]

.: On TIBO :.

What TIBO does is very dependent on the source material. There isn't really a position on the knob that can be recommended when trying to reach a particular set-out goal. It is all about just moving it and listening to how the solidity, directionality and positioning of the low end transmutes with each tick. It is NOT "as you keep increasing it, things get tighter". Whether it gets tighter, punchier or more low-end present for example, simply changes as the knob is moved. Any number of places you land (and often more than one place) sounds very flattering. However, this description gets flipped if you engage the TIBO side filter. In this case, it does get tighter the more you increase it – but – the center image is still benefiting from the changes mentioned above. The mono-making is very natural sounding when the side filter is engaged. The low end gets centered but it doesn't get smaller or weaker and it does not lose any front-back or y-axis dimensionality. [KE]

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.: Efficient shelf selection workflow :.

P440's shelving philosophy is unique in that the shelf positions don't just influence gain, but also frequency and the overall curve shape. The workflow that I find works best is to be aggressive with GAIN and the big shelf knob while listening to the shapes of each position, knowing that once you find a sound that you think works for the material, you can FINE TUNE GAIN up or down while locking that shape in place. And then FINE TUNE FREQ up or down to dial it in further if needed.

The lower shelf positions (0-4) might seem more subtle at first, but you can FINE TUNE GAIN them up to hear their boundaries more easily against the material. Even the default shelf at position 0 has a simple musical shape that when gained up can match the default gains of the higher shelf positions. I find that the most linear shelf position is shelf position 6 but gained heavily down to taste.

With this workflow I can quickly audition all 12 shelf positions to discover how well their shapes work or don't work. Even shelf position 12, with max negative FINE TUNE GAIN applied has a nice 5 kHz cut before rising up into 10 kHz+ and this gets used on some masters. [RR]

.: Stacking P440 instances (a TIBO example) :.

Stacking P440 instances can have a compelling cumulative effect. When doing so, one must be mindful of some of the bolder circuitry such as SOUL or O$_2$ and limit their usage when stacking, but stacking of subtler circuitry such as TIBO, which is the subject of this example, can yield fantastic results.

In a mix context, stacking the BIAS/TIBO settings can get some very interesting results. On very staccato distorted guitars I was having a bit of an issue because my brain likes symmetry and one of the two guitar players is cleaner on rhythm. One side is absolutely perfect. The other side is a bit behind by comparison. I started to play with the BIAS (like I do on everything nowadays...so good) and when I cranked it, I noticed a slight tightening of the guitar's bottom end, a bit more definition to the individual notes.

I then applied TIBO and like I dialed in with BIAS, it got turned all the way up. I had this feeling like I was on the right track but needed more, so another P440 came in and once again, cranking both (BIAS/TIBO) further defined all the notes. [LA]

.: Summing mixer substitute :.

Hardware is imperfect, and as in nature, this is central to the intangible uniqueness and beauty we experience in so many classic high-end designs. A reputable piece of outboard gear may commonly be used as a passthrough device for the purpose of imparting the subtle signature tone that it is known for. HW includes 5 design variations, each representing alternative impressions of the intoxicating dimension, separation, depth and clarity that is commonly experienced with quality hardware.

Tip: Be sure to experiment with Dual Mono when using HW for additional variation! [RR]

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.: TIBO: tight bottom or larger than life… or both? :.

The flexibility of TIBO goes beyond its original intent to tighten and solidify. You can use TIBO to process a mono signal in a stereo track or bus to deliver a larger than life representation of the original signal. To do this, you need to have the Dual Mono ON, as this will create randomization between the left and right channel which generates the needed SIDE information. If Dual Mono is off, you can still apply TIBO SAT to your signal. Either of these approaches works wonders on bass guitar!

Stereo analog hardware devices will always have variances between the left and right channel. This is why the low end usually is not as tight as a digital plugin but gives you larger than life representation of the signal. Now with TIBO you can have both when you turn on Dual Mono and apply TIBO to tighten up the low end and then use TIBO Saturation as a cherry on top. [ZS]

.: Oversampling :.

When using P440 in a mastering context where precise control over dimension, clarity and openness is paramount, oversampling may be beneficial. This ensures that no artifacts exist and only pure, unclouded, uncompromised sound is present.

If many P440 instances are being used during the mixing process, and if you are trying to preserve CPU usage, evaluate OS on/off, by listening to each P440 insert on a track.

Having OS on is not always 'better'. With OS off for example, SOUL can impart a gentle thickening throughout the mids. With OS on, SOUL can sound clearer or prettier in a sense, with the additional weight shifting to the upper mids. O_2 on the other hand sounds more Hi-Fi with OS on since it has a much more prominent harmonic effect that is better suited to the increased bandwidth.

P440 Sweet Spot is wonderful sounding and highly efficient with oversampling turned off. Think about whether or not it is needed and even if it may be beneficial, audition both options while using and trusting your ears. Focus both on the element itself and how it affects all other elements. [RM / RR]

.: Shape your low end :.

Dial a mix with P440 without HPF. Then turn it on and set it around 15Hz. Now turn off and on. Notice how you get an extra expanded stereo image.

TREMOR adds a bump, but HPF has a resonance, so it can also do the bump. However, each has a different color since TREMOR is a band while the Q on the HPF is a resonance of that filter.

Furthermore, the HPF Q goes negative from neutral at 0.71 to 0.49, in effect turning it to a 6 dB/oct 1-pole filter. This means you can bump up with TREMOR, then push down with Q as needed. You have a virtual playdough low end tool now.

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There is also generally unknown magic in attenuation. On a full mix, try Band 1 set at 9th position and GAIN -4 or -5 (Q in position 0), then listen to what happens to your low end. [ZS]

.: O$_2$ works within SOUL :.

O$_2$ works into the SOUL flavor so now I start with O$_2$ set OFF first to find a SOUL setting that works for the material. There is a ton of variation in the first 20% alone so pay attention to every click, but once you find a SOUL setting that gives the source a constructive nonlinear shape (across all 3 axis: front to back, side to side and top to bottom) then you can drive O$_2$ into it for a little harmonic fattening and flattening, but now within the contour of the chosen SOUL flavor. The two work off each other so a little goes a long way. [RR]

.: The right tool for the right job :.

P440 is not super surgical so I've been using it with a clean scalpel EQ that also does dynamic bands. I prefer keeping my musical corrections (P440) and technical corrections (dynamic EQ) separate because once I set the dynamic bands (like bumpers on a bowling alley preventing gutter balls), I can then start exploring shapes with P440 pushing into the bumpers.

The first word that comes to mind when flipping through the P440 filters is FIRM. I think many of you are already familiar with the PM Filter sound and know what I'm talking about. Your ear quickly locks onto their boundaries and there is no need for distracting graphs to dial in confidence.

To me the best sounding EQs (in analog) have an ability to add punch and firmness with a simple cut at the right spot - I call them pressure points. 20+ years turning EQ knobs and this still blows my mind when it happens, and P440 does this in a way no other digital EQ I can think of can.

So if the cuts are punchy you can only imagine what the boosts sound like. They remind me of the SPL PQ boosts (the HW not the SW), but instead of the bands being either Proportional Q or Constant Q, P440 allows you to do both concurrently if you want. I first use the coarse Proportional Q gains to find the approximate shape that tickles my ear, then fine tune with gain trim and Constant Q if needed. Mixed with the fixed frequency points, the workflow is so fast. [RR]

.: Separate attenuation from boost :.

I like to put two instances of P440. First one for band attenuation (and I turn everything else off: filters, shelves and O$_2$, TREMOR, SOUL etc..). You will notice that cutting with P440 usually gives a punch to that frequency. So I am sure you have never experienced that much enjoyment when cutting into frequencies like with P440.

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The second instance is for boosting and everything else.

Get the SOUL working for you and then add O₂ if needed. If you change SOUL value, re-examine your O₂ setting. HW sometimes works better if O₂ is off. Experiment based on material.

To find certain frequencies to work on, turn Q to 3 (tightest) GAIN to max and then sweep the frequency knob.

Band GAIN level directly influences the proportional Q. However, once you reach a somewhat comfortable FREQ/GAIN combo, you can use the FINE dB to push without proportional behavior. So you have both properties at your disposal.

Shelving steps are a combo of FREQ+GAIN. Once you get in the ballpark, you can use FINE TUNE GAIN or FINE TUNE Hz to move that shelf to the sweet spot for that particular track, if needed. Good luck on your journey. [ZS]

.: A guide to discovering P440 workflow :.

There is much to discover in P440. The following hands-on experiences and insights may help put you on a path to audio nirvana.

All of the curves determined by the hard-coded values found in the main parameter controls (Q Factor, FREQ and GAIN for the middle bands, plus all shiftable center points and unique shapes for both shelves) were chosen one at a time by ear. The stepped frequency points and Qs inspire me to dive in and explore how the curves interact with the music. It's an exploration because we don't yet know what will work or what won't. We have to discover this along the way and P440 intuitively guides this process better than any other EQ I've used.

A fine-tune adjust knob exists that allows you to go +/- HZ (the higher bands have increased fine-tune range to compensate for shorter waveforms). The workflow remains the same, but now with pinpoint precision if needed: scan through the frequency points on the big knob and if two positions sound good, you can fine-tune between them to dial in perfection. More often than not, my FINE Hz knobs are left at 0, but sometimes with sustaining instruments I will nudge the FINE Hz up and down to find the best window for them. It's like having the best of both hardware and software EQ combined IMO.

Fine-tune knobs also exist for both gain and Q which causes the curve flexibility to go through the roof. There are three proportional Q positions which allow you to quickly find a shape in conjunction with the stepped frequencies and gains, but once you find a Q+GAIN shape that you think is close, you can then alter the curve's width and amplitude using constant Q and smooth gain using the FINE sliders. I love this because my ear prefers to hunt for tone quickly using proportional Q, but then once I find a shape that works, I can leave the proportional shape alone while dialing in the curve width and amplitude like a normal digital EQ. This workflow has completely changed my approach and improved my EQing.

LF workflow - Imagine the low frequency curve and phase interactions (think Pultec boost+cut) coming from TREMOR (a sweeping 10hz to 90hz omnidirectional sounding boost) + a Low Shelf (with generous +/- fine-tune slider resolution) + Band 1 (a more directional sounding boost/cut) + a

resonant HPF that when set to a high RES Q value creates its own unique sounding pressure poke (though I usually prefer a lower HPF Q with TREMOR feeding into it). Obviously these four LF interactions can't all be firing strong at the same time, but the fun comes while discovering which amplitude + phase interactions deliver the cleanest, punchiest and BIGGEST sounding low end for the source material. There is never one size fits all when it comes to shaping low end, but I think P440 makes the discovery process enjoyably fast.

Sweet Spot is punchy and big in the low end to low mid. API 550a-ish. It is forgiving through the upper mids and highs with curve boundaries that aren't overtly etched like most every other digital EQ. Smooth, musically integrated boosts and vanishing cuts.

When the P440 is bypassed after dialing in curves and colors the constructive difference is usually shocking. It has a very unique sound that can be tailored across a wide range of material without typical DSP compromises (image shifts, transient choke, edginess, etc). I treat P440 like an analog EQ with tonal options and it continues to impress me daily. [RR]

.: Color options :.

There are 5 unique color options that pretty much all complement each other. Most are directly correlated to analog behaviors (ie: crosstalk, channel deviation, even/odd harmonics etc). Some affect image, while others affect transient density. They are all useful at times IMO and I enjoy flipping through them even when assuming they won't work for a particular mix. I'm often surprised at which combinations I arrive at.

The MOD button is also a trip once you start hearing it across diverse material. I used all of the color options across 12 songs but never all colors at the same time. The MOD and the HW settings overlap a bit down the middle so they were usually either / or on today's folk-rock record. HW-1 can work with MOD on if the mix's low mid has room for more knock-knock.

The star of the show today was Dual Mono. Every time I hit that dual mono button the added dimension was constructive and pleasing without any loss of power or weird image shenanigans. Great work on determining the channel deviations. [RR]

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Managing Presets

Basics

If the option to install presets is selected during installation, updates will overwrite the original presets but custom named presets will remain untouched. Be sure to save your own presets with different names using the save as option (to the right of the preset browser), or alternatively, ensure the preset installation option is not selected when updating the software.

Backing Up Presets

Presets can be backed up and restored using your operating system file manager. Simply perform a copy/paste of either individual preset files or the full presets folder to a backup location of your choosing. The presets folder can be found in the following locations:

FOR WINDOWS

'C:\Users\Public\Documents\Pulsar Modular\P440 Sweet Spot\Presets'

FOR MAC OS X

'/Users/Shared/Pulsar Modular/P440 Sweet Spot/Presets'

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General

Fine Tuning Mode

Press and hold the modifier key (in macOS: "control, option or command", in Windows: CTRL) while left clicking to adjust the knobs or sliders. Alternatively, right click when adjusting knobs or sliders without the need for a modifier key.

Uninstalling P440 Sweet Spot

FOR WINDOWS

- In 'C:\Program Files\Common Files\VST3', locate the 'P440 Sweet Spot.vst3' file and delete it.
- In 'C:\Program Files\Common Files\Avid\Audio\Plug-Ins', locate the 'P440 Sweet Spot.aaxplugin' folder and delete it.
- In 'C:\Users\Public\Documents\Pulsar Modular', locate the 'P440 Sweet Spot' folder and delete it. This folder contains the user guide and presets. If no other folders exist under 'Pulsar Modular', this can be deleted as well.

FOR MAC OS X

- In '/Library/Audio/Plug-Ins/Components', locate the 'P440 Sweet Spot.component' file and delete it.
- In '/Library/Audio/Plug-Ins/VST3', locate the 'P440 Sweet Spot.vst3' file and delete it.
- In '/Library/Application Support/Avid/Audio/Plug-Ins', locate the 'P440 Sweet Spot.aaxplugin' folder and delete it.
- In '/Users/Shared/Pulsar Modular', locate the 'P440 Sweet Spot' folder and delete it. This folder contains the user guide and presets. If no other folders exist under 'Pulsar Modular', this can be deleted as well.

Restrictions

The USER may not reverse engineer, disassemble, re-sample, create Impulse Response profiles or re-record, decompile, modify, alter in whole or in part PULSAR NOVATION LTD audio plugins for the intent of renting, leasing, distributing, repackaging (whether for profit or not). All choices of stepped frequency points, gain and shelf curves are covered under this explicit restriction.

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