Rave Generation

PRESENTS

TUBEQ

USER MANUAL

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1. Introduction

TubEQ is an authentic analog equalizer plugin that combines the musical character of two legendary EQs in a single, powerful processor. This unique hybrid design features the warm, surgical low-end of the iconic **Pultec EQP-1A** (modeled using Wave Digital Filters), the modern clarity and presence of the **Maag EQ4M** mid/high frequency bands (using State Variable Filters), and the harmonic richness of the **12AX7 tube** from the original Pultec amplifier stage - all finished with a precision brickwall lowpass filter at 24.5kHz.

From the studio-defining low-end warmth heard on countless classic recordings to the crystal-clear "Air" that makes modern productions sparkle, TubEQ delivers the authentic analog sound and character that shaped music history. Whether you're adding weight to kick drums with the famous "Pultec trick," bringing vocals forward with Maag-style presence, or adding harmonic richness with tube character, TubEQ provides the legendary analog sound with the convenience of modern digital control.

Beyond faithful hardware emulation, TubEQ offers the convenience and precision of modern digital control while maintaining the musical, interactive behavior of analog circuits. The result is an equalizer that sounds and feels like the original hardware, with the flexibility and recall of software.

2. Key features

- Authentic Pultec EQP-1A low-end modeling: Wave Digital Filter implementation of the legendary passive tube EQ circuit with authentic inductor-capacitor networks
- Maag EQ4M-inspired mid/high bands: Musical frequency points (160Hz, 650Hz, 2.5kHz) plus sweepable Air Band
- 12AX7 tube character modeling: Authentic modeling of the 12AX7 (ECC83) tube from the original Pultec EQP-1A amplifier stage, including subtle harmonic coloration and tonal character
- The legendary "Pultec Trick": Simultaneous boost and cut at low frequencies for enhanced weight and clarity
- Interactive EQ bands: Analog-style frequency interaction and natural phase relationships
- Progressive gain compensation: Intelligent level management maintains consistent output while preserving dynamic character
- Brickwall filter: Precision 24.5kHz lowpass prevents aliasing while preserving musical content
- Complete analog signal path modeling: From input transformers to output stages, every component authentically modeled

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3. Quick-start

1. Insert TubEQ on your desired track or mix bus
2. Enable the effect using the "Effect In" switch
3. Start with the Low frequency section: • Select frequency band (30Hz/60Hz/100Hz) based on source material • Add LF Boost for weight and warmth • Try the "Pultec Trick": Add some LF Atten while boosting for enhanced clarity
4. Shape the midrange and highs: • Use 160Hz for body control • Use 650Hz for vocal presence and punch • Use 2.5kHz for definition and bite • Add Air Band for open, sparkling highs
5. Add tube character with Tube Input and Tube Level controls for authentic Pultec warmth
6. Set Output level to match bypassed signal or creative preference

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4. User interface

4.1 Low frequency section (Pultec EQP-1A)

The low frequency section faithfully recreates the legendary Pultec EQP-1A using Wave Digital Filter modeling of the original analog circuit.

Control	Range	Description
LF Boost	0-10	Low frequency boost amount with authentic Pultec curve scaling and progressive response
LF Atten	0-10	Low frequency attenuation with authentic Pultec curve scaling - enables the famous "Pultec Trick"
LF Band	30Hz/60Hz/100Hz	Frequency selection switch - both boost and attenuation operate on selected frequency

The Famous "Pultec Trick": The original Pultec EQP-1A allows simultaneous boost and attenuation because the circuits operate at slightly different frequencies. This creates a unique sound where you can add low-end weight while removing muddiness, perfect for kick drums, bass, and full mixes.

Frequency characteristics:
- 30Hz: Deep sub-bass, adds fundamental weight to kick drums and bass
- 60Hz: Classic low-end warmth, excellent for adding body to thin sources
- 100Hz: Upper bass region, great for adding warmth without excessive sub content

4.2 Mid/high frequency section (Maag EQ4M)

The mid and high frequency bands are inspired by the legendary Maag EQ4M, featuring the same musical frequency points as the original hardware with smooth, continuous gain control.

Control	Range	Description
160 Hz	±5	Low-mid frequency band for warmth and body control
650 Hz	±5	Mid frequency band for vocal presence and clarity
2.5 kHz	±5	Presence band for definition and attack
Air Gain	0-10	Boost amount for the Air Band with progressive curve response
Air Band	off/2.5kHz/5kHz/10kHz/15kHz/20kHz/40kHz	Selects the Air Band frequency - higher frequencies provide smoother, more open sound

Frequency characteristics:
- 160Hz: Controls low-mid warmth and body - cut to reduce muddiness, boost for narrator-style vocal weight
- 650Hz: The "intelligibility" frequency - boost for vocal clarity, cut for a more distant sound
- 2.5kHz: Presence and bite control - crucial for vocal definition and guitar attack
- Air Band: The legendary Maag "Air" - adds open, sparkling highs that enhance perception of detail and space

4.3 Tube section (12AX7 from Pultec EQP-1A)

The tube section models the 12AX7 (ECC83) tube from the original Pultec EQP-1A amplifier stage, which restores the insertion loss of the passive EQ section while contributing subtle harmonic coloration and tonal character.

Control	Range	Description
Tube In	0-1	Input drive level into the tube stage - higher values increase the tube's tonal contribution
Tube Level	0-1	Amount of tube character processing applied to the signal

Tube modeling characteristics:
While the EQP-1A is not designed as a tube saturator, the 12AX7 does impart subtle harmonic enhancement, especially when driven near the top of its headroom.

TubEQ models these characteristics:
- **Harmonic coloration**: Subtle even and odd harmonics that contribute to the "Pultec sound"
- **Tonal character**: The natural tube response that adds warmth and musicality
- **Headroom behavior**: Authentic response when approaching the +21 dBm maximum output of the original
- **Tube warmth**: The characteristic smoothness and musical quality of the 12AX7

4.4 Output section

Control	Range	Description
Output	±12dB	Final output level control with progressive gain compensation
Effect In	off/on	Master bypass switch - when off, signal passes through clean

4.5 Additional controls

Precise movements: Holding down the 'Shift' key while adjusting a knob will enable you to make precise movements. Allowing for finer control over the audio processing parameters.

Reset knob: Right clicking a knob will reset its value. This action will restore the knob or fader to its default or initial position. Alt + click also works (MacOS: 'option' + click).

Adjust value: Double-clicking a knob allows you to adjust its value directly. This action provides a quick and intuitive way to fine-tune parameters with precision.

Undo/redo: Access Undo and Redo from the menu bar to easily correct or reapply changes. Undo reverses the last adjustment, preventing errors, while Redo restores it, essential for efficient workflow and precise edits.

GUI Opacity: From the menu bar, users can adjust the GUI Opacity from 0% to 100%. This control allows for varying the transparency of the plugin interface, offering better visibility of underlying work areas or personal preference adjustments.

Resize: The interface can be resized from 70% to 200% of its original size via the menu bar. This feature accommodates different screen sizes and resolutions, ensuring TubEQ is accessible and comfortably usable on a wide range of devices and display settings.

Preset menu: Accessible from the menu bar, the Preset Menu provides a comprehensive interface for browsing, loading, and selecting factory presets, enhancing the ease of finding the right settings for any session. Additionally, users can Load/Save, and Copy/Paste presets.

5. Signal flow and processing

Complete signal path

Input → Pultec Low EQ (WDF) → Maag Mid/High EQ (SVF) → 12AX7 Tube Character → Brickwall Lowpass Filter (24.5kHz) → Output Level → Output

Detailed processing chain

Pultec low frequency processing (Wave Digital Filter)

- Authentic inductor-capacitor network modeling
- Passive EQ behavior with tube makeup gain
- Supports simultaneous boost/cut ("Pultec Trick")
- Frequency-dependent impedance interactions

Maag mid/high frequency processing (State Variable Filter)

- 160Hz: Bandpass processing for warmth and body control
- 650Hz: Bandpass processing for vocal presence and clarity
- 2.5kHz: High shelf processing for presence control
- Air Band: Selectable high-frequency enhancement for openness and sparkle

12AX7 tube character (from Pultec EQP-1A)

- Models the amplifier stage tube from the original Pultec hardware
- Subtle harmonic coloration and tonal enhancement
- Natural tube warmth and musical character
- Authentic headroom behavior matching the original +21 dBm specifications

Brickwall lowpass filter

- 12dB/octave rolloff at 24.5kHz
- Prevents aliasing while preserving musical content
- Maintains phase coherence in the audio band

Progressive level compensation

- Automatic gain adjustment based on EQ settings
- Maintains consistent perceived loudness
- Preserves dynamic range and musicality

6. The legendary hardware

Pultec EQP-1A (1951-present)

The Pultec Program Equalizer, designed by Eugene Shenk and Ollie Summerland, revolutionized audio processing with its passive inductor-capacitor networks and tube makeup gain. The famous "Pultec Trick" - simultaneously boosting and cutting low frequencies - became a studio standard technique heard on countless classic recordings. TubEQ's Wave Digital Filter implementation captures the complete analog signal path including input/output transformers and the push-pull tube amplifier.

Maag EQ4M (1999-present)

Designed by Cliff Maag Jr., the EQ4M introduced the legendary "Air Band®" that set a new standard for high-frequency enhancement. Used by top engineers like Dave Pensado and Dylan Dresdow, the EQ4M's musical frequency points and selectable frequency bands created the signature sound heard on hits by Madonna, Justin Timberlake, and countless others. TubEQ captures this character using State Variable Filters with authentic frequency modeling and smooth gain control.

12AX7 tube (ECC83) in the Pultec EQP-1A

The 12AX7 (also listed as ECC83) is part of the amplifier stage in the original Pultec EQP-1A, working alongside the 12AU7 (ECC82) and 6X4 rectifier. While the EQP-1A is not designed as a tube saturator, the 12AX7 does contribute subtle harmonic coloration and tonal character, especially when the unit is driven near its +21 dBm maximum output. This tube's presence is part of what gives the Pultec its distinctive musical character and warmth that users associate with the classic sound.

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7. Tips & tricks

The Pultec trick

Start with LF Boost at 3-5 for weight
Add LF Atten at 2-4 to remove muddiness
Result: Enhanced low-end with improved clarity
Perfect for kick drums, bass, and full mixes

Frequency selection guide

30Hz: Deep content - kick drums, bass, full mixes
60Hz: Most versatile - works on most sources
100Hz: Upper bass warmth without excessive sub content

Vocal processing

160Hz: Cut to reduce muddiness, boost for warmth
650Hz: Boost for intelligibility and presence
2.5kHz: Boost for definition, cut to reduce harshness
Air Band: Try 10kHz or 20kHz for open, detailed sound

Air band selection
2.5kHz: Aggressive presence for cutting through mixes
5kHz: Balanced enhancement, versatile for most sources
10kHz: Classic character, smooth and musical
15kHz: Balanced character between 10kHz and 20kHz - musical and smooth
20kHz: Very smooth, adds "air" without harshness
40kHz: Ultra-smooth, subtle enhancement

Tube character
Subtle: Tube In 0.3-0.5, Tube Level 0.2-0.4
Classic: Tube In 0.5-0.7, Tube Level 0.4-0.6
Enhanced: Tube In 0.7-1.0, Tube Level 0.6-1.0

Genre applications
Electronic: Pultec for drums/bass, Air Band 10-20kHz, moderate tube
Rock/Pop: Pultec trick on rhythm section, 650Hz for vocals, 20kHz Air
Hip-Hop/R&B: Strong low-end, 650Hz for vocal clarity
Jazz/Acoustic: Gentle enhancement, higher Air Band frequencies (20-40kHz)

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8. Installation & troubleshooting

System requirements
• Operating system: macOS 10.13+ or Windows 10+
• Processor: Intel Core i5 or equivalent
• RAM: 4 GB minimum (8 GB recommended)
• Plugin formats: VST3, AU (macOS)
• DAW: Any compatible host (Logic Pro, Ableton Live, Studio One, FL Studio, etc.)

Installation process
1. Download the installer from the official website
2. Run the installer and follow on-screen instructions
3. Launch your DAW and rescan plugins if necessary
4. Locate "TubEQ" in your plugin list under "Rave Generation"

Troubleshooting
• Plugin not appearing: Ensure plugin path is correct in your DAW settings
• Activation issues: Check internet connection and license key accuracy

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TubEQ by **Rave Generation** combines the legendary analog character of the Pultec EQP-1A and Maag EQ4M with authentic 12AX7 tube character from the original Pultec amplifier stage. Experience the authentic analog sound that shaped music history, now with the convenience and precision of modern digital control.

For more resources, updates, and preset packs, visit ravegeneration.io