AmpBender

Virtual Guitar Amplifier by Heath Audio

Version 1.0.16

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1. Introduction

Welcome to **AmpBender**, a virtual guitar amplifier plugin that delivers authentic tube amp tones through advanced Wave Digital Filter (WDF) circuit modeling. AmpBender faithfully recreates the characteristics of classic British amplifiers with modern workflow enhancements.

Key Features

- WDF-based circuit modeling for authentic tube amp response
- Modular patchbay for custom signal routing
- Cabinet IR convolution with included speaker impulse responses
- Real-time spectrum analyzer
- AutoGain for consistent output levels
- Circuit modifications panel (Variac, Bias adjustments)
- Oversampling options for high-quality processing

Available Formats

Format	macOS	Windows	Compatible DAWs
VST3	Yes	Yes	Ableton, FL Studio, Cubase, Reaper, Studio One, etc.
AU (Audio Unit)	Yes	N/A	Logic Pro, GarageBand, Studio One
AAX	Coming Soon		Pro Tools
Standalone	Yes	Yes	N/A (runs independently)

2. Installation

macOS Installation

> **Important:** AmpBender is currently unsigned. You may need to allow it in System Preferences > Security & Privacy.

Using the Installer (.pkg)

1. Download the `AmpBender-v1.0.12-macOS.pkg` installer
2. Double-click to run the installer
3. If blocked, go to **System Preferences > Security & Privacy** and click "Open Anyway"
4. Follow the installation wizard
5. Restart your DAW to scan for new plugins

Manual Installation

Copy the plugin files to these locations:

```
VST3: ~/Library/Audio/Plug-Ins/VST3/AmpBender.vst3
AU:   ~/Library/Audio/Plug-Ins/Components/AmpBender.component
```

Then remove the quarantine attribute:

```
xattr -rd com.apple.quarantine ~/Library/Audio/Plug-Ins/VST3/AmpBender.vst3
xattr -rd com.apple.quarantine ~/Library/Audio/Plug-Ins/Components/AmpBender.co
```

Windows Installation

Using the Installer (.exe)

1. Download the `AmpBender-1.0.12-Windows-Installer.exe` installer
2. Right-click and select "Run as Administrator"
3. If Windows Defender SmartScreen blocks it, click "More info" then "Run anyway"
4. Choose installation options (VST3, Standalone)
5. Complete the installation and restart your DAW

Manual Installation

Copy the VST3 bundle to:

```
C:\Program Files\Common Files\VST3\AmpBender.vst3
```

3. Quick Start

1. Insert AmpBender on a guitar track in your DAW
2. Select a preset from the preset browser (top-left)
3. Adjust the **Preamp Gain** to taste
4. Enable **AutoGain** to maintain consistent output levels
5. Fine-tune with EQ knobs (Bass, Mid, Treble, Presence)
6. Use **Master Volume** for final level adjustment

> **Tip:** Start with the "Clean Crunch" preset for a versatile tone that works with most playing styles.

4. Gain Staging & Input Calibration

For the most authentic amp response, AmpBender is calibrated to match how a real guitar signal would hit the amplifier input. Understanding this calibration helps you achieve optimal tone and proper gain staging.

Input Calibration Reference

> **AmpBender Reference Level:**
> `-6 dBFS peak = 1Vp (0.707 VRMS) = +5.2 dBu`

This means:

- A guitar DI signal peaking at **-6 dBFS** in your DAW corresponds to a **1 volt peak** signal
- This matches the output of a typical hot humbucker pickup hitting a real amp input

- The Input Trim knob adjusts your signal from this reference point

How to Gain Stage Properly

1. **Set Input Trim to 0 dB** as your starting point
2. **Play your guitar** and watch the input meter
3. **Target -6 dBFS peaks** on strong strums or lead playing
4. **Adjust Input Trim** if needed:
    - If peaks are below -12 dBFS: increase Input Trim (signal too quiet)
    - If peaks are above 0 dBFS: decrease Input Trim (signal too hot)

Signal Level Effects

Input Level	Effect on Amp
Hot (above -6 dBFS)	More saturation, earlier breakup, compressed response
Normal (-6 dBFS)	Authentic amp response matching real hardware
Quiet (below -12 dBFS)	Cleaner tones, more headroom, less distortion

> **Pro Tip:** If you're using active pickups (like EMG), they output hotter signals. You may need to reduce Input Trim by -6 to -12 dB to match the calibration reference.

5. Features Overview

Amp Panels

AmpBender has three main panels that can be expanded or collapsed:

- **Left Panel:** Input controls, gain stages, and EQ
- **Center Panel:** Circuit modifications (Variac, Bias, Tubes)

- **Right Panel:** Patchbay, output controls, and cabinet section

Input/Output Meters

Real-time level meters with color-coded indicators:

- **Green**: Safe zone (below -12 dB)
- **Yellow**: Caution zone (-12 dB to -6 dB)
- **Red**: Danger zone (-6 dB to 0 dB and above)

Spectrum Analyzer

31-band real-time frequency analyzer showing the output signal. Toggle on/off to save CPU when not needed.

6. Controls Reference

Input Section

Control	Range	Description
Input Trim	-24 to +24 dB	Adjust input level before amp stages
Preamp Gain	0-11!	Drive the preamp tubes for distortion
Bass	0-10	Low frequency EQ
Mid	0-10	Midrange frequency EQ
Treble	0-10	High frequency EQ
Presence	0-10	High frequency enhancement
Master Volume	0-11!	Power amp drive and final output level

Circuit Mods (Center Panel)

Control	Description
Variac	Simulates voltage sag (90-120V). Lower values create compression and warmth
Bias	Adjust tube bias (cold to hot). Affects headroom and saturation character
Tube Selection	Choose from different preamp tube voicings

Output Section

Control	Description
Output Trim	Final output level adjustment (-24 to +24 dB)
AutoGain	Automatically compensates for gain changes (see Section 7)
Oversampling	**7 modes:** 1X RT, 2X RT, 2X OL, 4X RT, 4X OL, 8X RT, 8X OL **RT (Realtime):** Available during playback **OL (Offline):** Only during bounce/export for maximum quality Higher oversampling reduces aliasing at high gain but increases CPU usage
Cabinet IR	Select included cabinet impulse response or load custom IR

7. Signal Routing & Patchbay

The modular patchbay allows you to customize the signal flow between circuit stages. Each node represents a point in the amp circuit:

Available Nodes

- **Input:** Guitar signal entry point
- **Preamp 1-3:** Gain stages
- **Tone Stack:** EQ section
- **Phase Inverter:** Push-pull driver
- **Power Amp:** Output tubes
- **Cabinet:** Speaker simulation
- **Output:** Final output

Making Connections

1. Click on an output jack to start a cable
2. Click on an input jack to complete the connection
3. Cable colors indicate signal type (audio, control)
4. Right-click a cable to remove it

> **Note:** Unusual routing can create feedback loops. Use the Output Trim to manage levels.

8. AutoGain Feature

AutoGain automatically adjusts the output level to compensate for gain changes, making preset comparisons easier and preventing unexpected volume jumps when adjusting amp settings.

Status LED Indicator

A status LED above the AutoGain toggle shows the current state:

LED State	Color	Meaning
Off (Dark)	⚫	AutoGain is disabled
Blinking	🟡	Calibrating - measuring output level (5 seconds)

Solid	🟢	Locked - gain compensation is active and stable

How It Works

1. Enable AutoGain by clicking the toggle
2. Play your guitar - the LED blinks yellow during the 5-second calibration window
3. Once calibration completes, the LED turns solid green (Locked)
4. The compensation gain stays locked until you change amp parameters

Recalibration Triggers

AutoGain will recalibrate (LED returns to blinking yellow) when:

- Preamp Gain changes by more than 5%
- You toggle AutoGain off then on

> **Recording Tip:** AutoGain automatically locks when your DAW is recording, preventing any gain fluctuation during takes. The LED will show solid green immediately when recording starts, even if calibration wasn't complete.

9. Preset Management

Loading Presets

1. Click the preset name in the toolbar
2. Browse factory presets by category
3. Click to load a preset
4. Use arrow buttons for quick prev/next navigation

Saving Presets

1. Adjust controls to your desired sound

2. Click the Save button (or use your DAW's preset system)
3. Name your preset and choose a category

User Presets Location

```
macOS: ~/Library/Application Support/Heath Audio/AmpBender/Presets/
Windows: %APPDATA%\Heath Audio\AmpBender\Presets\
```

10. Troubleshooting

Plugin doesn't appear in DAW

- **macOS:** Remove quarantine with `xattr -rd com.apple.quarantine`
- **Windows:** Ensure VST3 is in the correct folder
- Rescan plugins in your DAW

High CPU usage

- Reduce Oversampling to 1x or 2x
- Disable the Spectrum Analyzer when not needed
- Collapse the Circuit Mods panel

No sound

- Check input/output routing in your DAW
- Ensure Input Trim and Output Trim are not at minimum
- Check the patchbay connections

GarageBand issues

AmpBender is sandbox-safe for GarageBand. If it doesn't load:

- Restart GarageBand
- Re-install the AU component
- Check System Preferences > Security & Privacy

11. Uninstallation

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macOS

Run the included **Uninstall AmpBender** application from your Applications folder, or manually delete:

```
# Plugin files
rm -rf ~/Library/Audio/Plug-Ins/VST3/AmpBender.vst3
rm -rf ~/Library/Audio/Plug-Ins/Components/AmpBender.component

# User data (optional - removes presets)
rm -rf ~/Library/Application\ Support/Heath\ Audio/AmpBender/

# Cache files
rm -rf ~/Library/Caches/AmpBender/
rm -rf ~/Library/Caches/com.Heath\ Audio.AmpBender/
```

Windows

Use **Add or Remove Programs** in Windows Settings to uninstall AmpBender, or manually delete:

```
:: Plugin files
del /s /q "C:\Program Files\Common Files\VST3\AmpBender.vst3"

:: User data (optional - removes presets)
rmdir /s /q "%APPDATA%\Heath Audio\AmpBender"
```

12. Support & Contact

Getting Help

We use GitHub Issues to track bug reports, feature requests, and support questions. This provides a transparent and organized way to manage feedback.

How to Report an Issue

1. Visit the AmpBender GitHub Issues page
2. Click "New Issue"
3. Choose a template: **Bug Report** or **Feature Request**
4. Fill in the requested information
5. Submit and we'll respond as soon as possible

What to Include in Bug Reports

- Your operating system and version (e.g., macOS 14.2, Windows 11)
- Your DAW and version (e.g., Studio One 6.5)
- Plugin format (VST3, AU, or Standalone)
- Steps to reproduce the issue
- What you expected to happen vs. what actually happened

Contact Information

- **Email:** jasonlnheath@gmail.com
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- **GitHub:** github.com/jasonlnheath/AmpBender

> **Version:** 1.0.16
> **Release Date:** December 2025
> **System Requirements:**
> - macOS 10.13+ (Intel or Apple Silicon)
> - Windows 10+ (64-bit)

> - 4 GB RAM minimum
> - VST3 or AU compatible DAW (AAX coming soon)
