

COD WAVES

BASSXTEND

DYNAMIC BASS ENHANCER — USER MANUAL



Version 1.0 · 2026

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1. Introduction

1.1 What BassXtend does

BassXtend is a psychoacoustic bass generator. It does not boost low frequencies. It listens to the band below a frequency you choose — the **Root** — and synthesises a series of harmonics *above* that frequency, built from the notes actually being played and loudness-matched to the band they stand in for.

The ear does the rest. Given a complete set of upper harmonics, hearing reconstructs the missing fundamental, so a bass line keeps its weight and its pitch on a phone, a laptop, a pair of earbuds or a small monitor — devices that cannot physically reproduce the fundamental at all. Because nothing is added below the Root, the effect survives systems that roll the bottom off entirely, and it does not eat headroom on the systems that do have bottom.

1.2 When to reach for it

- Bass lines and 808s that vanish on phones, laptops and earbuds
- Kick drums that need weight without more low-end energy in the mix
- Mixes that must translate to small speakers, TV sets and car systems
- Voice and dialogue that need chest and body through a small transducer
- Bass guitar that needs presence in a busy arrangement without turning it up
- A parallel sub send, using only the generated series (see **Low Band**, 6.1)

1.3 What it is not

BassXtend is not an EQ, not a saturator, and not a sub-harmonic synthesiser. It adds nothing below the Root, it does not multiply or divide pitch, and it does not distort the source signal — the harmonics it produces are tuned to the note being played and are generated in a separate path that carries no copy of the original bass.

In simple terms: BassXtend makes bass audible on speakers that have no bass, by adding harmonics above the bass instead of energy below it.

2. Installation

2.1 System requirements

	Windows	macOS
Operating system	Windows 64-bit (x64)	macOS 10.13 or newer (Intel & Apple Silicon)
Formats	VST3, AAX	VST3, AU, AAX
Host	Any DAW that supports one of the formats above, running mono or stereo tracks	
Internet	Required for activation (an offline activation path is available, see 3.2)	

2.2 Plugin formats and locations

Run the installer and follow its steps. The installer places the plugin binaries in the standard system locations, where every DAW looks for them:

- **Windows:** `C:\Program Files\Common Files\VST3` (VST3) and `C:\Program Files\Common Files\Avid\Audio\Plug-Ins` (AAX)
- **macOS:** `/Library/Audio/Plug-Ins/VST3`, `/Library/Audio/Plug-Ins/Components` (AU) and `/Library/Application Support/Avid/Audio/Plug-Ins` (AAX)

After installation, rescan your plugins in the DAW if it does not pick BassXtend up automatically. BassXtend appears under **Codwaves > BassXtend**.

3. Activation & Licensing

3.1 Activating online

The first time you open BassXtend on a new machine, the plugin shows a license panel over the interface with a single **Activate License** button. There is no serial number to type — activation runs through your Codwaves account in the browser:

1. Click **Activate License**, then **Activate BassXtend** (secure browser sign-in).
2. Your default browser opens on the Codwaves portal. Sign in to your account and confirm the activation for this computer. The plugin shows *"Complete sign-in in browser..."* while it waits.
3. When the portal confirms, the plugin unlocks immediately — no restart needed. The panel reports *"Product activated successfully."* together with your account e-mail.

The browser request stays valid for a few minutes. If it expires, the plugin shows *"Timed out, please try again!"* — simply click Activate again.

3.2 Offline activation

For studio machines without internet access, choose the **offline handoff** on the activation panel:

1. **Create a device request** — the plugin saves a signed request file (`bassxtend_OfflineActivation.dt`) for this computer, by default on the Desktop.
2. Move that file to any internet-connected device, open the Codwaves activation portal, and follow its steps. The portal gives you back a Codwaves access file (`.cw`).
3. Bring the access file back to the studio machine and drop it on the target area of the third step (or double-click the area to browse for it). The plugin unlocks on the spot.

3.3 Background validation and the grace period

Once activated, BassXtend revalidates its license quietly in the background. If your computer is temporarily offline or the license server cannot be reached, nothing changes for you: the plugin keeps working through a **14-day grace period** and shows a message with the exact deadline if the problem persists. Once the machine is online again, validation succeeds silently and the counter resets.

If validation keeps failing although the computer is online, a proxy, VPN, or firewall is usually in the way. Allow outbound HTTPS to `codwaves.com`, disable the proxy/VPN for a moment, or contact support with the

message shown. Also keep automatic clock synchronisation on — a system clock that jumps backwards forces a fresh online validation.

3.4 Before activation

Until the plugin is activated, BassXtend does not pass audio. Everything else keeps working: presets load and save, the interface is fully usable, and your DAW sessions are never blocked — session state always saves and restores correctly, so anything you set up before activating is preserved.

3.5 Managing your machines

Licenses are bound to your Codwaves account with a per-machine seat count. You add, review and release machines from your account page at codwaves.com — for example before migrating to a new computer. The activated panel also carries a **Deactivate** button, which releases this computer's seat directly from the plugin.

The local license is stored at:

- **Windows:** `%APPDATA%\Codwaves\bassxtend\license.cw`
- **macOS:** `~/Library/Codwaves/bassxtend/license.cw`

3.6 Update notifications

When a newer version of BassXtend is available, a small badge appears in the top-right corner of the plugin: *"New Update Available — Download v..."*. Click **Download** to get the installer, **Skip this build** to hide the badge until the next release, or close it for the session. The badge fades out by itself after a few seconds.

4. Quick Start

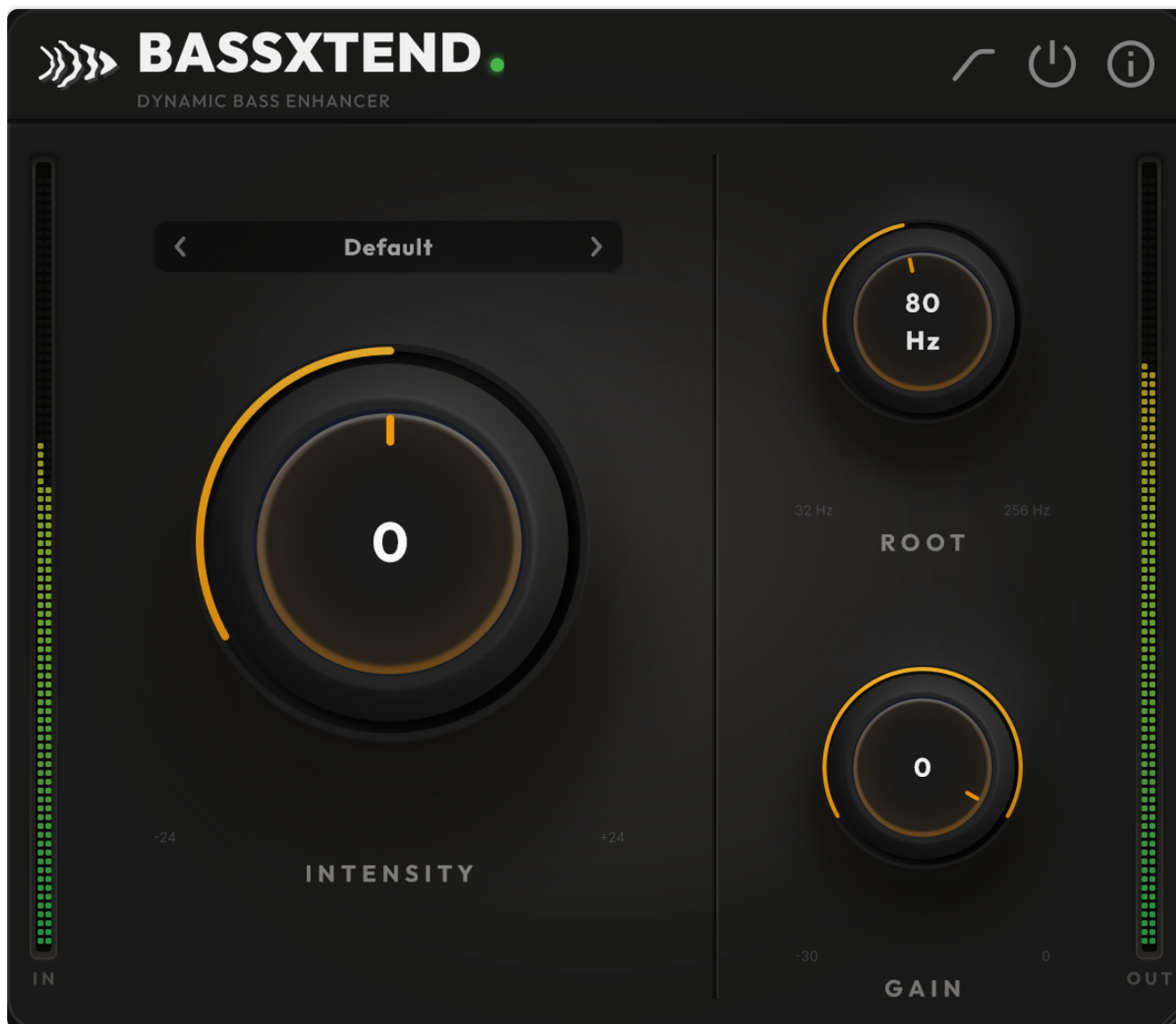
1. Insert BassXtend on the bass, kick, 808 or bus you want to translate. It works in mono and in stereo, and it adds no latency, so its position in the chain is free.
2. Play the busiest part of the material.
3. Set **Root** near the fundamental of what you are treating — around 40–60 Hz for an 808 or a kick, 70–90 Hz for a bass guitar, 90–130 Hz for a voice. Everything below Root is analysed; everything BassXtend generates sits above it.
4. Leave **Intensity** at **0 dB** to begin with. That is not "off" — it is the calibrated point at which the generated series matches the loudness of the band it stands in for.
5. Check the effect on a small speaker, a phone, or by filtering your monitoring below 100 Hz. That is the system the plugin exists for; on full-range monitors the change is deliberately subtle.
6. Adjust **Intensity** from there, usually by a few dB in either direction. Use **Gain** to match the output level back to the input before you judge it.



The *808 & Sub* factory preset: Root under the note, Intensity restrained.

A little Intensity goes a long way. Large positive settings raise the perceived bass level, but they also push the output stage into its loud regime, which is where the plugin starts to add colour. That is sometimes what you want — just do it on purpose.

5. The Interface at a Glance



BassXtend has five controls and nothing else. Reading the panel from the outside in:

- **Header** — the brand and status dot on the left; the **Low Band** switch, the **Bypass** power switch and the **Info** button on the right (section 6).
- **IN and OUT meters** — stereo segmented meters down the two outer edges (section 8).
- **Preset bar** — the pill above the big knob: previous, current preset name, next (section 9).
- **Intensity** — the large knob, the level of the generated harmonics (section 7.2).
- **Root and Gain** — the two smaller knobs to the right of the divider (sections 7.1 and 7.3).

Every knob draws its own value on its face, so the readout can never disagree with what the host is automating. Every control has a tooltip: hover for a second and it explains itself.

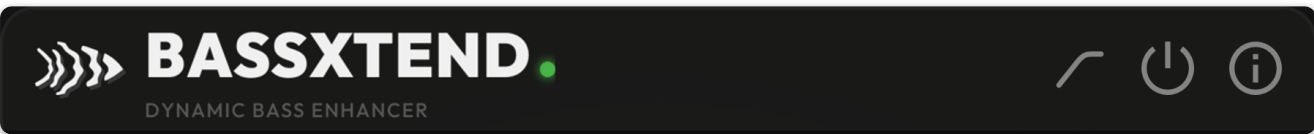
5.1 Resizing

Drag the bottom-right corner of the plugin window. BassXtend scales from 75 % to 200 % of its 600 × 520 design size, at a fixed aspect ratio, and the layout never reflows — everything simply gets bigger or smaller together. The size is remembered with the session.

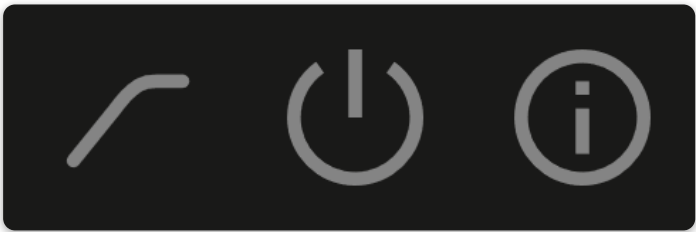
5.2 Working with the controls

Action	Result
Drag a knob up/down or left/right	Change its value
Ctrl / Cmd + drag	Fine adjustment
Double-click a knob	Return it to its default
Mouse wheel over a knob	Step the value
Hover over anything	Tooltip explaining the control

6. Header Bar



The header: brand and status dot on the left, Low Band, Bypass and Info on the right.



6.1 Low Band

The left-hand icon — a low-cut curve — decides what happens to the original band *below* the Root.

State	Icon	What you get
In (default)	unlit	The original band below Root is kept and summed with the generated harmonics. This is the normal way to use the plugin: the sound is unchanged on a full-range system and gains weight on a small one.
Out	lit	The original band below Root is dropped, leaving only the generated harmonics. Use it to audition exactly what BassXtend is adding, to build a parallel sub send, or to free low-end headroom on a system that cannot use it.



Low Band Out — the switch lights.

In simple terms: Low Band In is the normal mode. Low Band Out lets you hear — or send — only what BassXtend generates.

The crossover halves sum flat, so switching Low Band In changes nothing about the dry path: with Intensity all the way down and Low Band In, BassXtend is transparent.

The *Sub Send* factory preset is the one preset that ships with Low Band Out.

6.2 Bypass

The power icon bypasses the processing. Because the plugin has zero latency, bypass is a true comparison — there is no delay to compensate and nothing shifts in time when you toggle it.

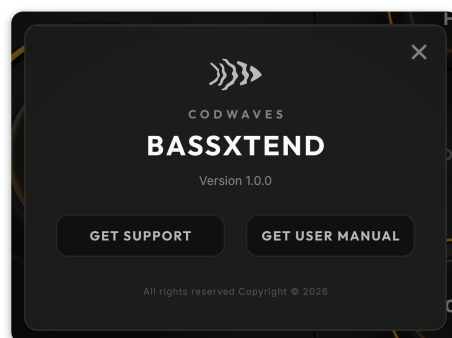


Bypass engaged.

The meters keep reading while bypassed, showing the signal passing through untouched.

6.3 Info

The circled *i* opens the info card: the Codwaves mark, the product name, the exact build you are running, and two buttons — **Get Support** and **Get User Manual** — which open the relevant page at codwaves.com in your browser. Click the cross, press `Esc`, or click anywhere outside the card to close it.



7. The Controls

Three knobs, and the Low Band switch already covered in 6.1. That is the whole parameter set.

7.1 Root



32 Hz – 256 Hz, default 80 Hz. Root is the crossover: the top of the band BassXtend analyses, and the bottom edge of the series it generates. The knob shows the frequency in hertz on its face; the taper is exponential, so the low end of the range gets as much travel as the high end.

Set it near the fundamental of the part you are treating. Too low and there is little energy in the analysed band, so there is little to build from. Too high and the generated harmonics start above the region the ear uses to reconstruct the note, which makes the plugin loud rather than weighty.

Material	Starting point
808s, sub-heavy synths	40 – 55 Hz
Kick drum	55 – 70 Hz
Bass guitar, electric bass	70 – 90 Hz
Singing voice	90 – 110 Hz
Spoken voice, dialogue	110 – 130 Hz
Full mix for small-speaker translation	150 – 200 Hz

In simple terms: Root is where the bass stops and the generated harmonics start. Put it near the note.

7.2 Intensity

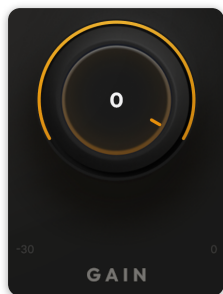
–24 dB – +24 dB, default 0 dB. Intensity sets the level of the generated harmonics. **0 dB is not off.** It is the calibrated reference: the point at which the generated series is placed within a couple of decibels of the loudness of the band it replaces. Half the useful settings sit below it.

Negative values give a discreet reinforcement that keeps the source's own character; positive values push the series forward and, past a few dB, start to engage the output stage's loud regime, which adds colour as well as level (see 10.3). Both are legitimate — the first is translation, the second is an effect.



In simple terms: Intensity is how much of the generated bass you hear, measured from a reference that already matches the original.

7.3 Gain



–30 dB – 0 dB, default 0 dB. Gain is the output trim. It only attenuates — it cannot boost — because the plugin's job is to add perceived weight, not level, and a control that could push the output up would make every A/B comparison flattering by accident.

Use it to match the output back to the input before you decide whether the processing is helping. The OUT meter next to it is there for exactly that.

In simple terms: Gain brings the output back down so you can compare fairly.

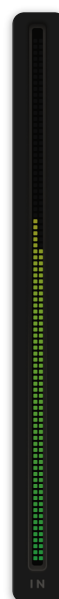
8. The Meters

Two stereo segmented meters run down the outer edges of the panel: **IN** on the left, **OUT** on the right. Each has one column per channel, lit from the bottom, with a peak-hold fall-back so a short transient stays readable.

They span **–48 dB to +6 dB** and ramp from green at the bottom through yellow to orange at the top. IN reads the signal arriving at the plugin; OUT reads what actually leaves it — after Intensity, after Low Band, after Gain and after the licence gate, so what you see is what the next plugin gets.

Their most useful job is the level match. Set Intensity, then pull Gain down until the OUT peaks sit where the IN peaks do. Anything you still prefer after that is a real preference and not a loudness illusion.

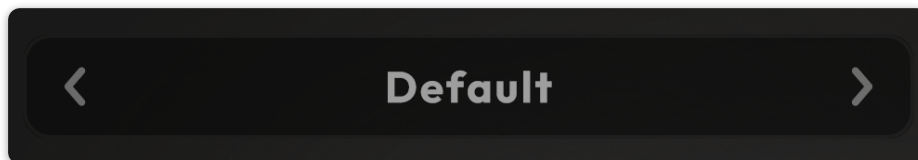
Segments lighting at the very top mean the output is running near full scale. BassXtend's output stage has deliberate rails modelled on the hardware-era behaviour it reproduces; if you are hearing hardness rather than weight, lower Intensity before you lower Gain — Gain moves the level, Intensity moves how hard the stage is driven.



IN and OUT.

9. Presets

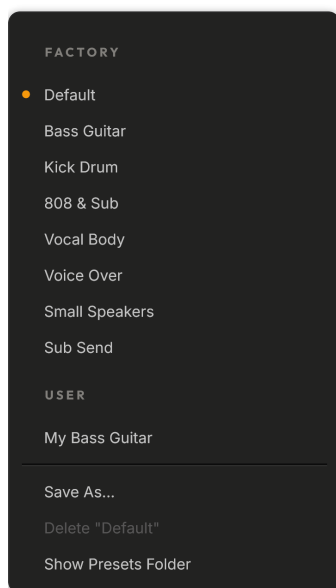
9.1 The preset bar



The recessed pill above the Intensity knob is the whole preset control:

- < and > step through the library — factory presets first, then your own — wrapping at both ends.
- Clicking the **name** opens the list.
- An asterisk after the name (Bass Guitar *) means the sound no longer matches the preset you loaded. Nothing is lost; it is simply telling you that you have moved something.

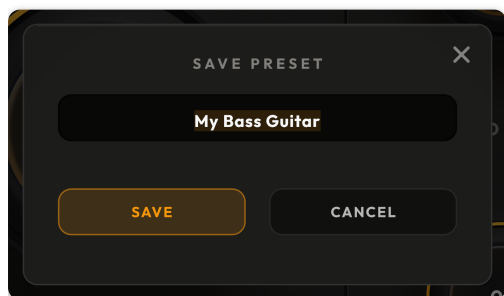
9.2 The preset list



The list is grouped: **Factory** first, then **User** once you have saved something of your own. The current preset carries a dot. Under the separator:

- **Save As...** — opens the save card (9.3).
- **Delete "..."** — removes the current preset. Greyed out for factory presets; they cannot be deleted or overwritten.
- **Show Presets Folder** — opens the user preset folder in Explorer or Finder, so presets can be backed up, shared or moved between machines by copying files.

9.3 Saving your own



Type a name and click **SAVE**, or press Enter. The card warns rather than surprises:

- An empty name is refused.
- A factory name is refused — factory presets are read-only.
- An existing user name warns once and turns the button into **OVERWRITE**, so no preset of yours is ever replaced by a single click.

Press Esc, click **CANCEL**, or click outside the card to close it without saving.

A preset stores the four sound parameters — Root, Intensity, Gain and Low Band. It deliberately does not store Bypass: recalling a preset never silently bypasses the plugin, and never un-bypasses it either.

9.4 Factory library

The factory presets are starting points sized off real material rather than invented. Note how many of them sit *below* Intensity 0 — that is the calibrated reference, not the floor.

Preset	Root	Intensity	Gain	Low Band	For
Default	80 Hz	0 dB	0 dB	In	The parameter defaults; a neutral place to start
Bass Guitar	85 Hz	−2 dB	−0.5 dB	In	Electric and acoustic bass
Kick Drum	60 Hz	−5 dB	−0.5 dB	In	Kick weight that survives small speakers
808 & Sub	45 Hz	−4 dB	−1 dB	In	808s and sub synths, where the fundamental is furthest below what a phone can reproduce
Vocal Body	95 Hz	−9 dB	0 dB	In	Chest weight on a lead vocal — a small, low move
Voice Over	120 Hz	−6 dB	−0.5 dB	In	Speech, above the male speaking fundamental
Small Speakers	190 Hz	+4 dB	−1 dB	In	The translation case: a high crossover, because a small speaker gives up long before 80 Hz does
Sub Send	55 Hz	+5 dB	−9 dB	Out	A parallel send carrying only the generated series

9.5 Where presets live

User presets are plain `.bxpreset` files. Copy them between machines freely.

- **Windows:** `%APPDATA%\Codwaves\BassXtend\Presets`
- **macOS:** `~/Library/Audio/Presets/Codwaves/BassXtend`

10. How BassXtend Works

10.1 Signal flow

A 3rd-order Butterworth crossover splits the input at Root — **-3 dB exactly at the set frequency**, about 18 dB per octave. The two halves sum to an allpass, so with Low Band In the dry path stays magnitude-flat.

1. The band below Root is highpassed at Root/3 and fed to the generator.
2. The generator is a recursive multiplicative loop: each pass turns an N th harmonic into an $(N+1)$ th, so the partials it produces are tuned to the note being played rather than being broadband distortion. At default settings five to six harmonics sit above -60 dB, falling roughly 5.7 dB per harmonic order.
3. A highpass inside the loop removes DC and difference tones before they can be multiplied up again — measured 77 dB below the wanted harmonics on two simultaneous bass notes.
4. A ceiling inside the loop caps the harmonic group, which is why the generator never needs oversampling: nothing in the loop can climb toward Nyquist.
5. The result is highpassed at Root, loudness-trimmed (10.2), summed with the band above Root and, if Low Band is In, with the band below it, and finally passed through the output stage (10.3) and Gain.

The output is tapped before the fundamental is re-injected into the loop, so the generated signal contains no copy of the original bass — measured within 0.7 dB of the crossover's own leakage at every setting.

10.2 Loudness matching

A raw harmonic generator is nearly silent on quiet bass and violent on loud bass, because an N th harmonic scales as the N th power of the input. BassXtend matches the generated series to the loudness of the band it stands in for, using an expansion ratio derived from **ISO 226:2003** equal-loudness contours and computed per tracked fundamental — 1.53 at 35 Hz falling to 1.28 at 140 Hz — rather than one fixed constant.

Two consequences you can hear:

- **Transients survive.** About half a decibel per decibel of the generated envelope is instantaneous and never passes through a detector, so attacks stay sharp.
- **The stereo image holds.** Detection is linked across channels with a per-channel trim: a 6 dB input balance comes out as a 6.2 dB balance. An anti-phase input produces no generated signal at all.

10.3 The output stage

Past a hinge, the wet signal grows roughly a decibel per decibel of low-band level, capped at +3 dB, and Intensity is applied inside that servo rather than after it. That is why pushing Intensity adds colour and not only level, and why the plugin sounds like the hardware-era processing it reproduces when it is driven hard. It is deliberate. If you want the clean regime, keep Intensity modest and use Gain for level.

10.4 Latency, CPU and sample rates

Property	Value
Latency	Zero. All IIR, no lookahead, no oversampling — safe anywhere in the chain, including live and while tracking
Tail	0.3 s
Processing	32-bit float, TPT state-variable filters
Sample rates	All host rates. Validated at 44.1 / 48 / 96 kHz, with drift ≤ 0.06 dB rms against the 48 kHz reference across 120 matched settings
Buffer sizes	Bit-exact across host buffer sizes and across transport reset — the sound does not depend on your DAW's buffer setting
Channels	Mono and stereo

11. Common Workflows

11.1 Making a bass line translate

1. Load **Bass Guitar** or **808 & Sub** depending on the source.
2. Set Root to the fundamental of the part — if in doubt, start at the preset's value and move it until the effect is strongest for the least Intensity.
3. Monitor on a small speaker or a phone. Raise Intensity until the line is clearly present there, then go back to your main monitors and check you have not made the low end busier.
4. Trim Gain so IN and OUT peak alike, and bypass to confirm.

11.2 Weight on a kick without more low end

Load **Kick Drum**. Root around 55–70 Hz, Intensity negative to start. Because nothing is added below Root, the kick gains attack-aligned weight without competing with the bass for the same headroom. If the kick and bass are fighting, treat one of them and leave the other alone.

11.3 A parallel sub send

1. Send the bass to an aux and insert BassXtend on it.
2. Load **Sub Send**, or set **Low Band** to **Out** yourself — only the generated series leaves the plugin.
3. Blend the aux under the dry bass. The send carries no copy of the original band, so the two never phase against each other.

11.4 Body on voice and dialogue

Load **Vocal Body** for singing or **Voice Over** for speech. These sit well below Intensity 0 on purpose: a voice shows harmonic dressing long before a bass guitar does. Move Root, not Intensity, if the effect sounds wrong before it sounds loud.

11.5 Small-speaker translation on a bus or master

Load **Small Speakers**. The high Root (190 Hz) is the point: a laptop speaker or a phone gives up long before 80 Hz, so the harmonics have to start higher to be reproduced at all. Keep Intensity conservative on a full mix and always check the result on full-range monitors as well — this preset is tuned for the device that cannot, not the one that can.

11.6 Auditioning what is being added

Switch **Low Band** to **Out**. What you hear is exactly what BassXtend is generating, with the original band removed. Switch it back to In when you are done — it is a listening tool, not usually a mix setting.

12. Practical Tips

- **Judge it on the system it is for.** On full-range monitors a correct setting is almost invisible. On a phone it is the difference between a bass line and no bass line.
- **Intensity 0 is the reference, not the floor.** Most of the factory library sits below it.
- **Move Root before you move Intensity.** Most "it sounds wrong" problems are a Root set away from the fundamental, not a level problem.
- **Match the level before you decide.** Gain only attenuates precisely so that a comparison cannot be won by being louder.
- **One instance per problem.** Treating both kick and bass with large settings puts two generated series in the same region; treat the one that needs it.
- **Nothing is added below Root.** If you need more actual low end, that is an EQ job — this plugin deliberately will not do it.
- **Zero latency means position is free.** Before or after compression, on a track or on a bus, live or offline — it never shifts the signal in time.

13. Troubleshooting

I cannot hear any difference

Check on a small speaker or a phone first — that is what the effect is for. Then check Root: if it sits far from the fundamental of the part, there is little energy in the analysed band to build from. Switching **Low Band** to **Out** tells you immediately whether anything is being generated at all.

It sounds distorted or harsh

Lower Intensity. Past a few decibels above 0 the output stage enters its loud regime by design and adds colour; that is the modelled behaviour, not a fault. Lowering Gain will not help, because Gain acts after the stage — Intensity is what drives it.

The low end got muddy

Root is probably too high, so the generated series is landing in the low mids. Bring Root down toward the fundamental. If several instances are running on overlapping material, remove all but the one that needs it.

The bass disappeared

Low Band is switched to **Out** — the original band below Root is being dropped. Switch it back to In unless you are deliberately building a parallel send.

The output is quieter than the input

Check Gain. It only attenuates, and a preset may have loaded a trim (most factory presets carry a small one).

The preset name shows an asterisk

That means the live parameters no longer match the preset you loaded. Nothing is wrong — save it under a new name if you want to keep it, or reload the preset from the list to go back.

No sound at all

If the licence panel is showing, the plugin is not activated and does not pass audio (see 3.4). Otherwise check Bypass and the host's own routing.

Activation messages

Message	Meaning / what to do
"Complete sign-in in browser..."	Finish the login in the browser window that opened.
"Timed out, please try again!"	The browser request expired — click Activate again.
"Online validation failed ... grace period expired"	Connect the computer to the internet so the licence can revalidate.
"System clock rollback detected"	Fix the system date/time (enable automatic sync) and go online once.

14. Parameter Reference

The host-visible parameter names are on the left; the captions printed on the panel are in brackets where they differ.

Parameter	Range	Default	Notes
Frequency (<i>ROOT</i>)	32 – 256 Hz	80 Hz	Crossover: top of the analysed band, bottom edge of the generated series. Exponential taper
Intensity	–24 – +24 dB	0 dB	Level of the generated harmonics. 0 dB is the calibrated reference, not "off"
Out Gain (<i>GAIN</i>)	–30 – 0 dB	0 dB	Output trim. Attenuates only
Low Band	In / Out	In	Keep or drop the original band below Root. Header switch
Bypass	Off / On	Off	Latency-free dry passthrough. Header switch; not stored in presets

All five parameters are automatable and are stored with the session. The editor size is stored with the session as well; it is not a parameter.

BassXtend — Dynamic Bass Enhancer
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