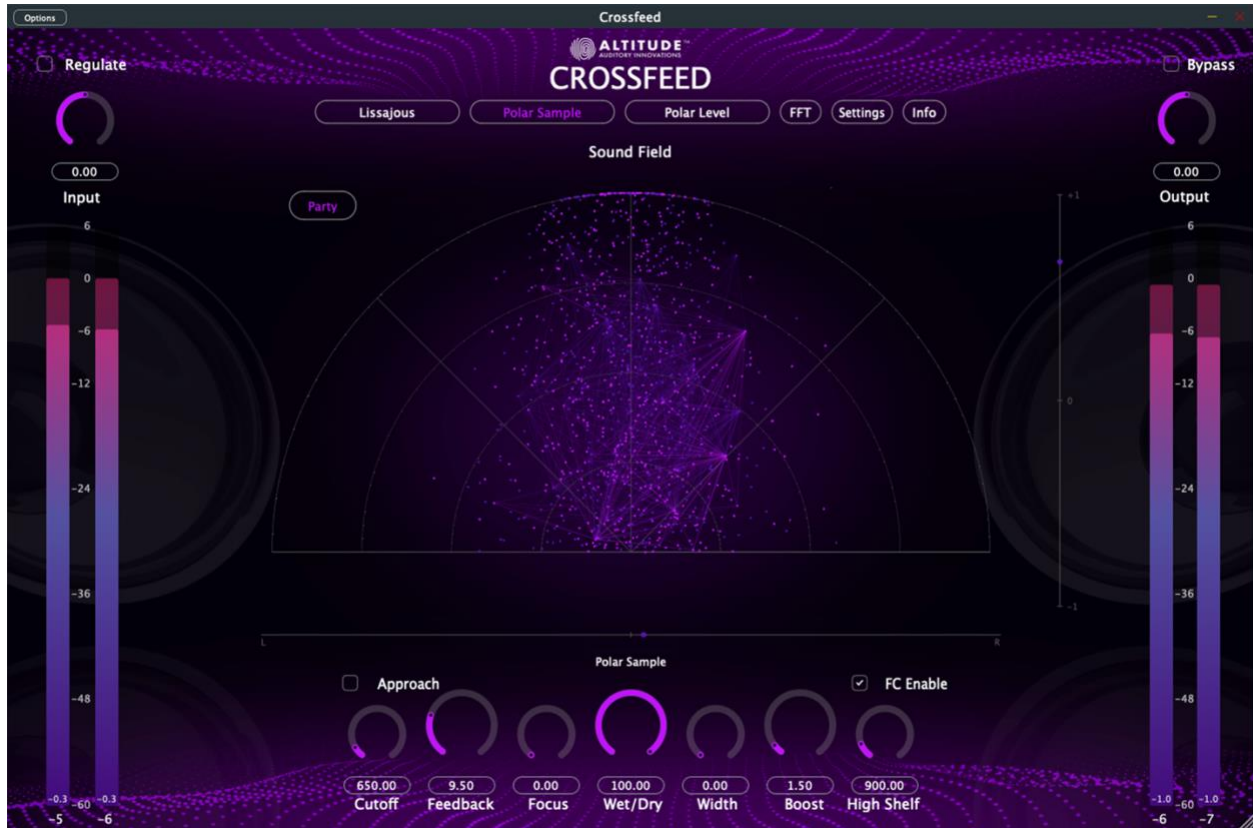


Crossfeed | User Manual
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Contact Altitude at:

Altitude Discord Server: <https://discord.gg/9yb7hcEsmG>

General Email: contact@Altitude.Audio

Website: <https://altitude.audio>

TABLE OF CONTENTS

Overview	4
Installation and Resource Locations	4
Installation Overview	4
Installation Paths	4
Support	4
Quick Start Guide.....	4
Installation and Setup	4
First-Time Configuration.....	4
Basic Workflow	5
Standalone Application Setup.....	5
User Interface.....	6
Resizing the Interface.....	6
Bypass Button	6
Saving Your Settings	7
DAW Plugin Presets:.....	7
Standalone Application State:	7
Factory Presets.....	7
Main View Controls.....	7
Core Parameters	8
Signal Flow Controls	8
Processing Parameters	9
Advanced Controls.....	9
Visualization Modes.....	10
Lissajous Vectorscope	10
Polar Sample Vectorscope	10
Polar Level Vectorscope.....	11
FFT (Spectrum) View.....	11
Settings View	12
Preset Management	12

Vectorscope Settings	12
FFT Analysis Settings	12
Auto Gain Settings	12
Metering	13
Input Metering	13
Output Metering	13
Processing Modes	13
Regulated Mode	13
Unregulated Mode	13
Assist Mode (Unchecked Default)	13
Direct Mode (Checked)	14
Signal Path	14
Parameter Interactions	14
Cutoff and Feedback	14
Focus and Width	14
Highshelf and Boost	14
Troubleshooting	15
Common Issues	15
Performance Optimizations	15
Known Limitations	15
Additional Tips	16
Best Practices	16
Creative Uses	16
Virtual Audio Devices (VADs)	16
Technical Specifications	16
Mac:	17
Windows:	17
Sample Rates:	17
Supported Hosts:	17
Audio Routing:	17

OVERVIEW

Crossfeed is a sophisticated audio processing plugin that provides advanced stereo field manipulation and visualization tools. It allows for precise control over stereo imaging while providing real-time visual feedback through multiple visualization modes.

INSTALLATION AND RESOURCE LOCATIONS

INSTALLATION OVERVIEW

Crossfeed's installation package includes the standalone application, CrossfeedPlugin, and the VST3 plugin for both macOS and Windows platforms.

INSTALLATION PATHS

- **macOS:** Installed files can be accessed at /Applications /CrossfeedPlugin
- **Windows:** Installed files can be accessed at C:\Program Files\Altitude\products\CrossfeedPlugin

SUPPORT

If you encounter any issues during authorization, please reach out to Altitude Support at Contact@Altitude.Audio for assistance.

QUICK START GUIDE

INSTALLATION AND SETUP

1. Install the plugin in your preferred format (VST3 or AUv3)
2. Launch your DAW and scan for new plugins
3. Insert CrossfeedPlugin on your master bus or individual tracks
4. Start with the NATURAL preset for subtle crossfeed

FIRST-TIME CONFIGURATION

1. Begin with Regulate ON for automatic gain control
2. Use Assist approach initially for simplified, modern crossfeed behavior
3. Monitor the input/output meters to ensure proper gain staging
4. Try different visualization modes to understand your stereo field

BASIC WORKFLOW

1. Set input level for optimal signal strength
2. Adjust Cutoff frequency to control crossfeed range
3. Use Feedback to set crossfeed intensity
4. Fine-tune with Focus and Width controls
5. Enable FC (Frequency Compensation) if needed

STANDALONE APPLICATION SETUP

Using CrossfeedPlugin with a Virtual Audio Device (VAD):

1. Install a Virtual Audio Device:
 - Use the VAD included with ARIA Studio (Mac)
 - Or download any compatible VAD for your system
2. Configure Audio Settings:
 - Open the standalone CrossfeedPlugin application
 - Click the Settings button
 - Select your VAD as the Input Device
 - Select your physical audio interface/headphones as the Output Device
 - Set Buffer Size based on your needs:
 - Lower (256) for minimal latency
 - Higher (512-1024) for better CPU performance
3. System Audio Routing:
 - Set your system audio output to the VAD input
 - CrossfeedPlugin will process this audio
 - Processed audio goes to your physical output device
4. Start with these settings:
 - 44.1 kHz sample rate
 - 512 samples buffer size
 - Assist mode (default)
 - Regulate enabled
5. Optimize for your use:
 - Reduce buffer size if you notice latency
 - Increase buffer size if you hear glitches
 - Adjust sample rate to match your audio sources
6. Tips for VAD Usage:
 - Keep the standalone application running while using system audio
 - Use the Regulate feature to prevent any unexpected volume changes
 - Monitor CPU usage and adjust buffer size accordingly--Watch FFT graphs for lag as proxy measurement

- Save your preferred settings for quick setup

USER INTERFACE

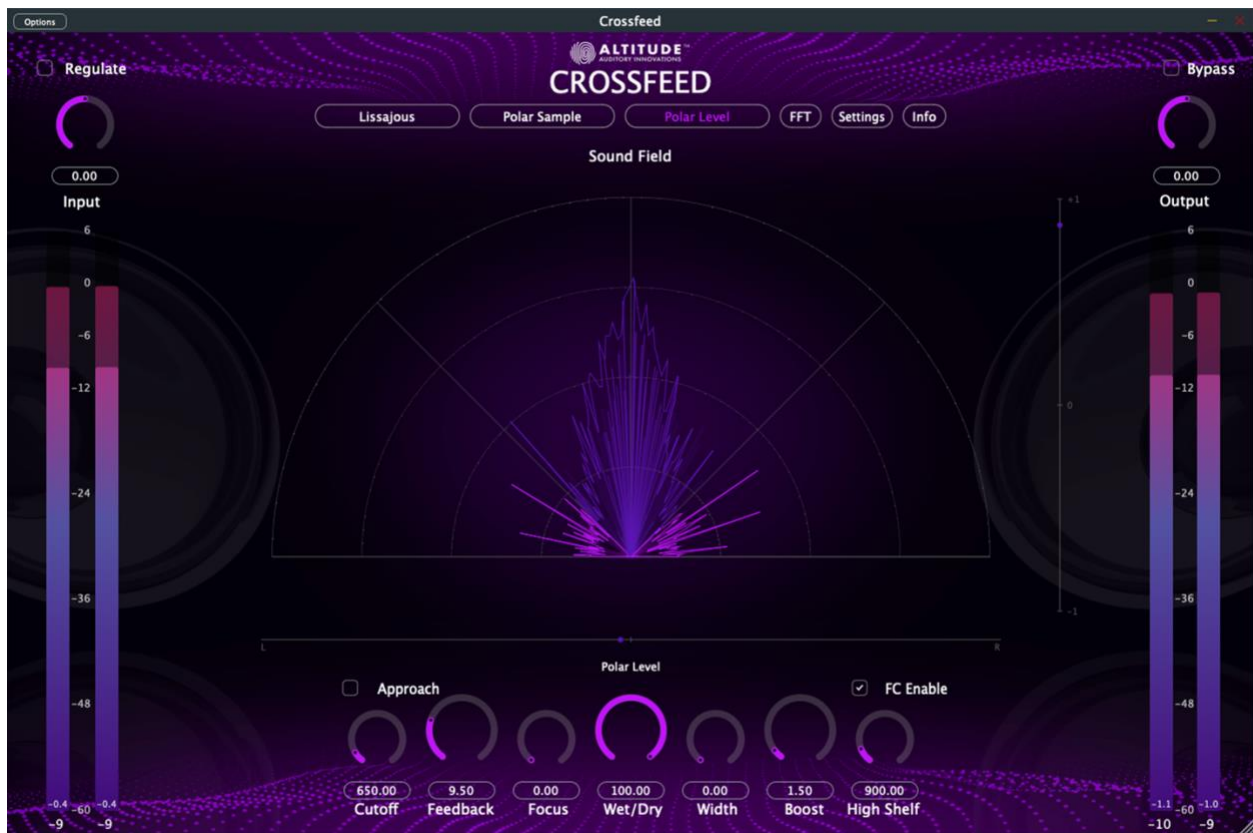
RESIZING THE INTERFACE

To adjust the size of ARIA's window, drag the lower right corner to your desired dimensions, with some limitations. Cmd + click on interface to toggle through different UI sizes.

BYPASS BUTTON

Check the BYPASS button to disable (bypass) DSP processing.

This control is useful for A/B testing between processed and unprocessed audio, allowing you to directly hear the effect.



SAVING YOUR SETTINGS

DAW PLUGIN PRESETS:

1. Use your DAW's VST3 or AUv3 preset management system:
 - Save current state as a preset
 - Name and categorize your presets
 - Access presets from any project
 - Presets are stored in your DAW's preset folder

STANDALONE APPLICATION STATE:

1. Use the standalone app's save state feature:
 - Access the settings menu and select SAVE STATE
 - Navigate to your Music folder
 - Save the state file

FACTORY PRESETS

The following presets are included and cannot be overwritten:

- **MOYish**
- **NATURAL**
- **TBD-A** (You and the community will determine these soon)
- **TBD-B** (You and the community will determine these soon)

MAIN VIEW CONTROLS

- **Lissajous:** Displays the stereo field as a 2D oscilloscope plot
- **Polar Sample:** Shows instantaneous stereo information in polar coordinates
- **Polar Level:** Displays the stereo field energy distribution with two colors for in and out of phase content
- **FFT (Spectrum):** Shows real-time frequency analysis
- **Settings:** Access to advanced configuration options
- **Info:** Shows plugin information and documentation



CORE PARAMETERS

SIGNAL FLOW CONTROLS

1. **Input** (-20dB to +20dB, default: 0dB)
 - Adjusts the input gain before processing
 - Useful for preventing clipping or compensating for quiet sources
2. **Output** (-20dB to +20dB, default: 0dB)
 - Controls the final output level after processing
 - Use to match processed signal level with bypass level or in unregulated mode
3. **Wet/Dry** (0% to 100%, default: 100%)
 - Blends between unprocessed (dry) and processed (wet) signal

- Allows for parallel processing techniques

PROCESSING PARAMETERS

1. **Cutoff** (20Hz to 8000Hz, default: 700Hz)
 - Sets the crossfeed filter's cutoff frequency
 - Lower values create more mono bass, higher values affect more of the spectrum
 - Highly dependent on feedback setting
2. **Feedback** (6dB to 20dB, default: 6dB)
 - Controls the amount of cross-channel bleeding
 - Higher values create a more blended stereo image
3. **Highshelf** (20Hz to 8000Hz, default: 950Hz)
 - Frequency above which high-frequency compensation is applied
 - Helps maintain stereo width in higher frequencies
 - Set very low for dramatic effect (e.g., 20Hz)
4. **Boost** (1dB to 10dB, default: 2dB)
 - Amount of high-frequency compensation
 - Counteracts natural high-frequency attenuation in Crossfeed

ADVANCED CONTROLS

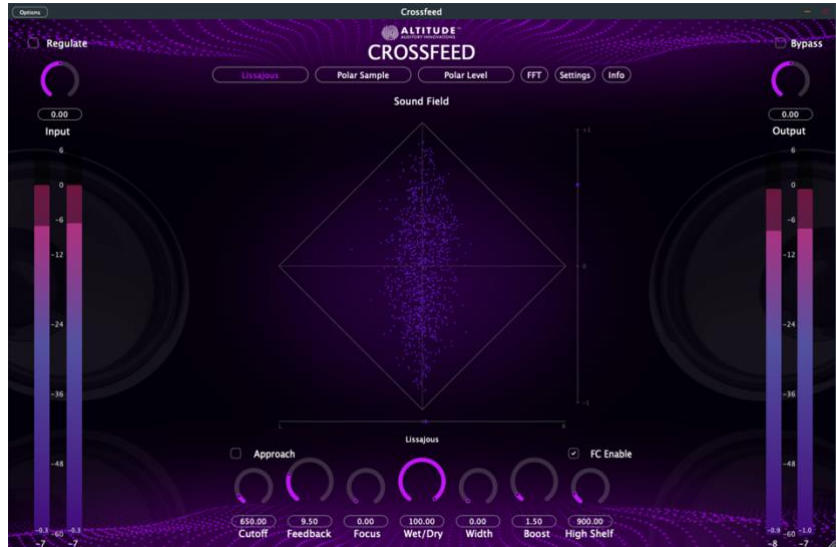
1. **Regulate (On/Off)**
 - Enables automatic gain regulation
 - Prevents output clipping while maintaining the signal level
 - Disable to hear more pronounced crossfeed effects
2. **Bypass (In/Out)**
 - Toggles all processing on/off
 - Useful for A/B comparison
3. **Approach (Direct/Assist)**
 - Direct (Checked): Traditional crossfeed processing
 - Assist (Unchecked): Simplified, modern approach
4. **Enable FC (On/Off)**
 - Enables frequency compensation cutoff control, otherwise it's automated
 - Adjusts spectral balance when crossfeed is active
5. **Focus (0-100%)**
 - Controls stereo image focus
 - Higher values create a more focused center image
6. **Width (0-100%)**
 - Adjusts the final stereo width
 - Values above 0% enhance stereo separation

VISUALIZATION MODES

LISSAJOUS VECTORSCOPE

The Lissajous plot displays the relationship between left and right channels in real-time. Mathematically, it plots L vs R where:

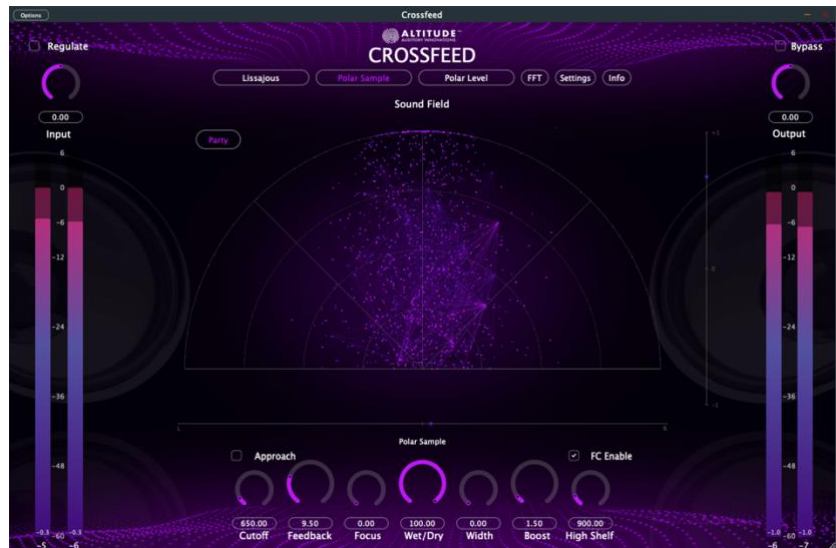
- X-axis represents the left channel amplitude
- Y-axis represents the right channel amplitude
- Vertical line at 0 indicates mono content
- Diamond patterns indicate stereo content
- Width of the pattern indicates stereo spread



POLAR SAMPLE VECTORSCOPE

Displays instantaneous stereo information in polar coordinates where:

- Angle (θ) represents stereo position: 0° (left) to 180° (right)
- Radius (r) represents amplitude
- Center points indicate mono content
- Outer points show stereo separation
- Two modes available:
 - Default: Standard polar representation
 - Party: Enhanced visualization with color mapping



POLAR LEVEL VECTORSCOPE

Shows the energy distribution across the stereo field using polar coordinates:

- Radius represents energy at each stereo position
- Angle represents pan position
- Integration over time provides averaged stereo field visualization



FFT (SPECTRUM) VIEW

Real-time frequency analysis display showing:

- Y-axis Range: Configurable amplitude range in dB
- X-axis: Frequency (Hz, logarithmic scale)
- **Stereo:** Independent L/R spectrum
- **Left/Right:** Individual channel analysis
- **Middle:** (L+R)/2 content
- **Sides:** (L-R)/2 content



SETTINGS VIEW

PRESET MANAGEMENT

- **MOYish:** Modeled after the Moy Crossfeed preset
- **NATURAL:** Subtle crossfeed for natural listening
- **TBD-A:** Holding spot for preset A; yet to be defined
- **TBD-B:** Holding spot for preset B; yet to be defined

VECTORSCOPE SETTINGS

- **Peak:** Shows instantaneous peak values
- **RMS:** Shows averaged RMS values



FFT ANALYSIS SETTINGS

- **FFT Size:** Window size for FFT analysis (1024-16K points)
- **Window Type:** Selection of FFT window functions
- **Averaging:** Temporal smoothing of FFT display
- **Attack:** Response time to level increases
- **Release:** Response time to level decreases

AUTO GAIN SETTINGS

- **Block Size:** Analysis block size for gain computation
- **Overlap:** Block overlap percentage
- **Peak Smooth:** Peak detector smoothing
- **RMS Smooth:** RMS detector smoothing
- **Release:** Gain reduction release time

METERING

INPUT METERING

Monitors the signal at the plugin input:

- **Peak meters** show instantaneous maximum levels
- **RMS meters** show average power levels
- Calibrated in dB with industry-standard ballistics

OUTPUT METERING

Displays the processed signal levels:

- **Peak meters** show instantaneous maximum levels
- **RMS meters** show average power levels
- Calibrated in dB with industry-standard ballistics

PROCESSING MODES

REGULATED MODE

- Automatically maintains consistent output levels
- Recommended for most situations
- Ideal for:
 - Master bus processing
 - Full mixes
 - Complex material

UNREGULATED MODE

- Manual control over levels
- Use when:
 - Precise control is needed
 - Processing individual tracks
 - Creative effects are desired

ASSIST MODE (UNCHECKED DEFAULT)

- Modern, simplified implementation
- Automatically manages parameter relationships

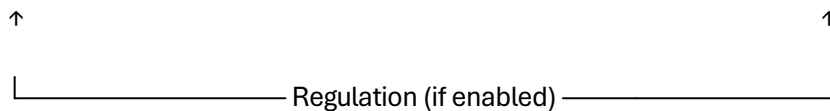
- Provides controlled, natural-sounding results
- Default mode when Direct is unselected

DIRECT MODE (CHECKED)

- Traditional crossfeed implementation
- Enables more extreme parameter settings
- Allows for more pronounced crossfeed effects
- Activated by selecting Approach parameter

SIGNAL PATH

Input → Gain Stage → Crossfeed Network → High Shelf EQ → Width Control → Output Gain → Output.



PARAMETER INTERACTIONS

CUTOFF AND FEEDBACK

- Lower Cutoff → Can use more Feedback
- Higher Cutoff → Use less Feedback
- Sweet spot: 700Hz/12dB for most material

FOCUS AND WIDTH

- High Focus + Low Width = Centered image
- Low Focus + High Width = Spacious sound
- Balanced settings preserve stereo field

HIGHSHELF AND BOOST

- Higher Cutoff → Less Boost needed
- Lower Cutoff → More Boost may help
- FC enables automatic adjustment

TROUBLESHOOTING

COMMON ISSUES

1. High CPU Usage:
 - Increase buffer size
 - Use smaller FFT size
 - Reduce window overlap
2. Unexpected Gain Changes:
 - Check Regulate setting
 - Verify input levels
 - Monitor peak meters
 - Adjust input/output gain
3. Stereo Image Issues:
 - Verify Bypass state
 - Check Width setting
 - Confirm Focus level
 - Monitor in Lissajous view

PERFORMANCE OPTIMIZATIONS

1. FFT Display Settings:
 - Size: 1024 for general use
 - Size: 4096+ for detailed analysis
 - Reduce averaging for CPU savings
 - Adjust averaging rate if lagging
2. Auto Gain Settings:
 - Block Size: 512 samples
 - Overlap: 256 typical
 - Peak Smooth: 0.9
 - RMS Smooth: 0.9
 - Release: 0.150

KNOWN LIMITATIONS

- Maximum sample rate: 192kHz
- Minimum display size: 760x650
- CPU usage scales with FFT size & number of channels
- Visualization update rate dependent on system performance

ADDITIONAL TIPS

BEST PRACTICES

- Start with presets
- Make small adjustments
- Use appropriate visualization
- Monitor in multiple views
- A/B test with Bypass

CREATIVE USES

- Individual track processing
- Bus processing
- Master bus treatment
- Sound design
- Spatial effects

VIRTUAL AUDIO DEVICES (VADS)

Each virtual audio device (VAD) offers unique features and capabilities. Below are our recommended options based on your operating system:

macOS Recommended VADs:

- **ARIA-Audio-VAD:** Included with ARIA Studio.
- **BlackHole 2ch** Virtual Audio Device: An excellent choice for routing audio between applications without latency.
- **Loopback** by Rogue Amoeba: Provides more complex routing capabilities and allows for multiple audio channels and devices to be configured with ease.

Windows Recommended VADs:

- **HiFi Cable & ASIO Bridge** by VB-Audio: Ideal for high-fidelity audio transfers and integrating with ASIO-supported applications.
- **VB-Cable** Virtual Audio Device by VB-Audio: A straightforward solution for routing audio between applications.

TECHNICAL SPECIFICATIONS

MAC:

CPU: Apple Silicon M1 and newer for Arm64 versions or Intel Core i5 / i7 / i9 / Xeon W 2013 and up for x86 versions

Memory Minimum: 8 GB RAM (16 GB recommended) 16 GB free disk space on the system drive

Operating System: macOS Catalina 10.15, Big Sur 11, Monterey 12, Ventura 13, or Sonoma 14

Screen Resolution:

Minimum: 1280x1024 / 1600x1024

WINDOWS:

CPU: X64 compatible Intel or AMD CPU

Memory Minimum: 8 GB RAM (16GB recommended) 16 GB free disk space on the system drive

Operating System: Windows 10 64 bit, Windows 11

Screen Resolution:

Minimum: 1024x768

Recommended: 1280x1024 / 1600x1024

SAMPLE RATES:

Both the plugin and standalone app support sample rates ranging from 44.1 kHz to 786 kHz.

SUPPORTED HOSTS:

Digital Audio Workstations (DAW) that support VST3 plugins will host Crossfeed.

AUDIO ROUTING:

Whether you're on the standalone app or the plugin in a DAW, you'll want a virtual audio cable for routing.

Try options like BlackHole, Loopback, or HiFi Cable & ASIO Bridge by VB Cable.