ADAM SZABO

AIRWAVE



USER MANUAL 1.0.0

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1. Introduction

1.1 Welcome

Thank you very much for using Airwave! Airwave is a meticulously crafted VST plugin that brings the unmistakable character of a classic late-'90s rackmount synthesizer into your DAW. Designed for producers and sound designers seeking lush pads, soaring leads, and deep, evolving textures, Airwave recreates the magic of dual-layer synthesis with precision and flexibility.

At its core, Airwave captures the essence of classic virtual analog synthesis, featuring rich oscillator waveforms, including the highly sought-after Super Saw, alongside dynamic multi-mode filtering, flexible modulation, and an intuitive control layout. Each sound layer operates together or independently, giving you the power to craft intricate, evolving tones with precision, with 10 voices for each layer.

The engine is written in optimised code to use as little CPU consumption as possible, while maintaining a high quality sound engine, finding a good balance between the two.

1.2 System Requirements

Windows Vista or higher with SSE2 support (or higher). A 32 or 64-bit compatible DAW or Host.

1.3 Installation

Airwave is available in 3 different plugin versions:

VST2.4 32-bit: Airwave.dll

VST2.4 64-bit: Airwave (64).dll

VST3 64-bit: Airwave (64).vst3

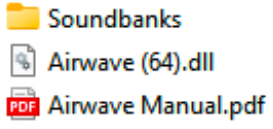
Installing Airwave is very easy, simply extract the entire 'Airwave' folder into your correct VST folder location, and then scan for the new plugin.

Consult your DAW or Host where the VST folders are located, but usually it is best to copy the **VST2.4 32-bit** Airwave to: **C:\Program Files (x86)\VstPlugins\Airwave**

The **VST2.4 64-bit** to: **C:\Program Files\VstPlugins\Airwave**

The **VST3 64-bit** usually goes to: **C:\Program Files\Common Files\VST3\Airwave**

Make sure the rest of the folders that contain data are located where the VST plugin file is, as that is where it will look for them. Do not copy them to a different folder from the VST file, otherwise it will not find the data. This is how it should look like (using the 64-bit .dll version for example):



1.4 Registration

Once you start your host, insert Airwave and follow the on-screen instructions. Enter your name and serial number into the text fields (you can use Ctrl + C to copy and Ctrl + V to paste) and click 'Register' to activate your license. Remove the current instance of Airwave from the host, and insert it again. If everything went well, the activation was successful and Airwave has been unlocked. If the registration window appears again, the data was incorrect and must be entered once more.

1.5 Troubleshooting

If your DAW or Host does not find Airwave, cannot load it, or otherwise shows an error of some kind, you might be missing the **Visual C++ Redistributable Package 2013**. Please download and install **vcredist_x64.exe** for the **64-bit**, and **vcredist_x86.exe** for the **32-bit** version:

https://www.microsoft.com/en-us/download/details.aspx?id=40784

If that still did not help, there might be other packages missing on your system. You can try installing an all in one package with all the different Redistributable Packages available:

https://www.techpowerup.com/download/visual-c-redistributable-runtime-package-all-in-one

2. Basic Operation

2.1 Interface and Controls

Airwave is a multi-layer synth, and has a very clean and logical layout of the interface. Each section of the synthesizer; oscillators, filters, envelopes, LFOs, and effects, are organized visually for intuitive navigation and quick patch editing.



The controls of Airwave consists of buttons and selectors that can be clicked, and knobs which can be controlled by dragging up and down in a vertical motion, or by using the **mouse wheel** to move it one step at a time. Knobs can either be unipolar, its values usually ranging from 0-127 or bipolar, ranging from -64 to +63, where the center position is +0. Holding the SHIFT key while dragging enables you to have higher accuracy and fine tune the control.

Double clicking, or clicking on the knob while holding the CTRL key, resets it to its default position.

Some parameters that are not applicable to the current function or mode are automatically disabled. These inactive controls appear



transparent or dimmed, indicating that they are not having any effect on the sound.

2.2 MIDI Learn

Most knobs on Airwave can be controlled with MIDI Control Changes (CC). You can easily assign a MIDI CC to a knob by right clicking on the parameter and selecting **'Midi Learn'**. The selected knob will wait for a MIDI input. If you want to cancel the assignment, right click on the knob again and select **'Stop Midi Learn'**. Once the knob is waiting for a MIDI input, and you turn a parameter on your MIDI controller, the knob will be assigned to that CC number. The assigned knob will be linked to that MIDI CC indefinitely in all Airwave instances, until you remove the link by right clicking on the knob again and selecting **'Remove Midi CC #7'** for example. To clear and remove all learned MIDI links, you can select **'Reset Midi CC'** from the main menu.

2.3 Loading and Saving Presets/Banks

In Airwave, the presets are saved in standard Cubase .fxp, and banks (containing 128 presets) in .fxb format. You can load or save banks from Airwave's main menu: **Load Bank (.fxb)** or **Save Bank (.fxb)**. To load or save individual presets, select **Load Preset (.fxp)** or **Save Preset (.fxp)**. You

can also copy and paste presets using the menu. When you load or paste a preset, it will be loaded to the currently selected program number. To rename a preset, left click the main display. To cancel editing, press the Esc key, or click anywhere outside the edit box. To accept the change press Enter. If you would like to start a preset from scratch and load all the parameters default setting, select the Init Preset from the menu.

2.4 Central Controls

The bottom center of Airwave's interface contains several essential controls and features that are central to its operation. This area includes the main display, layer and key mode selectors, synchronization options, and the browser and menu controls.



Main Display:
The Main Display in Airwave shows the currently selected patch number and its name. When you hover over a parameter, the display temporarily shows the parameter's name and value, ideal for making precise adjustments.

Left-clicking on the display allows you to rename the current patch, while right-clicking opens a dropdown list of all available presets within the loaded sound bank.

The Preset buttons beside the display let you quickly switch to the next or previous preset in the current sound bank.

LAYER:
Each Airwave patch contains two independent layers: LOWER and UPPER. These layers can be used separately or combined to create richer, more complex sounds.

The LOWER and UPPER buttons select which layer's parameters you are currently editing. If you press LAYER LINK, the indicator will light up, and you can simultaneously edit the parameters of both Layers. This is useful, for example, when moving the Filter Cutoff of both layers simultaneously. You can also Copy and Paste the entire layer to one another from the LAYER COPY button.

KEY MODE:
The **Key Mode** determines how the two layers respond when you play the keyboard:

- **SINGLE:** Only one layer (UPPER or LOWER) will generate sound.
- **DUAL:** Both UPPER and LOWER layers sound together for a thicker and more complex tone.
- **SPLIT:** The keyboard is divided at a specified **SPLIT POINT**, with the LOWER layer sounding below it and the UPPER layer above.

SPLIT POINT:
When in Split mode, this sets the note where the keyboard is divided. This allows you to play two distinct sounds from a single instance of Airwave, for example, a bass on the left and a pad on the right.

FX MODE:
Each layer has its own dedicated effects chain (Tone Control, Chorus, Delay, and Reverb). However, you can choose to share a single effects chain between both layers:

- **Per Layer:** Each layer uses its own independent effects section (default).
- **Combined (L):** Both layers are routed through the Lower layer's effects chain. The Lower layer's effect parameters will remain visible and active regardless of which layer is selected for editing.

PB RANGE:
When you move the pitch bend lever on a MIDI keyboard, the pitch of the notes being played will smoothly change. The bend range, that is, the extent of pitch variation, can be adjusted in semitone steps, up to a maximum of ±24 semitones (±2 octaves).

DOWN: Specifies the amount of pitch decrease when the pitch bend lever is pulled downward.

UP: Specifies the amount of pitch increase when the pitch bend lever is pushed upward.

SYNC Settings:
LFO 1: Determines whether LFO 1 **RATE** follows the host tempo:

- **OFF:** LFO 1 rate is free-running, based on its **RATE** knob.
- **1/16 – 8/1:** LFO 1 rate is synchronized to the host tempo, cycling at the chosen rhythmic interval.

DELAY: Controls whether DELAY TIME is synchronized to the host tempo:

- OFF: Delay time operates freely according to the TIME knob setting.
- 1/16 – 1/2: Delay is tempo-synced, producing echoes at rhythmic divisions of the beat.

MULTI-FX: Specifies how the Chorus Rate is synchronized:

- OFF: Chorus speed is free-running according to the selected Multi-FX type.
- 1/16 – 8/1: Chorus modulation rate is synchronized to the host tempo.
- LFO 1: Chorus modulation rate follows the speed of LFO 1.

Layer Settings:

LAYER TRANSPOSE: Shifts the pitch of the selected layer by up to ±2 octaves without changing your keyboard fingering. This is useful for matching key signatures with other instruments, or for creating harmonic intervals (such as 4ths or 5ths) between the UPPER and LOWER layers in DUAL mode.

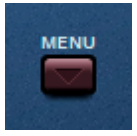
PATH GAIN: When playing in Mono or Legato mode, only one voice is active at a time, which can make the sound appear quieter compared to polyphonic playback. PATCH GAIN compensates for this difference by increasing the overall output level. A setting of +6 dB doubles the amplitude, while +12 dB quadruples it compared to 0 dB.

ENV MODE: The ENV MODE setting determines how note transitions behave, especially in Mono, Legato, or Unison modes, by simulating analog envelope behaviour:

- Standard: Each new note starts from zero envelope level.
- Analog: Each new note continues from the previous envelope's state, mimicking the natural 'carryover' behavior found in vintage analog synthesizers.

2.5 Main Menu

The Main Menu in Airwave holds a few different important functions like managing sounds, and changing the GUI size:



- **Soundbanks:** If you have several .fxb banks in the 'Soundbanks' folder where the Airwave VST file is located, one can can easily and conveniently load these soundbanks within Airwave.
- **Load Bank (.fxb):** Loads a soundbank in .fxb format.
- **Save Bank (.fxb):** Saves a soundbank in .fxb format.
- **Load Preset (.fxp):** Loads a preset in .fxp format.
- **Save Preset (.fxp):** Saves a preset in .fxp format.
- **Import .mid .syx .pat .pfm Bank:** Imports patches made for the hardware unit.
- **Init Preset:** Initializes all the parameters to their default values.
- **Restore Preset:** Restores the currently loaded preset's parameters to their original values.
- **Copy Preset:** Copes the preset to a temporary folder.
- **Paste Preset:** Loads the copied preset from the temporary folder.
- **Reset Midi CC:** Removes all Midi CC assignment.
- **GUI Size:** Changes the size of Airwave from a selection of pre-defined values. It is also possible to change the size by dragging the bottom right corner. Right clicking the corner resets to the original size.
- **User Manual:** Opens this manual.
- **adamszabo.com:** Opens the Adam Szabo website in the internet browser.
- **About...:** Displays the 'About' window.

2.6 Pitch Bend, Mod and Master



MODULATION:
The MODULATION section in the top right corner of Airwave's interface hosts two controls, the PITCH-B (Pitch Bend) and the MOD-W (Mod Wheel). The Pitch Bend right is used to temporarily shift the pitch up or down. When released, it automatically snaps back to the center position. It can also be controlled by MIDI as well. Using the PB RANGE selectors you can specify the bend range in semitones when Pitch Bend control is turned up or down.

The Modulation control beside the Pitch Bend, is used as a modulation source for any type of modulation. It is assigned by default to control the depth of parameters in the LFO 2 section, but can also be assigned in the CONT ASSIGN to control all kinds of parameters in the patch. The Mod control can also be changed with a MIDI keyboard, and is assigned to the MIDI CC#1 by default.

MASTER:
On the top right corner of the interface is the master VOLUME control. It sets the volume of Airwave's audio output after all the effects, and is the last control in the signal chain. It can be used to increase the main volume or reduce it to complete silence. In the center position (64) there is no gain applied.

3. Oscillator Section



The oscillators are the heart of any synthesizer, this is where the sound waves are created. Airwave has two sound generation sources: a main oscillator (OSC1), and a secondary oscillator (OSC2). These can be combined in many different ways to create a vast array of sounds.

3.1 Oscillator 1

The OSC 1 section provides controls for Airwave's primary oscillator. WAVE selects one of seven available oscillator types, while the two accompanying parameters adjust characteristics unique to the selected waveform:

- SUPER SAW: A legendary oscillator made up of seven sawtooth waveforms played simultaneously, ideal for creating rich and thick sounds.
  DETUNE: Controls how far each sawtooth is detuned from the central pitch. Turning the knob to the right increases detuning, resulting in a wider, more spacious sound.
  MIX: Adjusts the balance between the central waveform and the detuned voices. Turning the knob to the right increases the level of the detuned waves, making the sound thicker and more powerful.

- TRIANGLE MOD: A modified triangle wave rich in overtones, producing a bright, edgy tone. Because the harmonic energy is concentrated in the upper frequencies rather than the fundamental, the result is somewhat like a square wave with a high-pass filter applied.
  OFFSET: Determines how much the triangle waveform is reshaped. Turning the knob to the right increases the distortion, adding more overtones and brightness.
  LFO 1 DEPTH: Controls how strongly LFO 1 modulates the Offset parameter. Increasing this value makes the waveform variation from the LFO more pronounced.

- NOISE: Generates a key-tracked, filtered noise, allowing you to produce a range of noise 'colors' by shaping the spectrum with a low-pass filter.
  CUTOFF: Sets the cutoff point of the low-pass filter. Turning the knob to the right allows more high frequencies through, resulting in brighter noise and higher volume. The cutoff also tracks keyboard pitch: higher notes produce higher cutoff frequencies, and lower notes produce lower ones.
  RESONANCE: Controls the emphasis around the cutoff frequency. Turning the knob to the right increases the resonance, making the noise more tonal. At maximum, the sound approaches a sine wave.

- FEEDBACK OSC: Produces a tone reminiscent of electric guitar feedback, ideal for aggressive, cutting sounds.
  HARMONICS: Adjusts the tonal character and harmonic content.
  FEEDBACK: Controls how much feedback is applied, influencing the intensity and level of the harmonics.

- SQUARE: A classic waveform often used in synthesizer leads and bass tones.
  PWM: Adjusts the duty cycle (or width) of the square wave. Turning the knob to the right alters the waveform's symmetry, adding more overtones and changing the tone color.
  LFO 1 DEPTH: Determines how much LFO 1 modulates the pulse width, this technique is called Pulse Width Modulation (PWM). Turning the knob to the right increases the modulation depth, producing a richer and more animated sound.

- SAWTOOTH: A fundamental waveform used in countless instrument types. It's versatile and forms the basis of many classic synthesizer sounds.
  SHAPE: Controls the amount of deformation applied to the sawtooth wave. At the extremes, the waveform has a strong fundamental, great for thick basses. In the center position, it becomes thinner, resembling a high-pass–filtered tone.
  LFO 1 DEPTH: Sets how strongly LFO 1 modulates the Shape parameter. Turning the knob to the right increases the modulation intensity.

- TRIANGLE: A simple waveform with minimal overtones, used for smooth, flute-like sounds.
  SHAPE: Adjusts how much the triangle waveform is distorted. Turning the knob to the right increases the harmonic content, making the sound closer to a filtered square wave.
  LFO 1 DEPTH: Controls how much LFO 1 affects the Shape parameter. Turning the knob to the right increases modulation depth, resulting in more movement and variation in tone.

3.2 Oscillator 2

The OSC 2 section provides controls for Airwave's secondary oscillator. **WAVE** selects one of four available oscillator types, while the two accompanying parameters adjust characteristics unique to the selected waveform:

- **SQUARE:** A classic waveform often used in synthesizer leads and bass tones.
  PWM: Adjusts the duty cycle (or width) of the square wave. Turning the knob to the right alters the waveform's symmetry, adding more overtones and changing the tone color.
  LFO 1 DEPTH: Determines how much LFO 1 modulates the pulse width, this technique is called Pulse Width Modulation (PWM). Turning the knob to the right increases the modulation depth, producing a richer and more animated sound.

- **SAWTOOTH:** A fundamental waveform used in countless instrument types. It's versatile and forms the basis of many classic synthesizer sounds. (No parameters are available for this waveform type.)

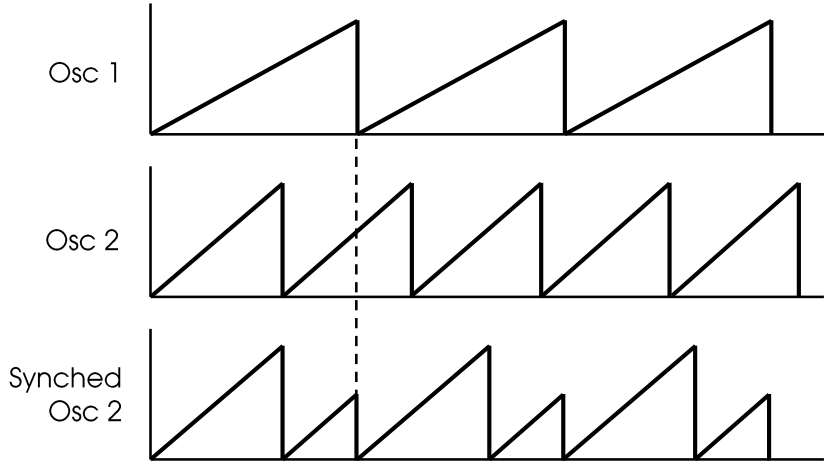
- **TRIANGLE:** A simple waveform with minimal overtones, used for smooth, flute-like sounds. (No parameters are available for this waveform type.)

- **NOISE:** Generates a non-key-tracked, filtered noise, allowing you to produce a range of noise 'colors' by shaping the spectrum with a low-pass filter.
  CUTOFF: Sets the cutoff point of the low-pass filter. Turning the knob to the right allows more high frequencies through, resulting in brighter noise and higher volume. Unlike the noise for oscillator 1, the cutoff frequency will not change, regardless of the key that you play
  RESONANCE: Controls the emphasis around the cutoff frequency. Turning the knob to the right increases the resonance, making the noise more tonal. At maximum, the sound approaches a sine wave.

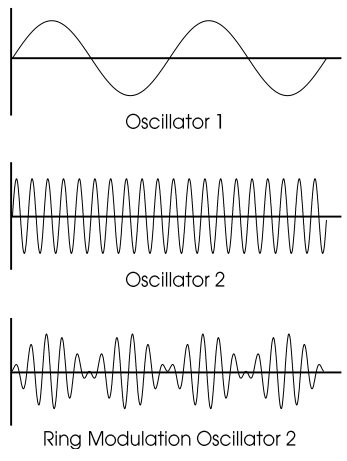
RANGE:
Sets the pitch offset of **OSC 2** relative to **OSC 1**, across a range of ±24 semitones (two octaves). Turning the knob to the right raises OSC 2's pitch; turning it to the left lowers it. At the center position (0), both oscillators play at the same pitch. When the RANGE knob is set to **–WIDE** or **+WIDE**, the **FINE/WIDE** control expands the pitch range to ±48 semitones (four octaves). In this mode, make sure the RANGE knob is turned fully left or right to enable the extended range.

FINE/WIDE:
When the RANGE setting is between –24 and +24, this control provides fine-tuning of up to ±50 cents (half a semitone) around the pitch set by the RANGE knob. Turning it to the right raises OSC 2's pitch slightly; turning it to the left lowers it. At the center position, the pitch matches the RANGE setting exactly. If the RANGE knob is set fully left (–WIDE) or fully right (+WIDE), this control switches to wide mode, allowing coarse tuning over a range of ±4 octaves. Turning the knob left lowers the pitch; turning it right raises it.

SYNC:
Toggles oscillator synchronization on or off. When enabled, the indicator lights up and OSC 2 produces a rich, harmonically complex sound. Sync is most effective when OSC 2's pitch is set higher than OSC 1's. When sync is on, OSC 2's waveform is forcibly reset every time OSC 1's waveform completes a cycle. This synchronization creates sharp, complex waveforms and distinctive overtone structures that are characteristic of classic 'sync' sounds.



RING:
Enables or disables the ring modulator. When turned on, the indicator lights and the sound becomes more metallic and bell-like. The ring modulator multiplies the waveforms of OSC 1 and OSC 2, generating new frequencies that combine and interact to produce rich, inharmonic overtones not present in either oscillator alone. The result is often a dissonant or unpitched timbre. The resulting sound is output through OSC 2. If the ring modulation effect seems faint, increase the OSC BALANCE toward OSC 2 in the OSC COMMON section.



3.3 Oscillator Common

OSC BALANCE:
Controls the mix between **OSC 1** and **OSC 2**. Turning the knob to the left increases the level of OSC 1; turning it to the right increases the level of OSC 2. When centered, both oscillators play at equal volume.

OSC SHIFT:
Shifts the overall pitch of the oscillators in one-octave steps. This lets you play notes above or below your MIDI keyboard's normal range which is useful when adjusting a single patch within a Dual or Split setup. Press **–OCT** to lower the pitch by octaves, or **+OCT** to raise it by octaves.

X-MOD DEPTH:
Controls the amount of **Cross Modulation**, where **OSC 2** modulates the frequency of **OSC 1** to create complex, metallic tones and sound effects. Turning the knob to the right increases modulation depth, producing more intense and harmonically rich results. Cross Modulation has no effect if OSC 1 WAVE is set to SUPER SAW or NOISE. If the modulation effect is hard to hear, adjust the **OSC BALANCE** toward OSC 1.

LFO 1 & ENV TARGET:
Selects what **LFO 1** and the **Pitch Envelope** will modulate:

- **OSC 1+2:** Modulates the pitch of both oscillators.
- **OSC 2:** Modulates the pitch of oscillator 2.
- **X-MOD:** Modulates the Cross Modulation Depth.

LFO 1 DEPTH:
Sets how strongly LFO 1 affects pitch modulation. Turning the knob right increases modulation depth. Turning it left also increases modulation, but inverts the LFO's phase, producing movement in the opposite direction. At the center position, LFO 1 has no effect.

3.4 Portamento

Portamento creates a smooth glide between consecutive notes, transitioning the pitch continuously from one note to the next. This effect is particularly effective when Mono mode is active. Press **ON** to toggle the portamento effect. When enabled, the indicator lights up and the pitch glides between notes. This produces natural, expressive transitions and works especially well for leads. Use the **TIME** knob to adjust how long the pitch transition takes. Turning the knob to the right increases the portamento time, resulting in a slower, more pronounced glide.

4. Filter & Amp Section



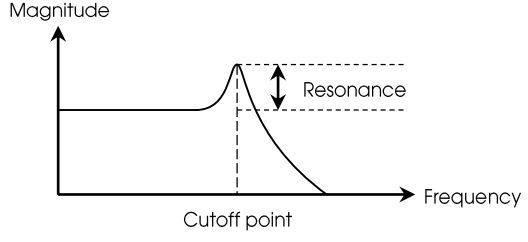
One of the most important parts of any synthesizer is the filter. Filters work by removing certain frequencies of the signal, leaving only those that are needed, thus enabling one to drastically alter the tonal quality of the oscillators. This is where the sound becomes organic, and comes alive!

4.1 Filter

The FILTER and FILTER ENVELOPE sections let you choose the filter type and shape how it responds over time, enabling a wide variety of tonal changes and dynamic movement.

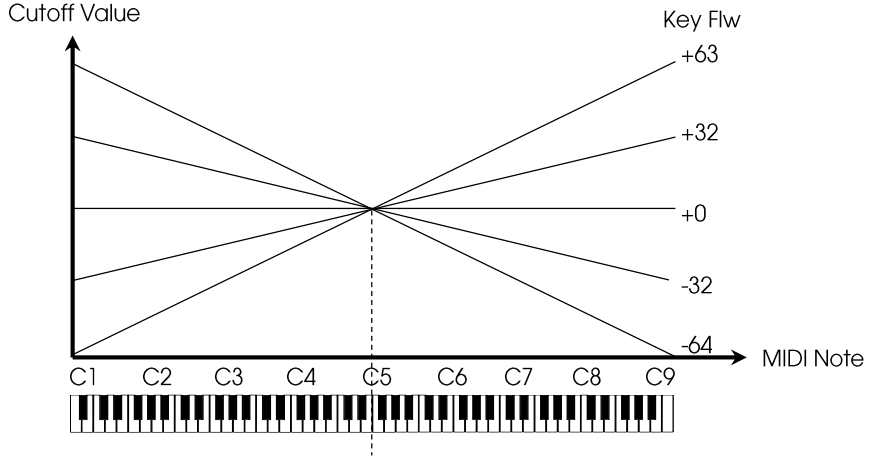
CUTOFF FREQ:
Adjusts the filter's cutoff frequency, the point where higher frequencies begin to be reduced. Changing the cutoff frequency alters the overall brightness of the sound. Raising the slider increases the cutoff frequency, allowing more high-end content to pass through and producing a brighter tone.

RES:
Controls the emphasis around the cutoff frequency. Increasing this slider boosts the harmonics near the cutoff point, creating a sharper and a more pronounced sound.



–12dB/–24dB:
Selects the slope of the filter. When the indicator is off, the filter uses a gentler –12 dB per octave slope. Pressing the –12dB/–24dB button to illuminate the indicator switches the filter to a steeper –24 dB per octave slope, producing a more defined separation between the frequencies that pass through and those that are cut. When the filter slope is -24dB, and the resonance is full, the filter goes into self-oscillation, and produces a sine wave.

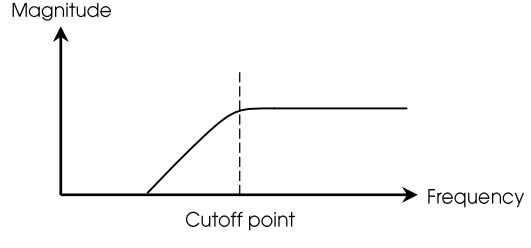
KEY FOLLOW:
Determines how the filter's cutoff frequency tracks keyboard pitch. With low-pass filter types, a centered **Key Follow** setting keeps the cutoff frequency fixed, regardless of which note you play. In this state, higher notes lose more harmonics, resulting in a mellower tone compared to lower notes. Turning the knob to the right increases Key Follow, raising the cutoff frequency for higher notes so that brightness remains consistent across the keyboard. A setting of +32 maintains equal brightness for all keys. Turning the knob left of center produces the opposite effect: higher notes lower the cutoff frequency, making upper notes sound even softer and darker.



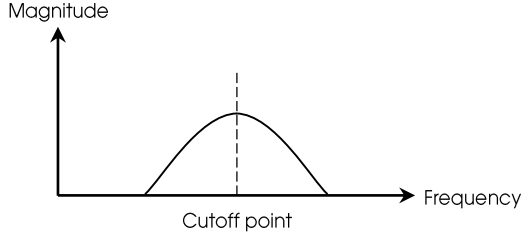
LFO 1 DEPTH:
Controls how strongly LFO 1 modulates the filter's cutoff frequency. Turning the knob to the right increases the modulation depth, creating greater movement in the filter and a more pronounced rhythmic effect. Turning it to the left also increases modulation depth but inverts the LFO 1 waveform, causing the modulation to move in the opposite direction. When the knob is centered, LFO 1 does not affect the cutoff frequency (i.e., the filter's brightness remains static).

TYPE:
The Filter Type selects the type of filter used to shape the sound. Choose from the following three options:

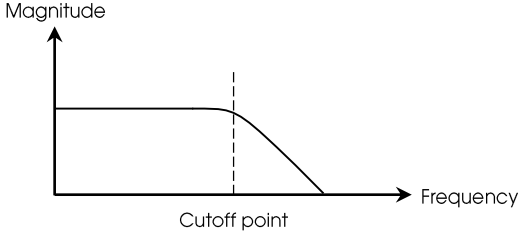
- **HPF:** The **High-Pass Filter** allows frequencies above the cutoff point to pass through. This type of filter produces a brighter, sharper sound and is useful for thinning out low-end content.



- BPF: The **Band-Pass Filter** allows frequencies around the cutoff point to pass while attenuating those above and below it. This emphasizes the midrange and is ideal for creating focused, characterful tones.



- LPF: The **Low-Pass Filter** allows frequencies below the cutoff point to pass while reducing higher frequencies. This is the most commonly used filter type, perfect for softening or mellowing a sound.



4.2 Amp

The AMP section controls the output volume and stereo position (panning) of the current layer.

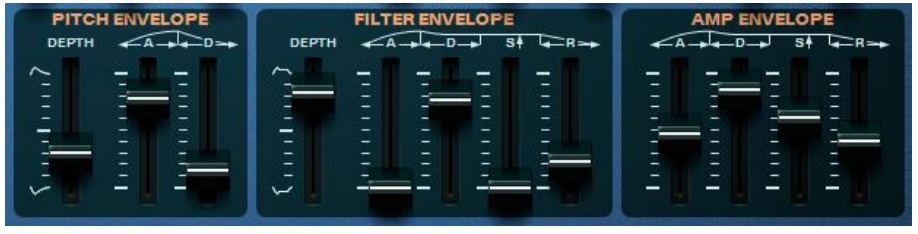
LEVEL:
Sets the overall volume of the layer. Turning the knob to the right increases the volume. Note that the **VOLUME** control in the **MASTER** section adjusts the overall output level of Airwave, affecting all layers.

PAN:
Selects how the sound's volume or stereo position will change.

- OFF: LFO 1 cyclically modulates the volume (tremolo effect).
- AUTO: LFO 1 cyclically pans the sound between left and right. The LFO 1 Fade Time parameter does not affect Auto Pan.
- MANUAL: The **LFO 1 DEPTH** knob is used to set a fixed pan position between left and right.

LFO 1 DEPTH:
When **PAN** is set to **OFF** or **AUTO**, this control adjusts how strongly LFO 1 modulates the volume or panning. Turning the knob right of center increases modulation depth. Turning it left of center inverts the LFO 1 waveform, increasing the effect in the opposite direction. At the center position, LFO 1 has no effect.

5. Envelope Section



An envelope is used to control a certain parameter during, and immediately after each note you press. This can be used to make a sound fade in or out, or change its timbre over time.

5.1 Pitch Envelope

The Pitch Envelope acts as a modulation source that affects the parameter selected by the **LFO 1 & ENV TARGET** control. It shapes how the pitch of OSC 1+2, OSC 2, or the cross modulation changes over time when a note is played.

DEPTH:
Sets how strongly the pitch envelope affects pitch. Moving the slider **above the center** increases the amount of pitch change. Moving it **below the center** inverts the envelope's shape, applying modulation in the opposite direction. At the center position, the pitch envelope has no effect.

ATTACK:
Determines the time it takes for the pitch to rise from the starting point to the maximum pitch change after a key is pressed.

DECAY:
Sets how long it takes for the pitch to return from the maximum change back to the normal pitch.

5.2 Filter Envelope

The Filter Envelope modulates the cutoff frequency of the filter over time, shaping how the brightness of the sound evolves after a note is played.

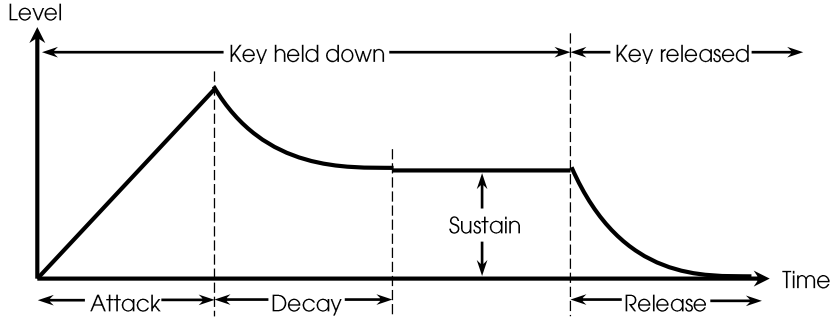
DEPTH:
Controls how strongly the envelope affects the filter's cutoff. Moving the slider above the center increases the amount of change, making the effect more pronounced. Moving it below the center inverts the envelope's shape, causing the brightness to move in the opposite direction. At the center position, the envelope has no effect on brightness.

ATTACK:
The time it takes for the brightness to rise from the start of the note to its maximum level.

DECAY:
The time it takes for the brightness to fall from the maximum level to the sustain level.

SUSTAIN:
The steady brightness level maintained while the key is held down.

RELEASE:
The time it takes for the brightness to fade back to its initial level after the key is released.



5.3 Amp Envelope

The Amplitude Envelope shapes the volume of the sound over time, defining how it starts, sustains, and fades out.

ATTACK:
Determines how long it takes for the volume to rise from silence to its maximum level after a note is played.

DECAY:
Sets the time it takes for the volume to drop from the maximum level to the sustain level.

SUSTAIN:
Specifies the steady volume level that is maintained while the key is held down.

RELEASE:
Controls how long the sound takes to fade out after the key is released.

6. LFO Section



LFO is an abbreviation of Low Frequency Oscillator, and is often used to add some cyclic movement to otherwise static sounds. An LFO is similar to a normal oscillator, but it oscillates significantly slower so that its output signal is too low for human hearing and only useful as a modulation source for other parameters. LFOs are used in much the same manner as envelopes, with the major difference that they are repeated indefinitely, so it can modulate the pitch of an oscillator to create a vibrato effect, or modulate the amplitude to create tremolo.

There are two LFOs in Airwave, and each one has a different assortment of parameter destinations it can modulate directly.

6.1 LFO 1

LFO 1 cyclically modulates the pitch, filter cutoff, or amplitude of the sound. The modulation amount for each destination is controlled by the **LFO 1 DEPTH** knobs in the **OSC COMMON**, **FILTER**, and **AMP** sections.

WAVE:
Selects the shape of LFO 1, which determines the modulation pattern. Each waveform produces a distinct type of movement:

- **Triangle:** Provides smooth, continuous modulation that rises and falls evenly. Ideal for creating natural vibrato or gentle filter sweeps.

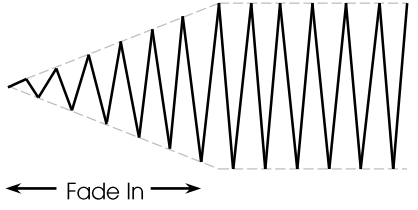
- **Sawtooth:** Creates a repeating ramp-shaped modulation. When the signal reaches its lowest point, it jumps back to the maximum and begins descending again. If the **LFO 1 DEPTH** control in the **OSC COMMON**, **FILTER**, or **AMP** sections is turned left of center, the waveform direction inverts, rising instead of falling.

- **Square:** Alternates instantly between two fixed levels, producing a sharp on/off modulation effect.

- **Sample and Hold:** Generates random, stepped modulation values, causing the sound to jump unpredictably between settings. This is useful for creating randomized pitch, filter, or amplitude variations.

RATE:
Sets the speed of LFO 1 modulation. Turning the knob to the right increases the modulation rate, resulting in faster pitch, filter, or volume variations. This parameter is disabled if **LFO 1 SYNC** is on.

FADE:
Determines how long it takes for the LFO 1 modulation to reach its full intensity after a key is pressed. Turning the knob to the right increases the fade-in time.



6.2 LFO 2

LFO 2 is a secondary LFO controlled by the modulation wheel. It operates independently from LFO 1, allowing modulation at a different rate. Because LFO 2 only takes effect when you move the modulation control, it's ideal for adding expressive accents and dynamic movement during performance. LFO 2 uses a **triangle** waveform.

When the modulation wheel is moved, pitch, filter, and amplitude are modulated simultaneously, each responding according to its individual **Rate** and **Depth** settings.

DEPTH SELECT:
Chooses which parameter you want to adjust the modulation depth for:

- **PITCH:** Controls how strongly LFO 2 modulates pitch, producing a vibrato effect.
- **FILTER:** Controls how strongly LFO 2 modulates the filter cutoff, producing a wah effect.
- **AMP:** Controls how strongly LFO 2 modulates the output level, producing a tremolo effect.

DEPTH:
Adjust the modulation amount of LFO 2 for the currently selected target. Turning the knob right increases the modulation depth. Turning it left inverts the LFO 2 waveform. When the knob is set to the center position, LFO 2 will have no effect on the sound.

RATE:
Sets the speed of LFO 2. Turning the knob to the right increases the modulation rate.

7. Control Section



The CONTROL section provides parameters for managing Airwave's polyphony settings and performance modulation options such as keyboard Velocity and MIDI CC control.

7.1 Solo Switch

When playing solo instruments or single-note leads, it's often best to use Mono, Legato, or Unison modes to ensure that notes do not overlap. Each layer can have its own Mono/Legato/Unison configuration. When all indicators for the SOLO SW buttons are off, Airwave operates in Polyphonic Mode, allowing multiple notes to sound simultaneously.

MONO:
Plays notes one at a time for clean, distinct articulation. When combined with Portamento, this mode creates smooth transitions between notes.

LEGATO:
Plays one note at a time, but transitions smoothly between notes only when played legato, that is, when a new key is pressed before the previous key is released.

UNI:
The unison makes all available voices sound together, creating a thicker, more powerful tone. You can further enhance this by adjusting Unison Detune, which slightly offsets the pitch of each voice to create a fuller, more dynamic tone.

7.2 Morphing

You can use Velocity to simultaneously affect multiple sound parameters. Press **VEL** to toggle this function on or off. When enabled, the indicator will light, and your playing dynamics will influence the sound according to the assigned settings in the **VEL ASSIGN** matrix. When Velocity is off, the sound will remain unaffected by how hard or softly you play.

MIDI Control messages can also be used to modulate multiple parameters at once, allowing expressive control as though several sliders or knobs were being adjusted simultaneously. The Control Assign allows you to link these messages to multiple sound parameters within Airwave. This gives you real-time expressive control over the synth's behavior.

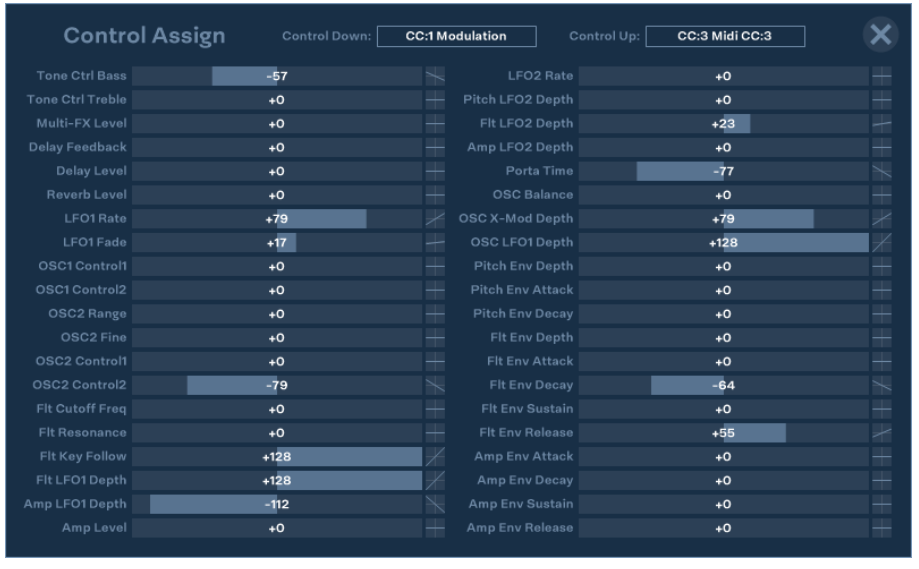
Each parameter in the Control Assign matrix can respond to two separate control directions:

Control Down, defines the parameter response when the control source moves in the negative direction.

Control Up, defines the parameter response when the control source moves in the positive direction.

Assignments are bipolar, meaning a single MIDI control can modulate a parameter both positively and negatively, depending on how the target is set up.

For example, you can assign CC:1 Modulation (Mod Wheel) as the Control Down source and CC:3 as the Control Up source, allowing each direction to independently affect parameters such as Filter Cutoff, Resonance, or LFO Depth. This flexible routing system enables complex, performance-based modulation, for instance, raising the modulation wheel could brighten the filter while simultaneously lowering the amplifier level or increasing LFO rate.



If Velocity or Control Assign settings are active and a destination is assigned, the VEL ASSIGN and CONT ASSIGN indicator will remain lit. If the indicator is dark, no modulation targets are assigned (all targets are +0), and the sound will not change in response to Velocity, or external MIDI controller movements.

Hold SHIFT while dragging the target amounts to make fine adjustments, and CTRL click, or double click to reset its values to +0.

8. Global Section



The Global section controls parameters that affect the entire patch, applying to both the Upper and Lower layers simultaneously.

8.1 Global

MASTER Tune:
Adjusts the overall tuning of the patch, allowing fine pitch adjustment within a range of ±50 cents. The current tuning value is displayed in Hertz (Hz).

Part Det:
When **Key Mode** is set to **Dual** or Split, this parameter adjusts the pitch offset between the **Upper** and **Lower** layers by up to ±50 cents (half a semitone). Positive values raise the Upper part and lower the Lower part, while negative values produce the opposite effect.

Unison Det:
Specifies the pitch spread between the highest and lowest voices when Unison Mode is active on one of the layers.
This can be set up to 50 cents (half a semitone). Higher values create a thicker, more layered sound. This parameter is only active when **UNI** is enabled on at least one layer.

9. Arpeggiator Section



The Arpeggiator automatically generates rhythmic patterns by cycling through the notes you play on the keyboard. When you hold down one or more keys, the arpeggiator repeatedly plays those notes in a programmed order and timing, creating a musical sequence or 'arpeggio.' This feature is useful for adding motion and rhythmic texture to different sounds. Depending on the selected pattern, the notes can play up, down, up & down, or random, synchronized to the internal tempo or an external MIDI clock.

9.1 Arpeggiator Settings

ON:
Toggles the arpeggiator on or off. When on, the indicator lights and the keyboard produces arpeggiated patterns. When Off, the indicator is dark, and the keyboard plays normally.

TEMPO:
Sets the internal tempo of the arpeggiator. Turning the knob to the right increases the tempo, turning it to the left slows it down.

SYNC:
Determines how the arpeggiator's tempo is synchronized. You can choose to use the internal tempo set by the TEMPO knob, or sync to the host's own tempo.

HOLD:
Toggles hold for the arpeggiator. When on, the indicator lights and the arpeggio continues playing even after releasing the keys. Playing a new chord will immediately update the arpeggio pattern. To stop playback, press HOLD again to turn it off. When off, the arpeggio only plays while keys are held down.

TARGET:
Specifies which layer(s) the arpeggiator will affect:

- LOWER & UPPER: Applies the arpeggio to both layers simultaneously.
- LOWER: Plays arpeggios only on the Lower layer.
- UPPER: Plays arpeggios only on the Upper layer.

MODE:
Selects the order in which notes are played:

- UP: Plays notes from lowest to highest.
- DOWN: Plays notes from highest to lowest.
- UP and DOWN: Alternates between ascending and descending order. Both UP and DOWN indicators will light.
- RAND: Plays notes in a random sequence.

RANGE:
Determines the octave range of the arpeggio.

- 1 OCT: Plays within one octave (the pressed notes only).
- 2 OCT: Extends the arpeggio across two octaves.
- 3 OCT: Extends across three octaves.
- 4 OCT: Extends across four octaves.

SWING:
This parameter adjusts the rhythmic 'feel' of the arpeggiator by delaying every second 16th note, creating a shuffle or swing effect. When set to higher values, the timing between notes alternates between short and long, producing a more relaxed, groovy rhythm rather than a strict mechanical sequence. Lower settings maintain an even, straight rhythm, while higher settings introduce more pronounced swing.

10. Effects Section



The Effects section in Airwave enhances and shapes the overall character of your sound. It provides four distinct processors; Tone Control, Chorus, Delay, and Reverb, each designed to add depth, space, and clarity to your patches. These effects can be used individually or combined to create anything from subtle tonal adjustments to rich, atmospheric textures. The processing order is designed to maintain clarity and musical balance, ensuring that each effect complements the others naturally.

10.1 Tone Control

The Tone Control allows you to shape the overall brightness or warmth of your sound by adjusting the low and high frequency ranges.

BASS:
Adjusts the low-frequency range. Turning the knob to the right increases bass content for a fuller, more powerful tone. Turning it to the left reduces low frequencies for a lighter sound.

TREBLE:
Adjusts the high-frequency range. Turning the knob to the right boosts the highs, producing a brighter, crisper tone. Turning it to the left softens the sound by reducing high frequencies.

10.2 Multi Effects

The Multi Effects adds depth, dimension, and motion to your sound. There are different type of choruses, flangers, phasers, modulations and a distortion to shape your sound.

MULTI-FX LEVEL:
The amount of the effect can be adjusted directly, knob to the right increases the overall intensity of the effect.

M-FX TYPE:
You can choose from a variety of 13 multi effects, each designed to enhance your sound in different ways:

- SUPER CHORUS SLW: Slow chorus with deep modulation.
- SUPER CHORUS MID: Medium-speed chorus with moderate modulation.
- SUPER CHORUS FST: Fast chorus with subtle modulation.
- SUPER CHORUS CLR: Bright, transparent chorus emphasizing higher frequencies.
- FLANGER SLOW: Flanger with slow modulation for smooth movement.
- FLANGER DEEP: Deep flanging for pronounced, swirling motion.
- FLANGER FAST: Fast flanging for energetic modulation.
- DEEP PHASING SLW: Slow, deep phasing for evolving textures.
- JET PHASING: Classic jet-like sweep effect.
- TWISTING: Warped modulation that twists and bends the sound.
- FREEZE PHASE 1/2: Short metallic delays for resonant, shimmering tones.
- DISTORTION: Adds harmonic drive and grit for a powerful, edgy tone.

10.3 Delay

The Delay effect adds repeating echoes to the sound, creating space and rhythmic motion. Delay parameters define how the echoes repeat, fade, and move in the stereo field.

TIME:
Sets the time interval between the original note and its echoes. Turning the knob to the right increases the delay time. This parameter is disabled if DELAY SYNC is on.

FEEDBACK:
Controls how much of the delayed signal is fed back into the effect to create repeating echoes. Lower settings make the delay fade quickly, while higher settings produce longer, more sustained repeats.

LEVEL:
Controls the volume balance between the original (dry) sound and the delayed (wet) signal. Turning the knob to the right increases the delay level.

DLY TYPE:
Choose from 5 delay types:

- PANNING L→R: Echoes alternate between left and right, starting on the left.
- PANNING R→L: Echoes alternate between right and left, starting on the right.
- PANNING SHORT: Same as Panning Delay, but with a quarter of the delay time.
- MONO SHORT: Centered mono delay with short time, identical to Panning Short timing.
- MONO LONG: Centered mono delay with twice the time of Panning Delay.

10.4 Reverb

The reverb effect simulates the natural reflections of sound in a physical space, such as a room or hall. It adds a sense of space and depth to your sound, making it feel more immersive and three-dimensional. Reverb can make a sound seem close and intimate or distant and atmospheric, depending on its settings.

SIZE:
Adjusts the perceived size of the simulated space. Smaller values emulate tight, enclosed rooms with short reflections, while higher values simulate large halls or open spaces with longer reverberation tails. Use this to control how 'big' or 'small' the sound environment feels.

COLOR:
Controls the tonal character of the reverb. Turning the knob to the left produces a darker reverb by reducing high frequencies, similar to sound in a carpeted or soft room. Turning it to the right makes the reverb brighter and more reflective, as if in a hard-surfaced hall. This parameter helps match the reverb's tone to the overall brightness of your patch.

LEVEL:
Controls the volume balance between the original (dry) sound and the delayed (wet) signal. Turning the knob to the right increases the reverb level.

11. Browser Section

11.1 The Browser



Airwave has a browser which allows for an easy and fast overview of all the 128 presets that are contained within one soundbank. You can select a preset by simply clicking on the name of the preset, and it will be loaded and highlighted. While the Browser is open, the computer **keyboard arrow keys** can also be used to switch between presets. Right clicking on a preset name brings up a list with a few options: **Copy Preset** will copy the selected preset, **Paste Preset**, will paste the copied preset into the selected slot, while **Init Preset** will initialize the preset.

Collecting and Saving your favourite sounds

If one has lots of sounds for Airwave, sometimes one wishes to create a new soundbank containing all the different favourite sounds. There is an easy way to do this using the browser: open two Airwave instances side by side so that both are visible, and open the Browser tab in each. Load the **Airwave Empty Soundset.fxb** from the **Soundbanks/** folder in one of them, and open another soundbank in the other Airwave instance. Right click on a patch that you like, and select **Copy Preset**, then in the Airwave with the empty soundbank, right click on an Init preset, and click **Paste Preset.** When you are happy with the collected sounds, simply go to the main menu and select **Save Bank (.fxb)**.

