USER'S MANUAL

MINIBRUTE

ANALOG SYNTHESIZER

Arturia©

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1 INTRODUCTION

Congratulations, and thank you for your purchase of the ARTURIA MiniBrute analog synthesizer. You now own what many players feel is the best sounding, most versatile, and most powerful analog synthesizer in its class.

The MiniBrute is the culmination of a lengthy (and very enjoyable!) collaboration between ARTURIA's engineers and analog synthesizer "guru" Yves USSON.

Since the late 1990s, the French company ARTURIA has received acclaim from players and reviewers alike for designing state-of-the art software emulations of the venerable analog synthesizers from the 1960s to the 1980s. From the Moog Modular V, back in 2004, to Origin, a modular system of a new generation that we introduced in 2010; from Analog Factory Experience, the first hybrid synthesizer ever (debuted in 2008), to the Oberheim SEM V released at the end of 2011, our passion for synthesizers and sonic purity has given demanding musicians the best software instruments for professional audio production.

Overview of some of ARTURIA's software, hardware and hybrid instruments

After recreating so many legendary analog synthesizers by translating "golden" versions of these classic instruments into sophisticated DSP algorithms, the time was right for ARTURIA to introduce an analog synth of its own. But *reproducing* analog circuitry is not the same as *designing* great-sounding analog circuits, so we enlisted the aid of Yves USSON — an extremely talented analog circuit designer and synthesizer enthusiast whose work spans three decades.

Besides being a talented researcher in bio-molecular microscopy, his clones of the Moog modules, as well as ARP or EMS and own designs, are highly renowned in the "modular" world and continuously produced under license by specialty manufacturers.

What's more, he's always willing to share his considerable experience, and pass along his knowledge to others. All his schematics stay open to the D.I.Y.[1] community; most of his works can be found on the "Yusynth" ongoing project website[2], and he casts a long, and welcome, shadow on the major Internet forums devoted to analog fanatics.

1 D.I.Y. = "Do It Yourself"
2 http://yusynth.net

Yves USSON and a couple of wired friends

Combining ARTURIA's acclaimed *savoir-faire* in designing innovative musical instruments, and Yves' deep knowledge and experience, the MiniBrute analog synthesizer has its roots in the 1970s yet incorporates the best of the 21st century.

The ARTURIA MiniBrute analog synthesizer

We built the MiniBrute with four goals: peerless analog sound, intuitive operation, realistic cost — and no compromises, whether with parts, design, or connectivity. From the smallest electronic OPA[3] to the potentiometers and the casing, we cherry-picked the very best suppliers, subjected every component to exhaustive testing, and fine-tuned the design for the best possible player experience.

Furthermore, we decided to bring back the fun of creating your own sounds, and controlling them on stage or in the studio. There are no presets, hidden menus, shift keys, or scrolling: All the sound-shaping is at your fingertips. This design philosophy also meant we could use true analog oscillators, not digital ones, to provide the purity of sound that is the hallmark of analog synthesis.

Playing a musical instrument should not feel like working with a spreadsheet. MiniBrute is about music and creativity, and the experience of playing an instrument that is fun, physical, inspiring, and satisfying. What's more, with its compact, 25-key keybed, MiniBrute is ideal for the mobile and desktop musician. Not only will it give you solid basses, amazing effects, and screaming leads, but give you sounds no other synth on this planet can make.

As everyone knows, analog synthesizers are expensive to produce. But what's the point in making a synth for everyone, if no one could afford it? So, we made a bet it would be a hit, and geared up to produce MiniBrute in volume — allowing us to obtain quantity pricing on parts, and translate the techniques of a craftsman to industrial manufacturing. The result is analog synthesis without compromise.

MiniBrute is truly a musical instrument. We loved designing it, building it, and now, playing it. We hope you will share our enthusiasm, and find inspiration in its sounds.

But that's enough talk — plug in your new analog friend, and start vibrating the walls...

3 Operational amplifier: a much useful electronic component

2 INSTALLATION

2.1 Usage Precautions

The MiniBrute uses an external power adapter. Do not use any power supply or adapter other than the one provided by Arturia and specified in this manual (see chapter 4.3.1 for more details). ARTURIA accepts no responsibility for damage caused by use of an unauthorized power supply.

WARNING

Do not place this product in a place or position where one might walk on, trip over, or roll anything over power cords or connecting cables.

The use of an extension cord is not recommended. However if you must use one, make sure that the cord has the ability to handle the maximum current needed by this product. Please consult a local electrician for more information on your power requirements.

This product should be used only with the components supplied or recommended by ARTURIA. When used with any components, please observe all safety markings and instructions that accompany the accessory products.

SPECIFICATIONS SUBJECT TO CHANGE

The information contained in this manual is believed to be correct at the time of printing. However, ARTURIA reserves the right to change or modify any of the specifications without notice or obligation to update existing units.

IMPORTANT

Always follow the basic precautions listed below to avoid the possibility of serious injury or even death from electrical shock, damages, fire or other risks.

The product used either alone or in combination with an amplifier, headphones or speakers, may be able to produce sound levels that could cause permanent hearing loss. DO NOT operate for long periods of time at a high level, at a level that is uncomfortable, or a level that exceeds prevailing safety standards for hearing exposure. If you encounter any hearing loss or ringing in the ears, consult an audiologist immediately. It is also a good idea to have you ears and hearing checked annually.

NOTICE

The manufacturer's warranty does not cover service charges incurred due to a lack of knowledge relating to how a function or feature works (when the unit is operating as designed); reading the manual is the owner's responsibility. Please study this manual carefully and consult your dealer before requesting service.

PRECAUTIONS INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

- Read and understand all the instructions.
- Always follow the instructions on the instrument.
- Before cleaning the instrument, always remove the electrical plug from the outlet, as well as the USB cable. When cleaning, use a soft and dry cloth. Do not use gasoline, alcohol, acetone, turpentine or any other organic solutions; do not use liquid cleaner, spray or cloth that's too wet.
- Do not use the instrument near water or moisture, such as a bathtub, sink, swimming pool or similar place.
- Do not place the instrument in an unstable position where it might accidentally fall over.
- Do not place heavy objects on the instrument. Do not block openings or vents of the instrument; these locations are used for ventilation to prevent the instrument from overheating. Do not place the instrument near a heat vent or any place of poor air circulation.
- Use only the provided AC adapter, as specified by ARTURIA (see chapter 4.3.1 for more details).
- Make sure the line voltage in your location matches the input voltage specified on the AC power adapter.
- Do not open and insert anything into the instrument, as this could cause a fire or electrical shock.
- Do not spill any kind of liquid onto the instrument.
- In the event of a malfunction, always take the instrument to a qualified service center. You will invalidate your warranty if you open and remove the cover, and improper testing may cause electrical shock or other malfunctions.
- Do not use the instrument when thunder and lightning is present.
- Do not expose the instrument to hot sunlight.
- Do not use the instrument when there is a gas leak nearby.
- ARTURIA is not responsible for any damage or data loss caused by improper operations to the instrument.
- ARTURIA recommends the use of shielded and less than 3 meters long cables for Audio, and ferrite equipped CV/Gate cables.

2.2 Register your Instrument

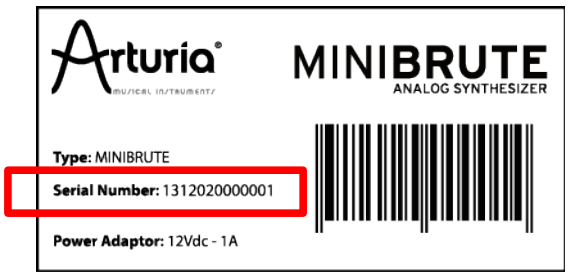
Registering your instrument establishes your legal ownership, which entitles you to access the Arturia Technical Support service, and be informed of updates.

Additionally, you can subscribe to the ARTURIA newsletter to be informed of ARTURIA-related news as well as promotional offers.

Connect to your Arturia account via this URL:

http://www.arturia.com/login

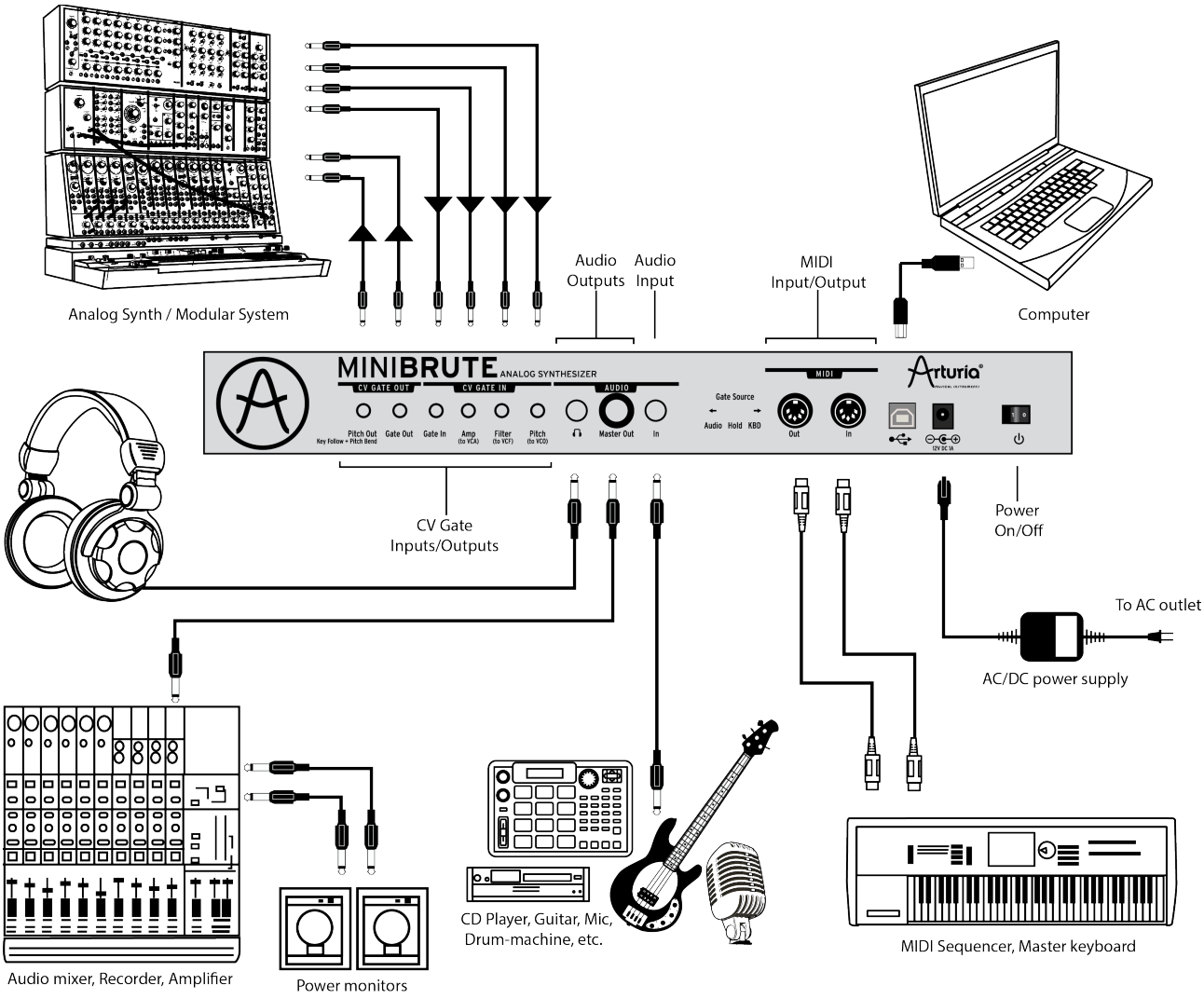
Go to the section "*My Registered Products*", and add the MiniBrute synthesizer by entering its serial number, as printed on the sticker located under the machine:



2.3 Connecting the MiniBrute to the World

Always power-off all audio gear before making any connections. Failing to do so may damage your speakers, the MiniBrute synthesizer, or other audio equipment.

After completing all connections, set all levels to 0. Power on the various devices, with audio amplifier or monitoring system *last,* then raise the volumes to a comfortable listening level.



Here is an overview of the MiniBrute synthesizer's connectors:

- Audio Input & Outputs.....6.35 mm (1/4") mono jacks
- CV/Gate.....3.5 mm (1/8") miniature mono jacks
- MIDI Input & Output.....Standard MIDI DIN-5
- USB.....Standard USB type B
- Power DC Input.....Internal 2.1 mm, external 5.5 mm

2.4 Warm-Up and General Tuning

As with all other true analog synthesizers, after being powered-on the MiniBrute needs a warm-up period of approximately five to ten minutes. The allows reaching a stable operating temperature, which insures accurate oscillator pitch. Warm-up time depends on the external temperature; a colder ambiance will require longer

warm-up times, while a hotter ambiance will result in shorter times.

Once the synthesizer has reached its running temperature, tune it to pitch. Use an external tuner to check the instrument's tuning; if needed, tweak the **Fine Tune** knob to tune the MiniBrute to the desired pitch.

The MiniBrute has been designed for rock-solid pitch stability when operated in normal temperature and humidity conditions, at external temperatures between 20°C and 32°C in temperate areas. In practice, the MiniBrute provides satisfactory operation over a much wider temperature range, although extreme external temperatures or fluctuations can lead to longer stabilization time or erratic tuning.

3 QUICKSTART

This chapter provides the basics you'll need to create your very first sounds with the MiniBrute, so you can start enjoying its rich, full sounds immediately. In subsequent chapters, we'll get deeper into the sound design process so you can create more animated and complex sounds.

3.1 Create your first sound: the "basic patch"

Once your MiniBrute has been correctly connected to your sound system, set all the controls to their minimum level:

- counter-clockwise for the knobs
- lowest position for sliders
- centered position (12 o'clock) for controls with – and +, as well as **Fine Tune**.

Set the rear panel **Gate Source** switch to the **KBD** position (see chapter 4.3.4).

Set the **FILTER** section's **Mode** switch to **LP**, and the **ENV Speed** switch to **Fast.**

Set the **CONTROL** section's **Aftertouch** switch to **Off**, and **MOD Wheel** to **Vibrato.**

Set the **VIBRATO** switch to the ∿ position.

Set the **LFO** section's **Clock** switch to the **Free** position.

Set the **ARPEGGIATOR** section's **Hold/On/Off** switch to **Off.**

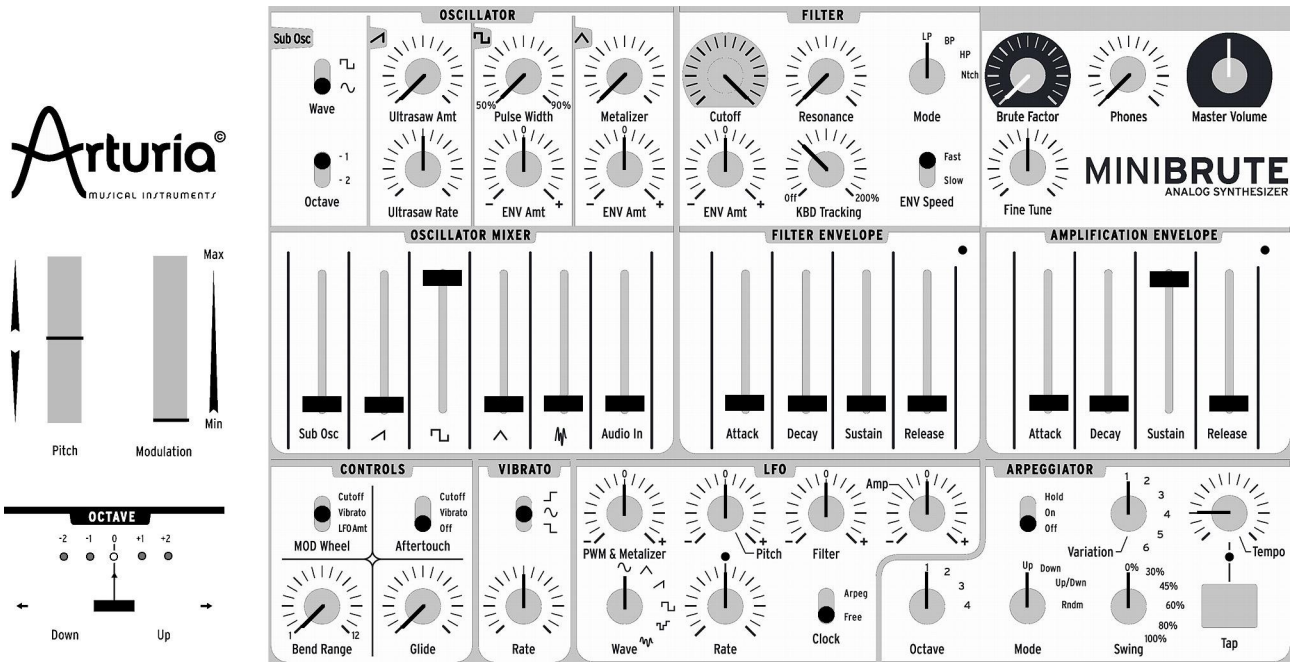
Switch on your MiniBrute, let it warm up, and set the **Master Volume** knob to center.

Set the **MIX** section's square wave slider to maximum.

Turn the **FILTER** section's **Cutoff** knob fully clockwise.

Set the **AMPLIFICATION ENVELOPE** section's **Sustain** slider to maximum.

Here's an overview of the patch:



Now, press a key; you should hear your very first MiniBrute sound!

Nice... but it sounds a bit like a pocket calculator, doesn't it? We'll improve this in the very next chapter, but for now play the keyboard while pressing either the Down or Up **OCTAVE** section button. This should transpose the notes accordingly.

3.2 Add some vibrato

Press and hold a key on the keyboard, and slowly raise the **Modulation Wheel** — this will add some vibrato to the sound.

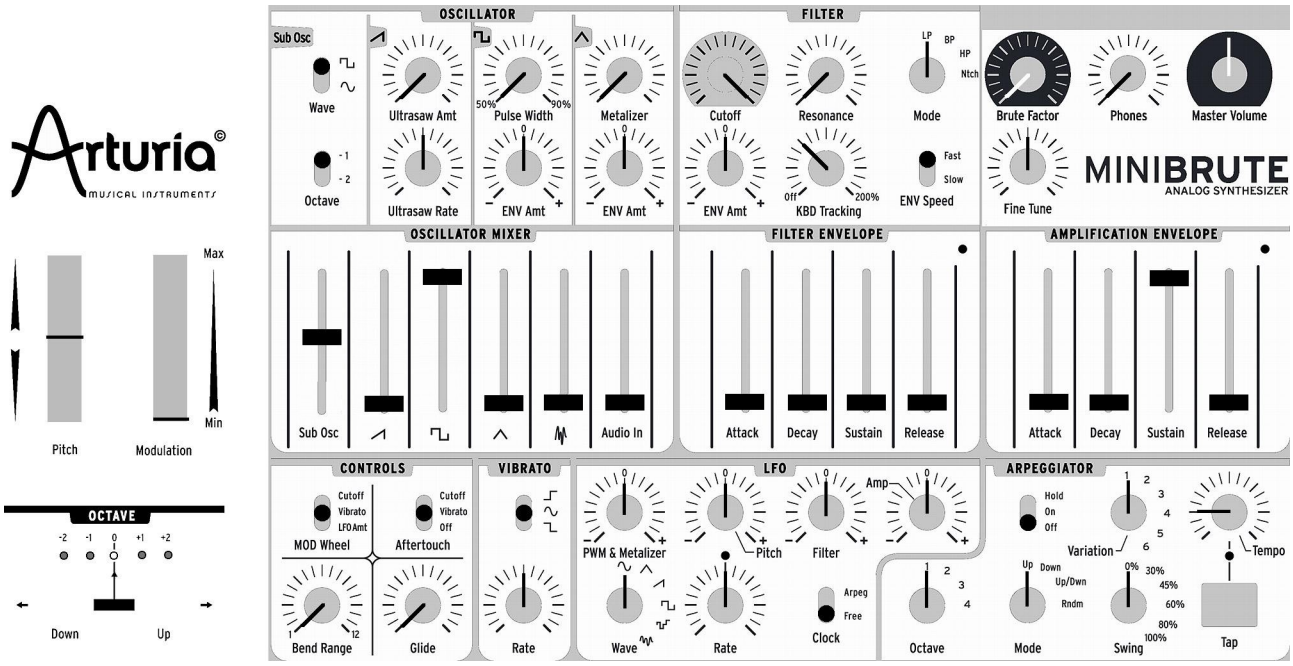
Return the Modulation Wheel to minimum position.

Set the **CONTROL** section's **Aftertouch** switch to the **Vibrato** position.

Now play the keyboard and when a key is down, press down on it further. This triggers vibrato modulation on the note you're holding, so you can add expressiveness to your playing.

Raise the **Sub Osc** switch to the ⊓ position, and the **Octave** to the **-1** position. Crank up the Sub Osc slider in the **MIXER** section to the middle of its range, and press a key. This beefs up your sound by adding more bass.

Here's an overview of the patch:

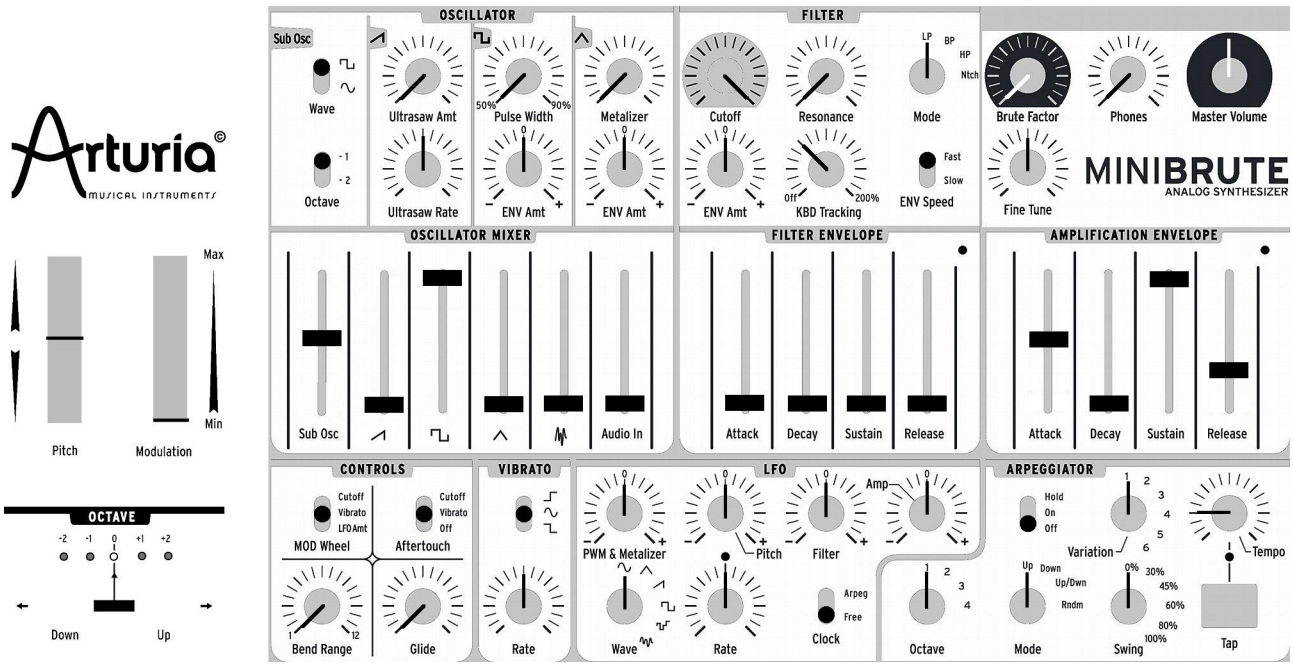


3.3 Tweak the envelope

Now let's shape the sound's amplification envelope, which determines how the level changes over time when you play a note. Until now the **Sustain** level has been set to maximum, which results in an "electronic organ" sound that has no dynamics. By changing the other parameters (**Attack**, **Decay**, **Release**) we can control how the sound fades in, sustains, and fades out.

Increase the **AMPLIFICATION ENVELOPE** section's **Attack** slider to its middle position, then press a key. Now the sound rises slowly up to the sustain level. As soon as you release the key, the sound stops abruptly. Raise the **Release** slider, and the sound will fade out to its minimum level when you release a key.

Here's an overview of the patch:



Now set these four envelope sliders all the way down, and raise the **Decay** slider to maximum. Press and hold down a key: the sound appears as soon as you press the key, and slowly fades out to the minimum level. While pressing a key repeatedly, slowly turn down the **Decay** slider: the sound will fade out more rapidly. In the lowest range of the slider, you'll hear short, percussive sounds.

Now that we've covered amplification envelope basics, let's check out something even more fun.

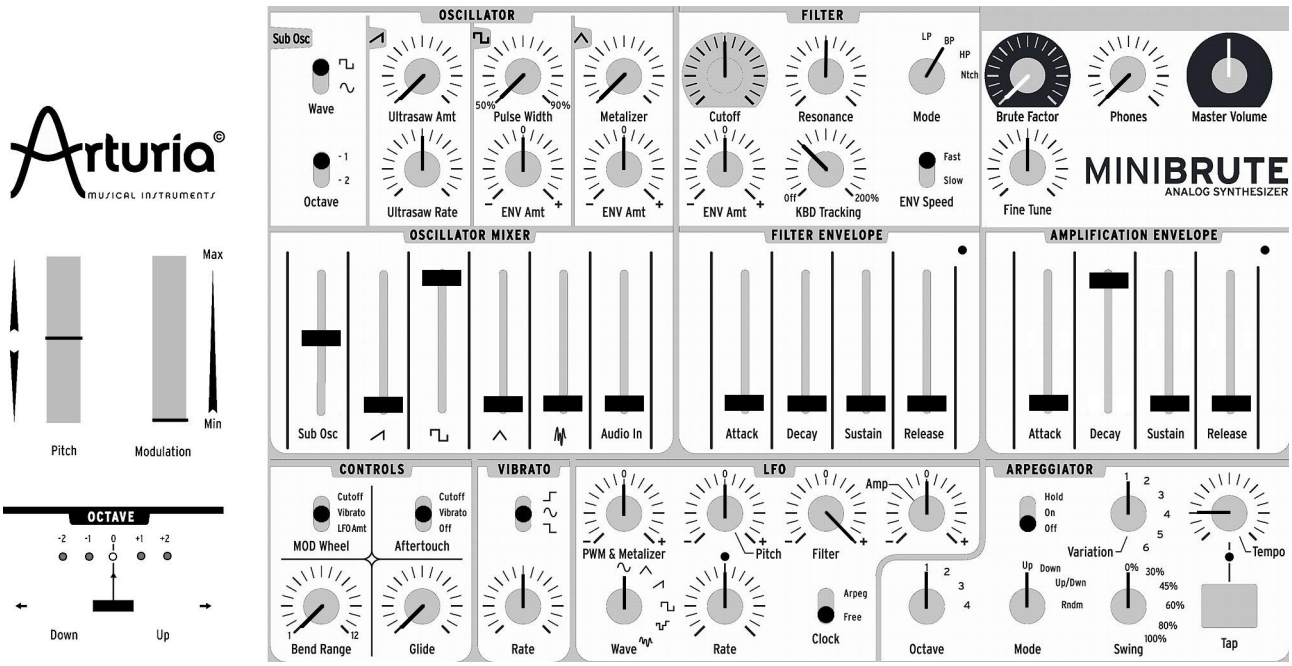
3.4 Meet the LFO

Once again, in the **AMPLIFICATION ENVELOPE** section raise the **Decay** slider to maximum, and set the other envelope sliders to minimum.

In the **FILTER** section, set the **Cutoff** and the **Resonance** knobs to their middle positions, and set the **Mode** selector on **BP.**

In the **LFO** section, set the **Filter** knob to maximum.

Here's an overview of the patch:



Press and hold a key: you should hear timbre sweeps, a bit like a didgeridoo, at a rhythm indicated by the red LED. Tweak the **Rate** knob to slow down or accelerate this wah-wah effect, and play with the filter's **Resonance** to accentuate it.

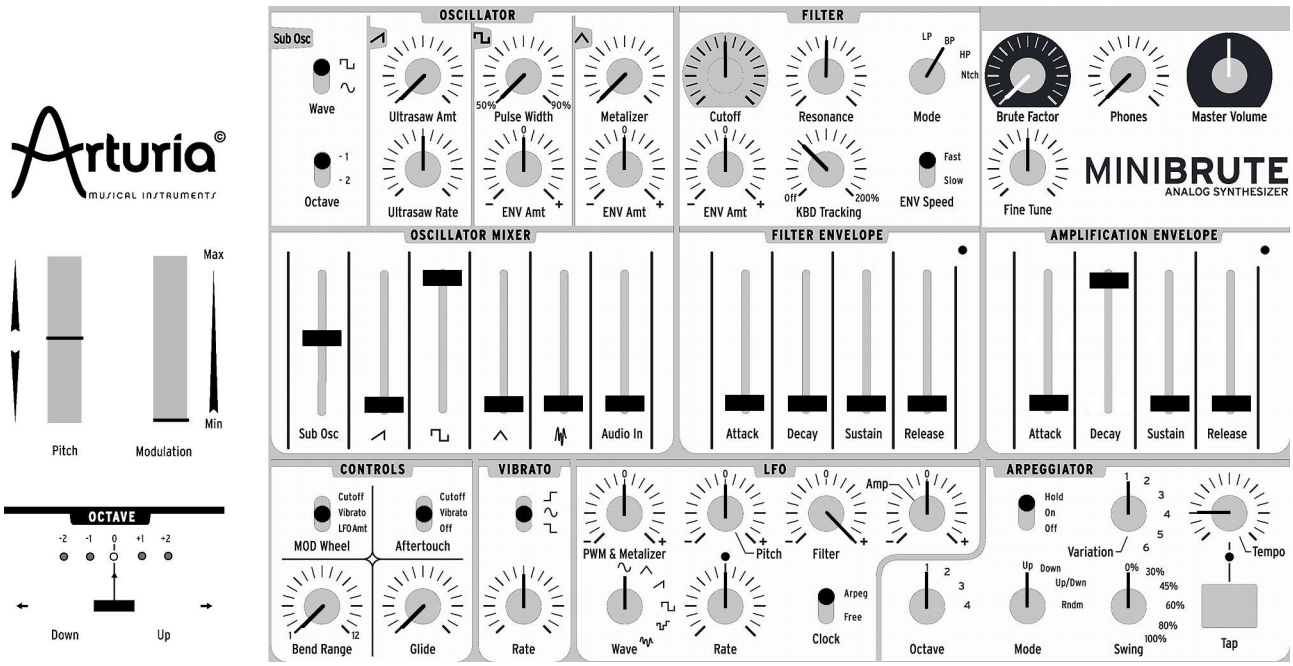
Be cautious, you've just entered the Dubstep realm...

3.5 Create arpeggiated sequences

While still in the LFO section, set the Clock switch on Arpeg. The **Rate** red LED should now blink at the same tempo as the **Tempo** in the **ARPEGGIATOR** section, as both clocks are now synchronized.

Now in the **ARPEGGIATOR** section, set the **Hold/On/Off** switch to **Hold**.

Here's an overview of the patch:



Press the keyboard's lowest C key, then release it: the note auto-repeats continuously, because the arpeggiator is set to **Hold.**

Press the key again and while holding it down, press the two other C keys: now when you release all keys, a sequence of octaves auto-repeats continuously.

While the sequence is playing, tweak the **Octave** knob to extend the octave span; also tweak the **Mode** knob to alter the arpeggio's direction.

In this chapter, you've been introduced to just a few of the MiniBrute's sonic possibilities. But there's much more, in the following chapters we'll cover:

- Complete details of the different sections that make up this fantastic instrument
- More tips on how to use these elements to build you very own sounds

Your journey with the MiniBrute has just begun...

4 GENERAL DESCRIPTION

Your MiniBrute is a true analog sound synthesizer, so all sounds are produced by analog electronic circuits. No digital computer circuitry is involved in the generation, filtering, or basic control of sound. This is one of the reasons why MiniBrute creates rich, animated, and lively electronic sounds.

4.1 Analog synthesizer architecture

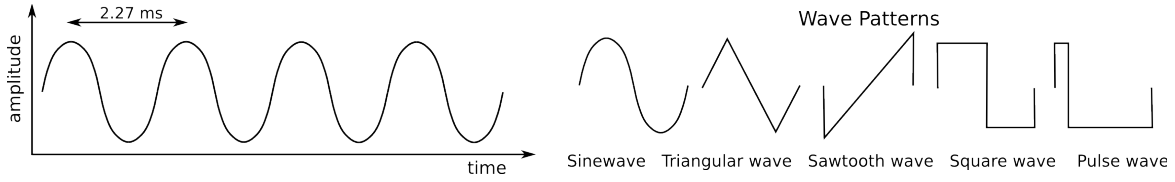
The analog sound production chain uses a classical approach called subtractive synthesis. The basic sound generator is a waveform with a rich harmonic content; filtering then "subtracts" harmonics to create new variations on the original timbre. Subsequent circuits (an envelope generator in conjunction with a VCA, or voltage-controller amplifier) alter the level in a precise way to create dynamics.

4.1.1 Signal generators

The signal generators are the circuits that produce the basic waveforms for sound creation. There are two basic categories: pitched signal generators and the unpitched signal generators.

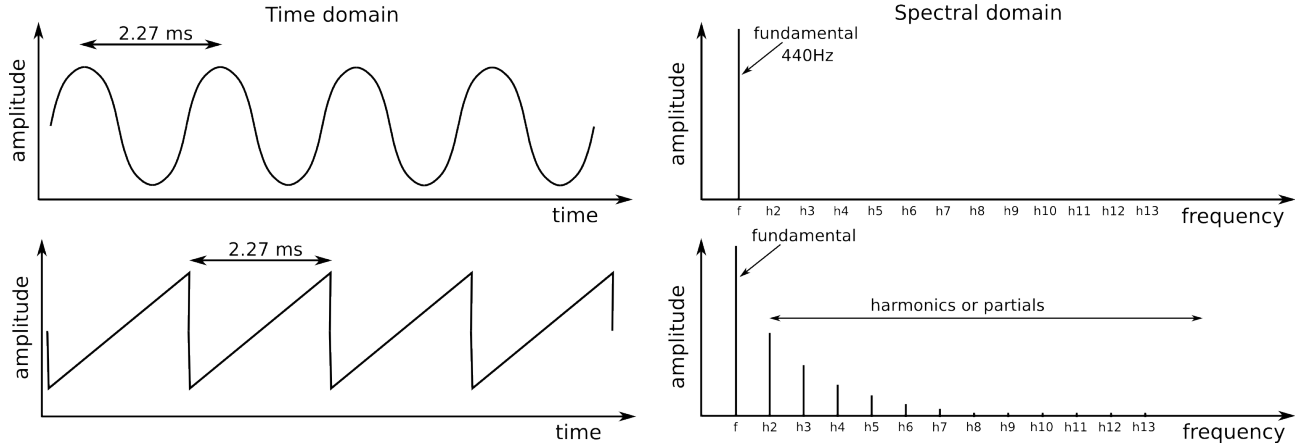
4.1.1.1 Pitched signal generator (oscillators)

This device, also called an oscillator, produces an electronic signal characterized by a repetitive, shaped pattern (called a waveform). The number of times this pattern repeats in a second determines the signal's frequency, which determines its pitch. For example, a pattern that repeats every 2.27ms corresponds to a fundamental frequency of 440 cycles per second, or 440 Hertz (a unit of measurement for cycles per second named in honor of Heinrich Hertz, who first demonstrated the existence of magnetic waves, and abbreviated Hz). This frequency is associated with the pitch of middle **A** on a piano keyboard. In general, oscillators will provide some or all of the following basic waveforms: sine wave, triangular wave, sawtooth wave, square and pulse waves.



If these waveforms have the same frequency, then their pitch is equivalent. However, different waveform shapes have different timbres. For example, the sine wave sounds dark and plain, while the sawtooth wave sounds very bright. The square wave sounds a bit like a clarinet and the pulse wave resembles an oboe.

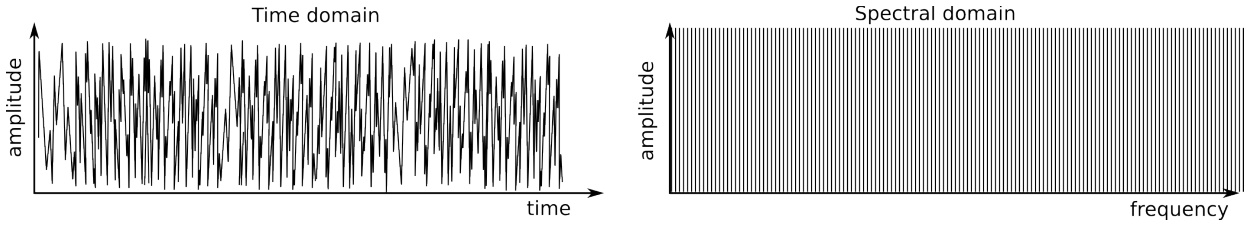
These complex waveforms are actually made up of multiple sine waves — a fundamental sine wave that determines the base frequency, and sine waves representing higher harmonics (also called overtones or partials) of that frequency which, when added together, produce a unique timbre. These harmonics are an integer multiple of the fundamental frequency, i.e., the second harmonic is twice the fundamental frequency, the third harmonic is three times the fundamental, and so on.



Most importantly, other devices can control an oscillator to set its pitch (keyboard controller), modulate its pitch (vibrato), and modulate the shape of the waveforms (PWM, Ultrasaw).

4.1.1.2 Unpitched signal generator

Unlike the previous category, an unpitched signal generator (also called noise generator) has no regular, periodic pattern — the signal's amplitude is always changing randomly. Therefore, it has no fundamental frequency (hence no pitch), and its harmonic spectrum consists of a nearly infinite number of frequencies that have no harmonic relationship.

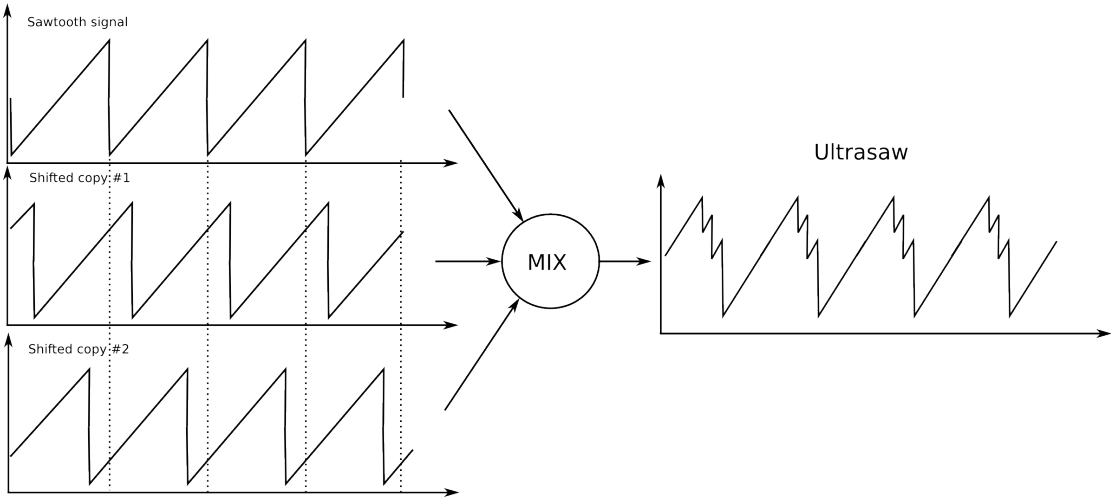


Such signals sound very different from the pitched signals, and are like the sound of wind, a water stream, steam exhaust, rain, waterfall, etc.

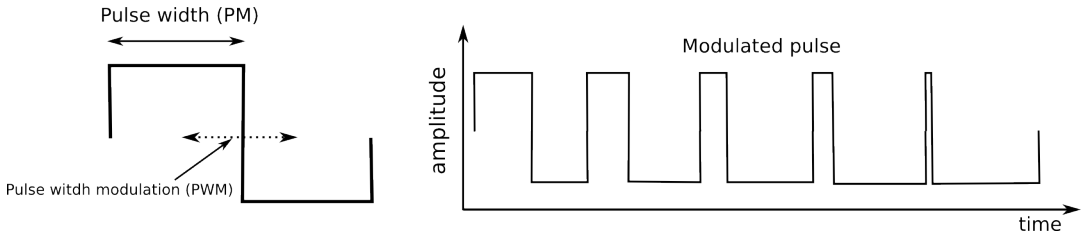
4.1.2 Signal enhancers

Signal enhancers (or wave-shapers) transform or distort the oscillator's basic pitched signal to increase their harmonic content, and make them sound brighter and richer. The MiniBrute provides three signal enhancers:

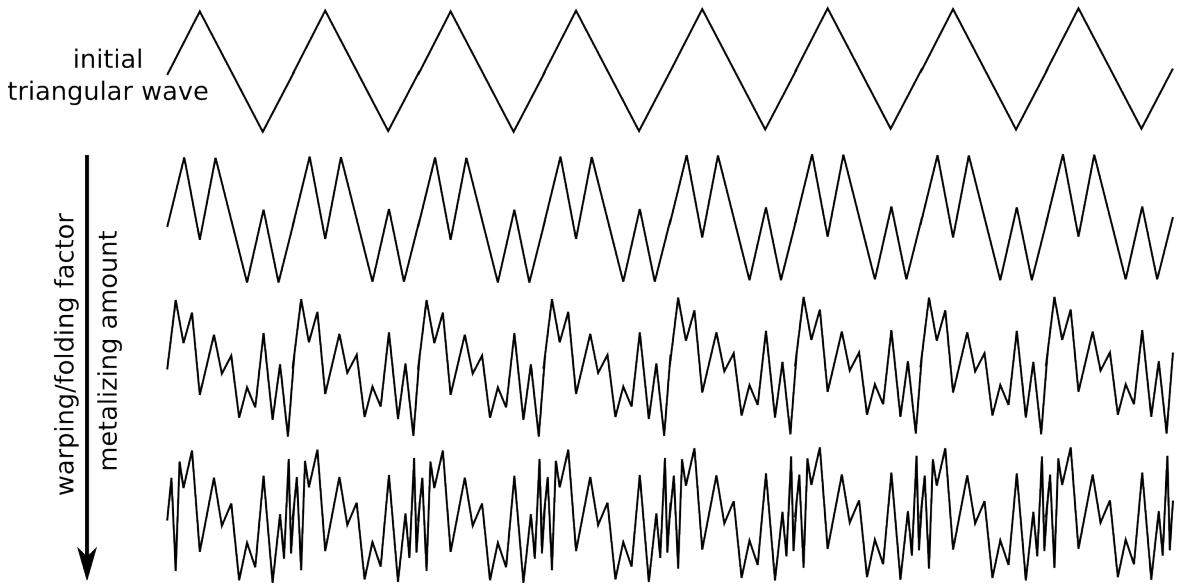
- The **Ultrasaw** builds two phase-shifted copies of the basic sawtooth signal. These copies have independent and ever-evolving phase shifts with respect to each other, and are eventually mixed with the sawtooth signal. This results in a lively, rich, and bright ensemble effect whose character depends on the modulation rates of the phase-shifted copies.



- The **Pulse Width Modulator** (or **PWM**) takes the square wave and changes the ratio between the time the waveform is at maximum or minimum. The square wave corresponds to a 50% PW. The pulse width can be set over a wide range (50% to 90%) making it possible to create a wide variety of woodwind instruments.



- The **Metalizer** takes the basic triangular waveform and "warps/folds" it to create very complex jagged waveforms that are rich in high harmonics. This results in "metallic" pitched sounds that are ideal for harpsichord- and clavinet-type tones. Dynamic modulation (LFO or envelope) of the warp/folding parameters opens up a realm of clangorous, spring coil-like sounds.



4.1.3 Filter

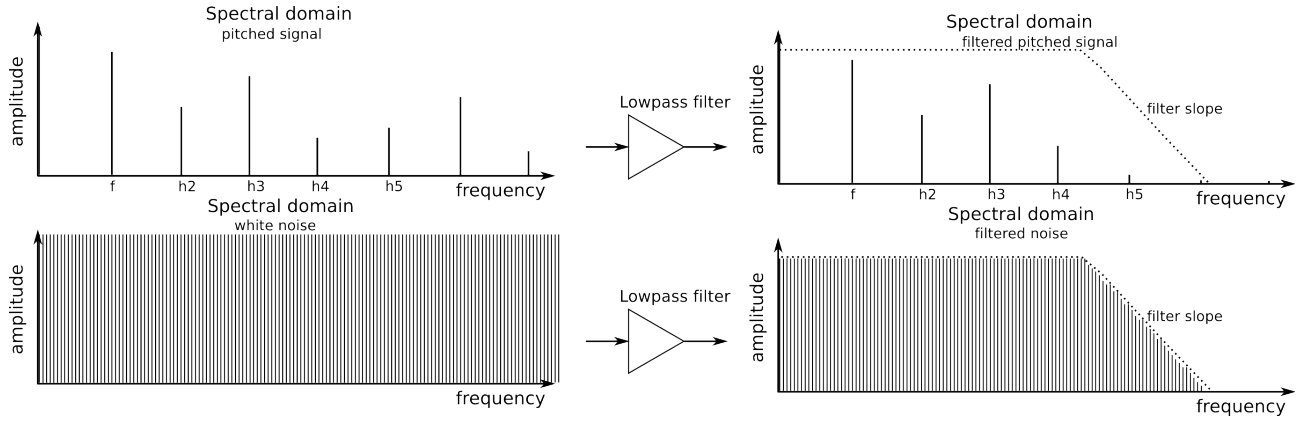
4.1.3.1 What is a filter?

In general, a filter follows the signal generator and signal enhancers, and modifies the spectral content of the signal or signals. This can involve either attenuating (filtering out) or emphasizing (resonating) particular overtones and partial, and these changes can be either static or dynamic. Filters are very important circuits whose design contributes greatly to the a synthesizer's sound and character.

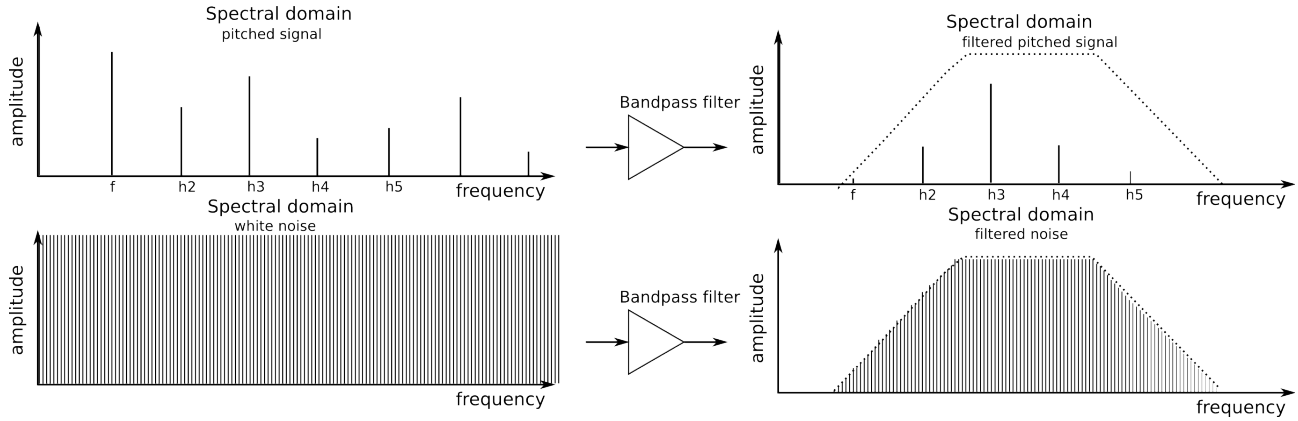
4.1.3.2 Filter types: Low-pass, Band-pass, High-pass and Notch

A filter can operate in various ways or modes. These modes are called **transfer functions** or **spectral responses**. In the MiniBrute the filter can operate either as a low-pass filter, a band-pass filter, a high-pass filter, or a notch filter.

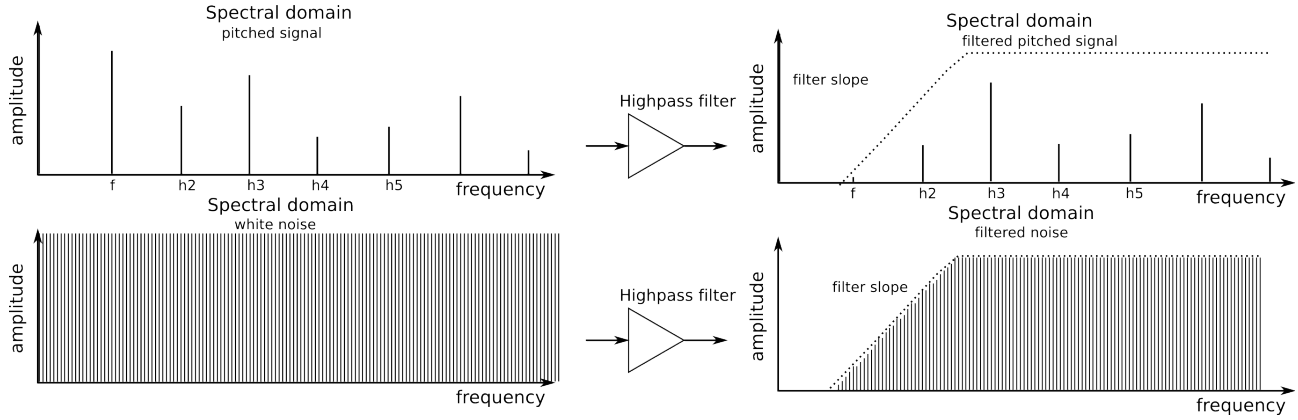
In **low-pass** mode, the spectral contents below a given *cutoff frequency* (shortened to cutoff) remain unchanged, while partials above the cutoff are attenuated. The attenuation is a function of the frequency where the higher the partial frequency, the greater the attenuation. In other words, it is called a low-pass mode because it passes the low frequencies below the cutoff and reduces the high frequencies above the cutoff. This correlation of attenuation to frequency determines the filter's slope, which is measured in -dB/octave (i.e., the amount of attenuation applied to a partial with a frequency twice as high as the cutoff).



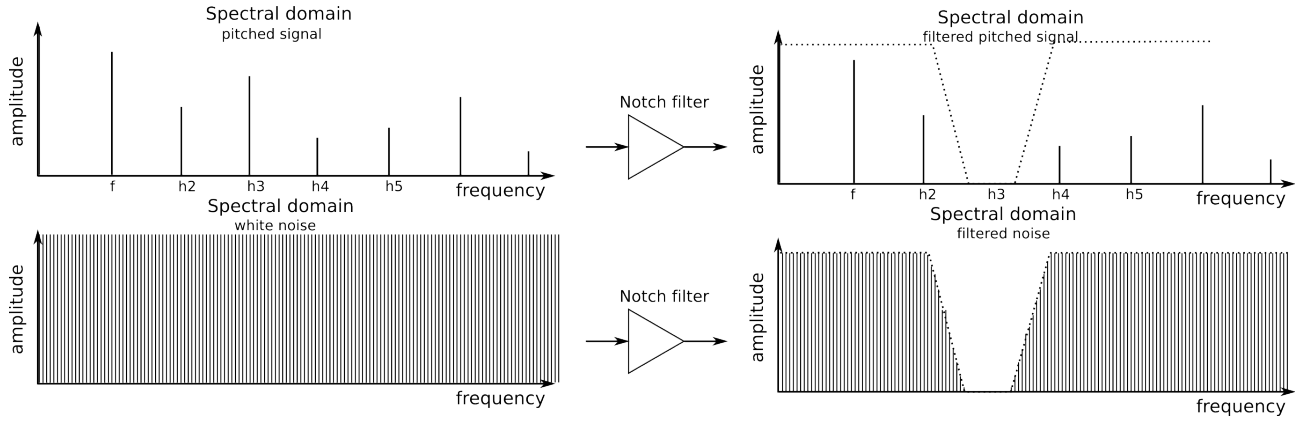
In **band-pass** mode, the cutoff frequency becomes a band's center frequency. Partials within this band remain unchanged, while partials below or above the band's range are attenuated strongly.



In **high-pass** mode, partials above the cutoff frequency remain unchanged, while the partials below the cutoff are attenuated.



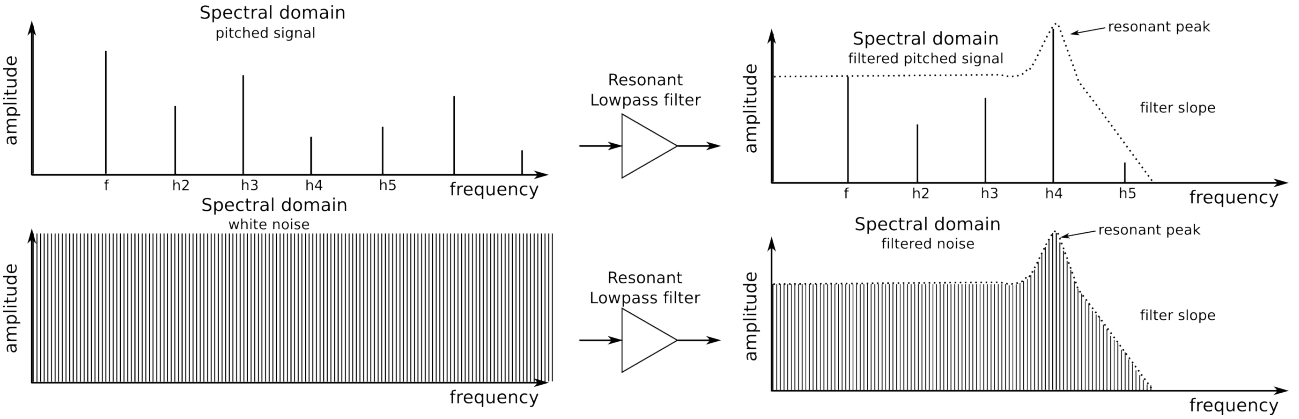
In **notch** mode (or rejection filter) the cutoff frequency becomes a band's center frequency; partials within this band are attenuated, while partials above and below this band remain unchanged.



The cutoff frequency doesn't have to be static; controlling it with other devices like a keyboard (keyboard tracking), or LFO, envelope generator, or other controllers, creates dynamically-changing, interesting timbres.

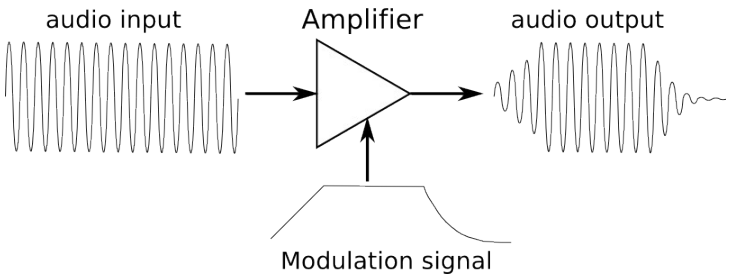
4.1.3.3 Resonance or emphasis

Resonance is a filter's ability to amplify or emphasize partials that are close to the cutoff frequency, thus creating a peak in the spectral response. This parameter can be increased up to a point where the filters no longer acts like a mere filter, but starts to oscillate on its own.



4.1.4 Amplifier

The amplifier generally follows the filter, and determines the signal's overall amplitude. Its gain is controllable through various modulation sources such as an LFO, envelope generator, or some kind of external control (like a foot-pedal). The amplifier is primarily responsible for shaping a sound's dynamics.

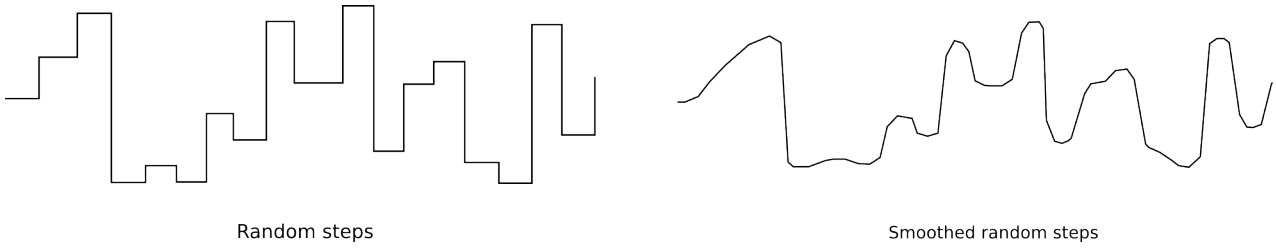


4.1.5 Modulators

Modulators provide signals that are designed specifically to control the behavior of oscillators, filters and amplifiers. Unlike audio oscillators, modulators are low-frequency signals. For example, when you sing with vibrato, you are "modulating" your voice with a low-frequency change in pitch, typically around 5Hz or so. The tremolo circuit in a guitar amplifier modulates the amplifier's level.

Modulators are useful to create dynamic pitch changes (like "wobulation" or creating chirps), timbre sweeps, and level variations. The main modulators are the LFO (low frequency oscillator) and envelope generator, but they can also be provided by external sources that generate *control voltage* (CV) signals that provide modulation, and *gate* signals that turn modulators or notes on and off.

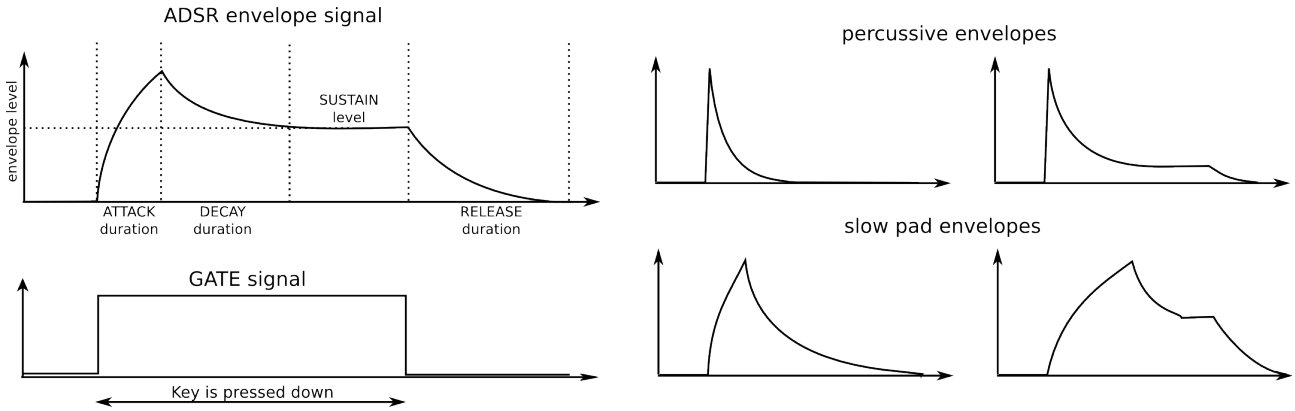
An LFO is low frequency oscillator that can produce various waveforms at sub-audio frequencies (0.05Hz up to 100Hz). In general the waveform options are sine, sawtooth, square, random steps, and random waves. These waves' amount and polarity (i.e., whether they go positive or negative) can be controlled before being fed to the target devices.



Contrary to an LFO, an envelope generator (or ADSR generator, for "Attack / Decay / Sustain / Release") does not provide a repeating pattern but is controlled by the keyboard or Gate input. Pressing down a key or sending a gate signal provides an evolving signal with four different stages:

- The **attack** stage determines how long it takes for the envelope to go from zero to its maximum level. The attack time can be as short as 1ms or as long as 10 seconds.
- The **decay** stage begins when the attack stage reaches its maximum value, and determines the time it takes to decrease from this maximum value down to a steady level (set by the sustain parameter; see next). The speed of this decay can vary from 1ms to 10 seconds.

- The **sustain** stage starts at the end of the decay phase, and remains at the sustain value long as a keyboard key is held down or a gate signal remains full on. The sustain level is variable between zero (no sustain) and the envelope's maximum value.
- Finally, the **release** stage starts upon releasing the key, and sets the amount of time for the level to decrease from the sustain level down to zero.



4.1.6 Player interface

To play a tune with your synthesizer, as a player you need a player interface. The MiniBrute provides you with a two-octave, piano-type keyboard. Besides offering a way to play notes, this keyboard provides additional controls for adding expressiveness:

- **Aftertouch** generates a signal that corresponds to how hard you press on a key after it's down. You can use this signal to modulate vibrato, filter cutoff, and other parameters.
- **Velocity** corresponds to the dynamics of your playing, and similarly to aftertouch, can modulate multiple parameters.
- **Transposition** allows shifting the keyboard's note range over six octaves.
- The **pitch bend** wheel allows adding real-time pitch changes, like bending strings on a guitar.
- The **modulation** wheel allows applying real-time modulation changes to various parameters. For example, it could add vibrato, or change the filter cutoff as you move it.
- An **arpeggiator** automates the creation of repeating sequences of notes.

Alternative ways of playing the synthesizer are available through MIDI control and external CV/GATE signals.

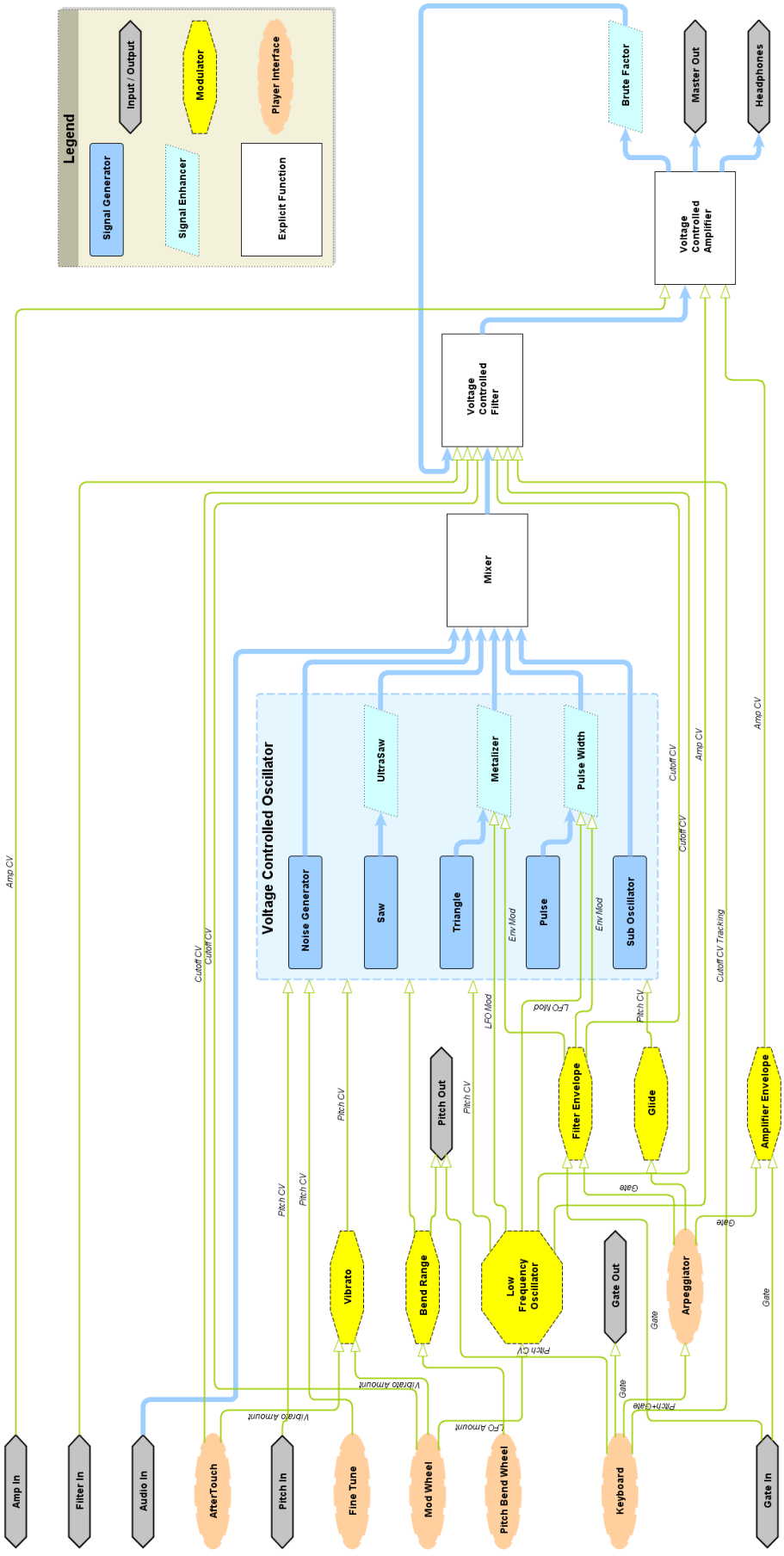
4.1.7 Inputs and outputs

In order to hear the MiniBrute, its audio output needs to connect to an audio amplifier either directly or through a mixer console (or use the Headphones output).

As to control, the MiniBrute can accept control voltage signals from devices like an analog step sequencer or MIDI controller (e.g., a MIDI drum pad or wind controller), or even audio signals from an external sound source such as a microphone or electric guitar.

The means to control other instruments, or be controlled by other instruments, is provided by the collection of inputs and outputs such as MIDI in and out, an external audio input, and CV and GATE inputs and outputs.

4.1.8 MiniBrute diagram



4.2 Front Panel

4.2.1 The oscillator and its signal mixer

The oscillator delivers three basic waveforms: sawtooth, pulse, and triangle wave. These waveforms are accessible through the signal mixer and their respective levels can be adjusted with the slider potentiometers. A sub-oscillator is available to create sub-bass sounds. The mixer also controls the level of noise and of external audio (if an external source is plugged in the rear panel's audio in jack). The mixed signals then feed the filter. The waveforms can also be modified using signal enhancers (Ultrasaw, Pulse Width Modulation and Metalizer).

4.2.1.1 The waveforms

Saw and Ultrasaw

The level of the plain Saw (sawtooth) and Ultrasaw signals is controlled with the slider potentiometer labeled with the saw icon. Pulling it down completely mutes the signals, while moving it up increases their level. When the **Ultrasaw Amount** knob is fully counter-clockwise, only the saw signal is audible. Turning this knob clockwise mixes more Ultrasaw sound in with the plain saw signal. The Ultrasaw consists of two copies of the plain saw that are independently phase-shifted using their own LFO. The phase shift of one copy is modulated at a constant rate (1Hz), while the second copy's phase shift modulation rate can be controlled with the **Ultrasaw Rate** knob from a rate of 0.1Hz (tick 0) for slow beating frequency effects, to 1Hz (tick 13) for chorus-like effects, to 3Hz (tick 15) for house-like supersaw effects, and up to 10Hz (tick 18) for "trembling" sounds.

Square and Modulated Pulse

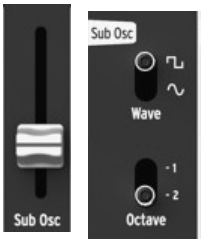
The level of the plain Square wave and Pulse width modulated signals is controlled with the slider potentiometer labeled with the square symbol. Pulling it down completely mutes the signals and moving it up increases their level. When the **ENV Amt** (envelope amount) knob is set to 12 o'clock (0 mark) and the **Pulse Width** knob is fully counter-clockwise (50% tick), the square wave is audible. Turning the **Pulse Width** knob clockwise transforms the square wave into an asymmetrical pulse whose width can be increased up to 90%, giving a very "acid" sound (like a oboe). The pulse width is also under the control of two modulators: the **Filter Envelope** [4.2.2.7], the polarity and amount of which can be adjusted with the **ENV Amt** knob; and the **LFO** [4.2.6], the polarity and amount of which can

be adjusted with the **PWM & Metalizer** knob in the front panel's LFO section.

Triangle and Metalizer

The level of the Triangle wave and Metalizer is controlled with the slider potentiometer labeled with the Triangle symbol. Pulling it down completely mutes the signals and moving it up increases their level. Turning the **Metalizer** knob from fully counter-clockwise to fully clockwise warps the triangle wave's smooth, flute-like sound into complex, metallic-sounding waves. The wave warping/folding is also under the control of two modulators: the **Filter envelope**, the polarity and amount of which can be adjusted with the **ENV Amt** knob; and the **LFO** [4.2.6], the polarity and amount of which can be adjusted with the **PWM & Metalizer** knob [4.2.6.4] in the front panel's LFO section.

The sub-oscillator (Sub Osc)



The Sub-oscillator level is controlled with the slider potentiometer labeled **Sub Osc**. Pulling it down completely mutes the sub-bass signal and moving it up increases its level. The **Sub Osc** Section contains two toggle switches. The **Wave** switch selects the sub-oscillator's waveshape, which can be either a square wave (grinding sub-bass sounds) or a sine wave (deep mellow sub-bass sounds). The **Octave** switch sets the sub-bass to either one octave (**-1**) or two octaves (**-2**) below the oscillator's pitch.

Noise

The signal mixer also provides the control of other signals which aren't generated by the Oscillator. The Noise slider potentiometer adjusts the amount of white noise signal sent to the filter. Mixing a small amount of noise with oscillator waves creates a kind of breathing, natural quality. For example, mixing the Triangle wave with a small quantity of noise creates a credible flute sound. Noise is also useful on its own to create various special effects or nature sounds such as wind, water streams, and rain, as well as percussive sounds such as cymbals.

Audio In

The **Audio In** slider potentiometer adjusts the amount of an external audio source (guitar, microphone, etc.) that can be plugged into the MiniBrute signal chain via the rear panel **Audio In** jack [4.3.3]. This makes it possible to process an external audio signal with the filter and amplifier; also note that this signal can trigger the envelopes.

4.2.2 The filter

The filter alters the oscillators' timbre via the four response modes described previously (LP, BP, HP & Notch). Its cutoff and resonance can be adjusted manually. The cutoff can also be controlled by the keyboard and modulated by various modulation generators. The MiniBrute filter is based on Nyle Steiner's *Sallen & Key* architecture (designed in the 70s) and offers -12dB/octave slopes in LP and HP modes, and -6dB/octave slopes in BP and Notch modes.

4.2.2.1 Mode

This selects among the four filter modes: **LP** (low-pass), **BP** (band-pass), **HP** (high-pass), and **Notch**. The **LP** mode is the most commonly-used, and provides sounds which are full/fat and round. The **BP** and **HP** modes provide thinner and harsher sounds. When modulated by the LFO, the **Notch** filter mode sounds similar to a phaser effect pedal.

4.2.2.2 Cutoff

This knob adjusts the filter's cutoff frequency. The frequency range goes from below 20Hz when turned fully counter-clockwise up to 18kHz when fully clockwise. For example, in **LP** mode you can adjust a sound's brightness. As an exercise, set all the oscillator mixer slider potentiometers to 0 (lowest position). Adjust the **NOISE** generator slider to midrange, then set all the **filter envelope** [4.2.2.7] and **amplifier envelope** [4.2.3.1] sliders to 0. Move the amplifier envelope **SUSTAIN** slider to its highest position. Set the filter mode to **LP**, turn the **ENV Amt** knob [4.2.2.4] to 12 o'clock and set **KBD Tracking** knob [4.2.2.5] on **Off**, then press a key and tweak the **Cutoff** knob as you listen to the changes in the sound.

The cutoff frequency can also be controlled by the keyboard [4.2.2.5] as well as by the rear panel **Filter CV** input [4.3.6].

4.2.2.3 Resonance

This knob lets you create a resonance peak at the cutoff frequency. Turning it clockwise emphasizes the partials at the cut-off frequency, and the sound becomes more aggressive. When the knob reaches its last quarter zone, the filter starts to oscillate on its own. However this oscillating behavior depends on the cutoff frequency; the MiniBrute filter oscillates within a range beginning around 350 Hz up to approximately 8 kHz. To extend the oscillation range, use the **Brute Factor** knob [4.2.8.4].

4.2.2.4 ENV Amt (envelope amount)

The **ENV Amt** lets you control the amplitude and polarity of the envelope signal sent to modulate the filter cutoff frequency. At the 0 position (12 o'clock), no envelope modulation occurs. When turned counter-clockwise (below the 0 mark), the **ENV Amt** knob sends an increasing amount of the inverted ADSR envelope. When turned clockwise (beyond the 0 mark) the **ENV Amt** knob sends an increasing amount of the standard, positive-going ADSR envelope.

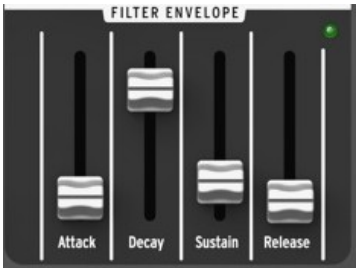
4.2.2.5 KBD Tracking

The filter cutoff frequency can also be keyboard-controlled. The KBD Tracking knob lets you adjust how the cutoff follows the keyboard. Repeat the exercise described in the Cutoff section, set the **KBD Tracking** knob to 100% (12 o'clock), then play a series of notes on the keyboard. The filter should open more to retain high frequencies as you play higher up on the keyboard.

4.2.2.6 Envelope speed

This switch toggle the speed of both the filter and amplifier envelopes. In fast mode, the ADSR curves can be very rapid, which is useful when creating "snappy" and percussive sounds. In the slow mode, the ADSR curves can be very slow, making them suitable for slow, evolving sounds like pads.

4.2.2.7 Filter Envelope



In normal mode, the Filter envelope is triggered by the keyboard GATE signal. It can also be triggered by other GATE sources such as the **Arpeggiator** clock [4.2.7] or the rear panel's external **GATE IN** jack [4.3.6]. Note that depending on the position of the **GATE Source** switch located on the rear panel [4.3.4], the filter envelope is under the control of either the keyboard GATE signal, the automatic GATE from the external **Audio input** [4.3.3], or the hold position of the **GATE** switch.

The **Attack** slider sets the duration of the envelope's first stage. Depending on the filter section's **ENV Speed** switch [4.2.2.6] the Attack time ranges from 1ms to 1s or from 10ms to 10s.

The **Decay** slider sets the duration of the envelope's second stage. Depending on the filter section's ENV Speed switch [4.2.2.6] the Decay time ranges from 1ms to 1s or from 10ms to 10s.

The **Sustain** slider sets the level of the envelope's sustain stage.

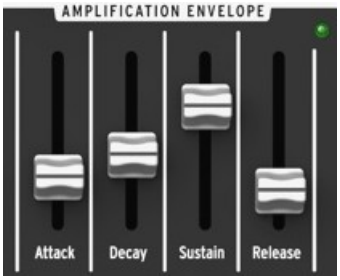
The **Release** slider sets the duration of the envelope's final stage. Depending on the filter section's ENV Speed switch [4.2.2.6] the Release time ranges from 1ms to 1s or from 10ms to 10s.

A LED indicator shows the amount of filter envelope sent to filter. The LED's brightness depends both on the envelope signal amplitude and on the **Velocity** signal sent by the keyboard (when the Velocity function has been enabled over **USB** by the **MiniBrute Connection** software; see the Software section of this manual).

4.2.3 The amplifier

The amplifier controls the sound's amplitude dynamics, as determined by the **Amplifier Envelope** and **LFO** parameters.

4.2.3.1 Amplifier Envelope



In normal mode, the Amplifier envelope is triggered by the keyboard GATE signal. It can also be triggered by other GATE sources such as the **Arpeggiator** clock [4.2.7] or the rear panel's external GATE IN jack [4.3.6]. Note that depending on the position of the **GATE** switch located on the rear panel [4.3.4] the amplifier envelope is under the control of either the keyboard GATE signal, the automatic GATE from the external **Audio input**, or the hold position of the **GATE** switch.

The **Attack** slider sets the duration of the envelope's first stage. Depending on the filter section's **ENV Speed** switch [4.2.2.6] the Attack time ranges from 1ms to 1s or from 10ms to 10s.

The **Decay** slider sets the duration of the envelope's second stage. Depending on the filter section's ENV Speed switch [4.2.2.6] the Decay time ranges from 1ms to 1s or from 10ms to 10s.

The **Sustain** slider sets the level of the envelope's sustain stage.

The **Release** slider sets the duration of the envelope's final stage. Depending on the filter section's ENV Speed switch [4.2.2.6] the Release time ranges from 1ms to 1s or from 10ms to 10s.

A LED indicator show the envelope amount sent to the amplifier. The LED's brightness depends on the envelope signal's amplitude.

4.2.4 Controls

4.2.4.1 MOD Wheel

The **MOD Wheel** switch controls the **Modulation** wheel assignment [4.2.8.2]. Depending on the position of this switch the Mod wheel controls either the filter cutoff frequency (**Cutoff** position), the vibrato amount sent to the oscillator (**Vibrato** position), or the amount (**LFO Amt**) of the current LFO signal to the various targets (**PWM & Metalizer**, **Pitch**, **Filter** and

Amp). With the third option (**LFO Amt**), all the LFO modulation signals are controlled by the Modulation Wheel so when it's at its minimum position (**Min**) the targets receive no LFO signal; when the switch is set on this position, make sure the Modulation Wheel is fully engaged to maximum.

4.2.4.2 Aftertouch

The **Aftertouch** switch controls the aftertouch signal assignment; aftertouch is very useful to trigger modulation events while playing without using extra knobs or sliders, thus increasing expressiveness. The **Aftertouch** switch has three positions: it can be routed the filter cutoff frequency (**Cutoff**), used to trigger **Vibrato** [4.2.5], or be disabled (**Off**).

4.2.4.3 Bend Range

The **Bend Range** knob controls the range of the **Pitch** wheel [4.2.8.2]. With this knob fully counter-clockwise, the Pitch wheel ranges from -1/2 tone (lowest position) up to +1/2 tone. With this knob fully clockwise, the Pitch wheel ranges from -1 octave (lowest position) up to +1 octave.

4.2.4.4 Glide

The **Glide** knob sets the amount of portamento (i.e., how long it takes for the pitch to glide from one note to another when notes are played on the keyboard or by the Arpeggiator). With this knob fully counter-clockwise, there is no glide and the note pitch transitions instantly to the next note. Turning this knob clockwise increases the portamento effect. At the maximum setting, it takes approximately 4s to glide from the lowest **C** of the MiniBrute keyboard to the highest **C** (two octaves above).

4.2.5 Vibrato

The Vibrato is a specialized low frequency oscillator dedicated to oscillator pitch modulation. It's completely independent from other modulation sources, and its modulation depth and triggering are controlled by the **Modulation** wheel [4.2.4.1] and the **Aftertouch** switch [4.2.4.2] respectively. It provides different modulation waveforms, selectable with a three-position switch:

- a positive square wave useful to create a trill-up effect (the pitch jumps alternatively between the keyboard pitch up to a higher pitch depending on the **Modulation** wheel setting);
- a sine wave for the classical vibrato effect;
- a negative square wave for trill-down effect.

The Rate knob controls the Vibrato's modulation rate, and ranges from 3 Hz to 30

Hz.

4.2.6 LFO

The LFO is a low frequency oscillator. It is the primary modulation source for the MiniBrute's other sections.

4.2.6.1 Wave

The LFO offers several modulation waveforms, selected by the **Wave** knob: sine, triangle, sawtooth, square, random stepped (also referred to as Sample & Hold), and random gliding.

4.2.6.2 Rate

The Rate knob set the LFO oscillation rate, and ranges from very slow rates (0.1Hz) up to quite fast rates (100Hz). The red LED located above the knob blinks in time with the rate. Note that the LFO rate may be superseded by the arpeggiator tempo clock if the **Clock** switch is set to **Arpeg** (see below).

4.2.6.3 Clock

The **Clock** switch sets the LFO rate's operating mode. It can be slaved to the arpeggiator tempo clock (**Arpeg**) or set to **Free** mode (i.e., the LFO rate depends solely on the **Rate** knob setting).

4.2.6.4 Modulation routing

PWM & Metalizer

The **PWM & Metalizer** knob controls the amplitude and polarity of the LFO signal that modulates the oscillator pulse wave Pulse Width, and the Metalizer's folding level. At the 0 position (12 o'clock) no modulation is sent to the targets. When turned counter-clockwise (below the 0 mark) the **PWM & Metalizer** knob sends an increasing amount of the inverted LFO signal. When turned clockwise (beyond the 0 mark) the **PWM & Metalizer** knob sends an increasing amount of the normal LFO signal.

Pitch

The **Pitch** knob controls the amplitude and polarity of the LFO signal that modulates the oscillator pitch. At the 0 position (12 o'clock) no modulation is sent to the targets. When turned counter-clockwise (below the 0 mark) the **Pitch** knob sends an increasing amount of the inverted LFO signal. When turned clockwise (beyond the 0 mark) the **Pitch** knob sends an increasing amount of the normal LFO signal.

Filter

The **Filter** knob controls the amplitude and polarity of the LFO signal that modulates the filter's cutoff frequency. At the 0 position (12 o'clock) no modulation is sent to the target. When turned counter-clockwise (below the 0 mark) the **Filter** knob sends an increasing amount of the inverted LFO signal. When turned clockwise (beyond the 0 mark) the **Filter** knob sends an increasing amount of the normal LFO signal.

Amp

The **Amp** knob control the amplitude and polarity of the LFO signal that modulates Amplifier's level. On the 0 position (12 o'clock) no modulation is sent to the target. When turned counter-clockwise (below the 0 mark) the **Amp** knob sends an increasing amount of the inverted LFO signal. When turned clockwise (beyond the 0 mark) the **Amp** knob sends an increasing amount of the normal LFO signal.

4.2.7 Arpeggiator

The arpeggiator offers a way to sequence notes that are played on the keyboard. It can create simple arpeggio patterns as well as complex, intertwined patterns.

4.2.7.1 Hold/On/Off

The **Hold/On/Off** switch is enables or disables the arpeggiator:

- **Off** disables the arpeggiator, and the MiniBrute synthesizer is in "normal" operation mode.
- **On** activates the arpeggiator as long as keys are pressed down. In this case, the arpeggiator repeatedly plays the notes in a sequence that corresponds to the pitch order in which the keys were pressed. The played pattern can also be modified by the other arpeggiator controls (**Octave, Mode, Swing** and **Variation** knobs).
- The **Hold** mode allows recording/playing back a sequence of notes without needing to keep the key held down. The arpeggiator plays the pattern repeatedly until you either press a new key or return the switch to the **On** or **Off** positions. By default, all notes are pitch-sorted; however the **Hold** mode

can be toggled in a time-sorted notes mode through the MiniBrute Connection software (see chapter 4.4 for further details). In this mode, by holding down the first note pressed and then adding other notes (or even the same ones several times), you can build looped melodic sequences (up to 16 notes).

4.2.7.2 Octave

The **Octave** knob determines the arpeggiator's transposition range, from one to four octaves.

4.2.7.3 Mode

The **Mode** switch chooses how the pool of arpeggiated notes will be sorted with respect to playing order:

- **Up** .....sorts the pool by ascending pitch.
- **Down**.....sorts the pool by descending pitch.
- **Up/Dwn**.....first plays the pool in Up mode, then Down mode. The first and last notes repeat.
- **Rndm**.....picks notes randomly from the pool.

4.2.7.4 Swing

The **Swing** switch sets the swing amount applied to every even note in the arpeggio, from a strictly "mechanical" groove to one that's totally "off-the-tempo." 6 positions are selectable, with swing values varying from 50% (position 1) to 75% (position 6).

4.2.7.5 Step

The step selector defines the tempo subdivisions to be used:

- **1/4**.....quarter note, or one note on each step
- **1/8**.....eighth note, or 2 notes per step
- **1/16**.....sixteenth note, or 4 notes per steps
- **1/4T**.....quarter note (triplet), or 3 notes per 2 steps
- **1/8T**.....eighth note (triplet), or 6 notes per 2 steps
- **1/16T**.....sixteenth note (triplet), or 12 notes per 2 steps

4.2.7.6 Tempo & Tap

The **Tempo** knob sets the arpeggiator's clock rate from 30 bpm to 260 bpm. The red LED under the knob blinks in sync with the tempo beat.

The **Tempo** knob acts differently if MiniBrute detects an external MIDI clock on the **MIDI Input** or **USB** connector:

- With no external MIDI clock, the **Tempo** knob acts as expected — its position sets the general BPM value.
- An external MIDI clock deactivates the **Tempo** knob except at its extremes, where it acts as a performance-oriented divider/multiplier. Fully counter-clockwise halves the tempo, while fully clockwise doubles the tempo.

You can also define the tempo empirically with the **Tap** button, which provides a "tap tempo" function. It too acts differently if MiniBrute detects an external MIDI clock on the **MIDI Input** or **USB** connector, and works interactively with the **Tempo** knob:

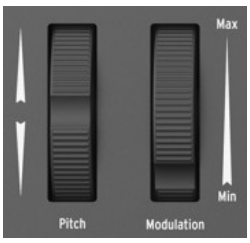
- With no external MIDI clock, you can set the tempo with a "human touch" by tapping on the pad at the desired beat. However when playing "live" with human musicians, you may want to synchronize the synthesizer tempo accurately with the other players; to do this, hold down the **Tap** pad. The **Tempo** knob switches from absolute to relative mode, so so you can use it to fine-tune the groove.
- With an external MIDI clock, holding down the **Tap** pad transforms the **Tempo** knob into a performance-oriented tempo modifier that ranges from -100% (divide by 2) to +100% (multiply by 2). The current **Tempo** knob position represents the MIDI-defined general tempo; moving the knob increases or decreases tempo. MIDI clock control resumes if you release the **Tap** pad, so the MiniBrute immediately gets back in sync with the general groove.

4.2.8 General controls

4.2.8.1 Keyboard

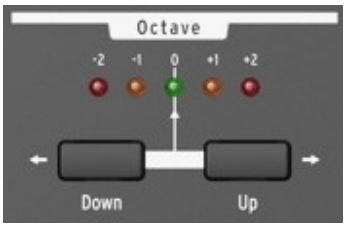
The MiniBrute keyboard covers a two-octave range, which can be extended using the **Octave Down/Up** buttons [4.2.8.3]. The keyboard also provides aftertouch and velocity control, and can also be used as fully polyphonic MIDI controller for other devices via the rear panel **MIDI out** jack [4.3.5].

4.2.8.2 Wheels



The MiniBrute features the two classic control wheels. The **Pitch** wheel position defaults to the middle of its range, and returns to its default position when released. This wheel creates a pitch bend effect, where the player can shift pitch smoothly up or down while playing a note. The amount of shift is proportional to the rotation of the wheel, with its full range adjustable between +/- one semitone to +/- one octave by the Bend Range knob [4.2.4.3]. The second wheel is the **Modulation** wheel. It sets the overall amount of modulation signal sent to targets selected by the **MOD Wheel** switch [4.2.4.1]. Depending on the switch setting, it controls the **Cutoff**, the **Vibrato** or the **LFO** amounts.

4.2.8.3 Octave



The **Octave** section transposes the MiniBrute keyboard over a wide pitch range. One LED among the five colored LEDs (**-2** red,**-1** orange, **0** green ,**+1** orange,**+2 red**) is lit at a time and indicates the transposition octave. The default selection is 0 (green LED), where the leftmost C key corresponds to C2 (130.81Hz) and the rightmost C key corresponds to C4 (523.25Hz).

For example, pressing the **Down** button once shifts the keyboard down by one octave and the leftmost C is now C1 and the rightmost is C3. Pressing the **Down** button a second time shifts the keyboard down by one more octave.

To shift the keyboard up by one octave press the **Up** button.

With the **Down** and **Up** buttons the MiniBrute can play notes from C0 (32.7 Hz) up to C6 (2093 Hz), with the **Pitch** wheel altering these even further.

When you change the octave with **Down**/**Up** buttons, transposition occurs only after a key has been pressed.

4.2.8.4 Brute Factor

The **Brute Factor** is a special MiniBrute feature inspired by a common patch used on a famous vintage mono-synthesizer that connected the headphone output to the external audio input. The result is a kind of feedback loop that's ideal for raspy and grungy sounds. This patch has been implemented internally to the MiniBrute, and is controlled by the **Brute Factor** knob.

This knob's normal position is fully counter-clockwise, which disables the **Brute Factor**; turning up the knob gradually adds distortion to the sound. For low **Brute Factor** settings, the distortion is smooth and gentle but becomes harsher as you turn up the knob. When turned up above about 75% of the way, the MiniBrute can go berserk and produce barely controllable, crazy feedback sounds.

The **Brute Factor** feature drastically alters the filter characteristics, so expect highly unpredictable results at extreme settings. You have been warned!

4.2.8.5 Phones

The **Phones** knob controls the volume of the Phones output located on the rear panel [4.3.3]. Remember to be cautious with levels when listening through headphones.

4.2.8.6 Master Volume

The **Master Volume** knob sets the MiniBrute overall output volume, which fits the standard +4dBu line level. To silence the MiniBrute, turn this knob fully counter-clockwise.

4.2.8.7 Fine Tune

The **Fine Tune** knob provides precision adjustment of the oscillator pitch. The 12 o'clock position corresponds to the default tuning (i.e. A=440Hz) when you play the second rightmost A of the keyboard and the default **Octave** [4.2.8.3] is selected. The full range of the **Fine Tuning** knob is from about -2 semitones to +2 semitones. Fine-tuning makes it possible to tune the MiniBrute to other instruments that are slightly out of tune.

4.3 Rear panel

4.3.1 Power supply

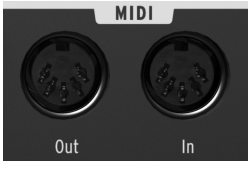
The AC connector receives the MiniBrute's external power supply plug. Only connect the adequate power supply: 12V DC, 1A, center positive.

The **Power** button turns the power on/off.

4.3.2 USB

The **USB** outlet interfaces with a personal computer. It can be used for MIDI communication, as well as editing some of the synthesizer internal parameters such as MIDI channel or velocity curves, or updating the arpeggiator firmware, through the MiniBrute Connection software [4.4].

4.3.3 MIDI



The **MIDI Out** and **In** jacks let your MiniBrute communicate with other MIDI devices. The MiniBrute can serve as a MIDI polyphonic controller or MIDI sound module. If you are using MiniBrute as a sound module, use a MIDI cable to connect MiniBrute **MIDI In** connector your external MIDI device's MIDI Out connector. To control an external MIDI device from MiniBrute keyboard, patch a MIDI cable from MiniBrute **MIDI Out connector** to your external MIDI device's MIDI IN connector.

By factory setting, the MiniBrute sends and responds on MIDI channel 1. This can be easily changed through the MiniBrute Connection software [4.4].

4.3.4 Gate Source

The **Gate Source** switch selects which gate signal triggers the MiniBrute envelopes. The default **KBD** triggers the gate from the keyboard. **Hold** mode forces the envelope to the SUSTAIN stage independently from any other gate source. This mode is very useful for drones, because there is no need to press a key and you can use both hands to tweak the knobs! In **Audio** mode, a gate signal is generated when the signal level at the **AUDIO In** [4.3.5] reaches an internally preset threshold.

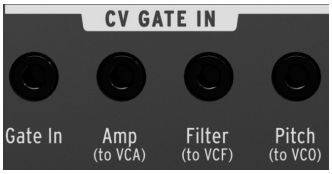
The threshold value for the Audio mode, as well as several other general settings, can be adjusted through the MiniBrute Connection software [4.4].

4.3.5 AUDIO

Connect the **Master Out** with an unbalanced audio cable to an audio mixer, a computer's sound card, or directly to an audio amplifier. The **Master Volume** knob [4.2.8.6] controls the output level.

You can connect any audio source (synthesizer, pre-amplified guitar, output of a mixer, etc.) to the **AUDIO In** jack, and process the incoming signal with the MiniBrute filter and amplifier. The **AUDIO In** signal can also trigger the MiniBrute envelopes if you select **Audio** as the **Gate Source** [4.3.4]. Connect your headphones to the phones output, and set the volume with the **Phones** volume knob [4.2.8.5].

4.3.6 CV / GATE IN



The MiniBrute also connects with other analog devices (analog synthesizer, analog step sequencer, etc.) through a **CV/GATE** interface where **CV** means Control Voltage. The **Gate In** 1/8" jack allows other analog devices to trigger the MiniBrute envelopes. The main MiniBrute functions (i.e., amplifier volume, filter cutoff, and oscillator pitch) are controlled by the **Amp (to VCA)**, **Filter (to VCF)** and **Pitch (to VCO)** 1/8" jacks respectively.

4.3.7 CV / GATE OUT

The MiniBrute can also control other analog devices. The **Pitch Out** 1/8" jack provides the CV produced by the MiniBrute keyboard as well as by the Pitch wheel. The keyboard's GATE signal is also available on the **Gate Out** 1/4" jack.

4.4 Configuration software: MiniBrute Connection

However being analog, the MiniBrute synthesizer comes with a software allowing various configuration tasks, such as:

Global settings	MIDI channel selection
	Velocity curve selection
	Aftertouch curve selection
	Audio Input gain selection
	LFO re-triggering
	Play mode
	Legato activation
	Arpeggiator mode
Maintenance	Firmware update

The "MiniBrute Connection" software and its dedicated User's Manual are freely downloadable from the ARTURIA website:

http://www.arturia.com/products/minibruteconnection

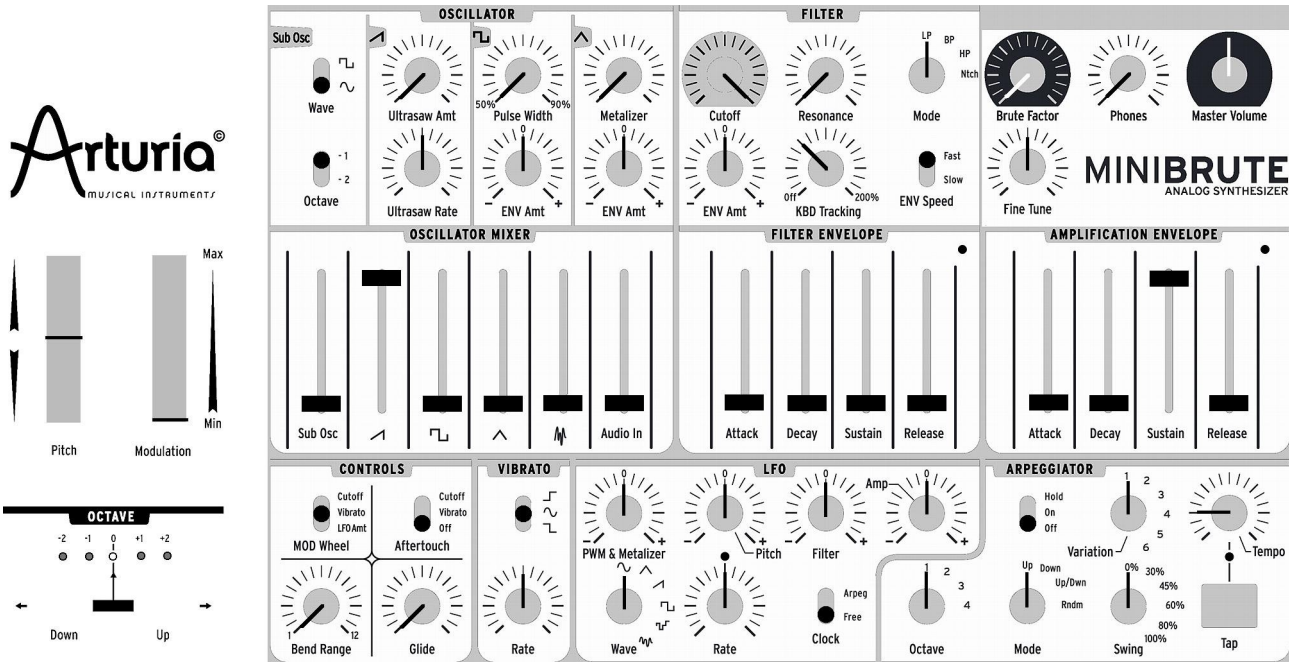
5 USING YOUR MINIBRUTE

5.1 Let's create a basic sound

Let's define a basic, initialized configuration for designing your own sound.

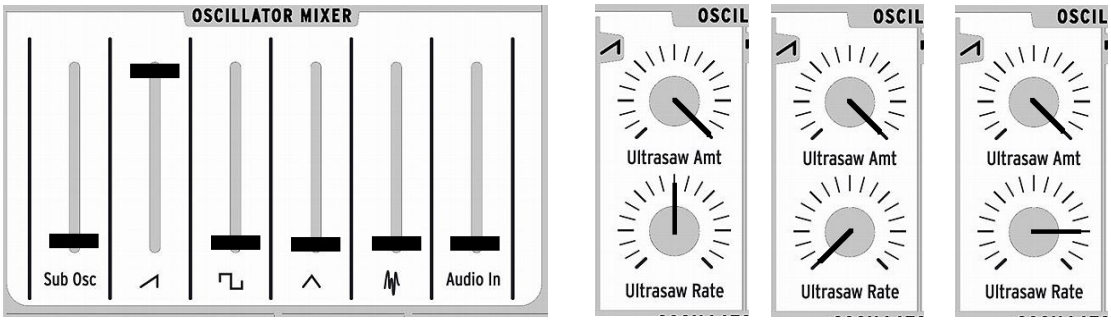
Connect your MiniBrute to an external audio amplifier and power on your MiniBrute as previously described [2.3]. Set the **Gate Source** switch [4.3.4] on the MiniBrute rear panel to the **KBD** position.

Adjust the sliders and knobs and shown in the following patch view.



Play the keyboard, and you should hear a basic sawtooth sound rich in harmonics. Next, let's add some animation and life to this flat sawtooth sound. As shown below, turn the **Ultrasaw Amt** fully clockwise. This transforms the sound as if there were two or three slightly detuned oscillators, which creates a slow "beating" effect where the oscillators interact with each other.

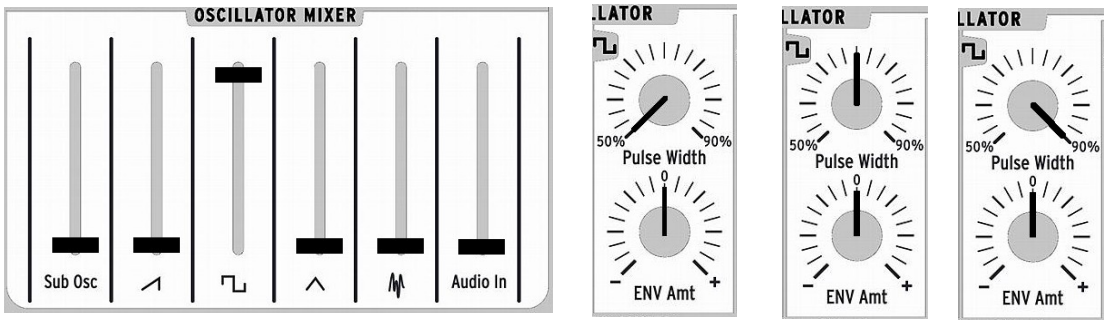
Now turn the **Ultrasaw Rate** knob fully counter-clockwise; the beating becomes very slow and creates a slow sweep. Push the **OCTAVE Down** button once to obtain very deep, lively brass sounds; next push the **OCTAVE Up** button once to return to the default pitch range, turn the **Ultrasaw Rate** knob fully clockwise, and you'll hear cliché *house music* sounds. The effect is even more pronounced if you add some vibrato by turning up the **Modulation** wheel slightly.



*Try out various settings of the **Ultrasaw** knobs*

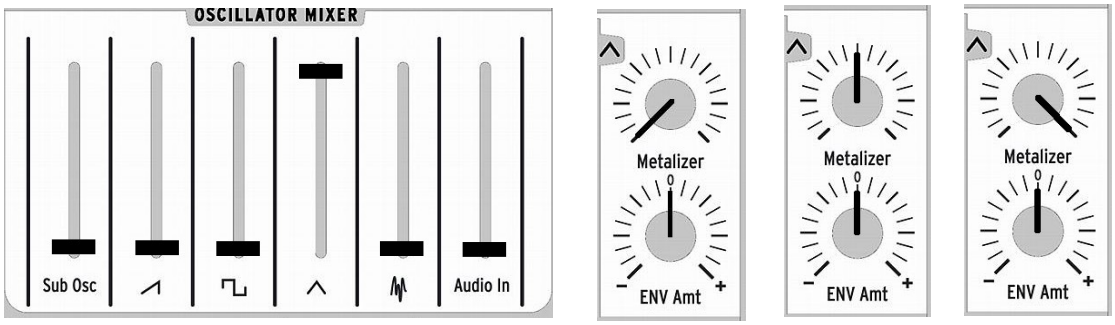
Now let's compare the various waveforms available.

Turn down the *Sawtooth* slider and turn up the *Square* slider. Play the keyboard, and you'll hear a hollow, clarinet-like sound. Now turn the Pulse Width knob clockwise as shown below. As you turn up the knob, the sound becomes slightly harsher and "nasal," like a reed instrument.



*Try out various settings of the **Pulse Width** knob*

Turn down the *Square* slider and turn up the *Triangle* slider. The *Triangle* waveform is very basic, with few harmonics. Now turn the **Metalizer** knob clockwise as shown below. As you turn up the knob, the sound becomes richer by adding more partials, and evokes metallic sounds like metal plates or metal strings. The sound acquires a clangorous nature, but remains in tune.

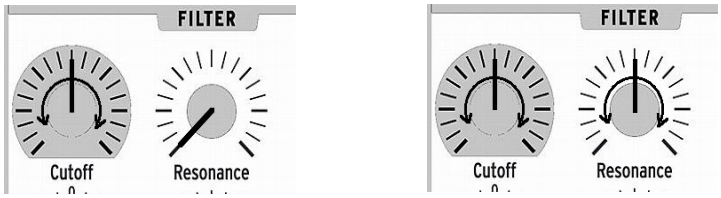


*Try out various settings of the **Metalizer** knob*

Next, let's control the harmonic content of these basic pitched waveforms by using the filter.

Return to our initialized sound as shown at the start of this chapter, then tweak the **Cutoff** knob. As you turn it down (counter-clockwise), the bright *Sawtooth* sound loses more and more of its higher partials and becomes "darker" and warmer. Next, increase (turn clockwise) the amount of Resonance and tweak the **Cutoff** knob. The increased resonance gives more "edge" to the sound and with a

middle setting (12 o'clock), you'll hear a *wha-wha*-like effect when tweaking the **Cutoff** knob. At maximum resonance the **FILTER** starts auto-oscillating, which superimposes a tonal pitch to the filtered sound. Also try out the different modes (**LP**, **BP**, **HP**, **Notch**).



*Let's tweak the **FILTER Cutoff** and **Resonance***

5.2 Sound modulations

Return again to our initialized, basic sound shown at the start of this chapter. Set the **CONTROLS** section's **MOD Wheel** switch to **Vibrato**. Now while playing the keyboard, turn the modulation wheel. The vibrato modulates the oscillator at the rate defined by the **VIBRATO** section's **Rate** knob. Now toggle the switch to its various settings; the upper position creates up-trills and the lower, down-trills.

Return the **MOD Wheel** to its minimum position and set the **CONTROLS** section's **Aftertouch** switch to **Vibrato**. Play notes on the keyboard; increasing your finger's pressure on a key increases the amount of vibrato modulation. Reducing the finger pressure reduces the amount of vibrato modulation. **Aftertouch** can also be assigned to the **FILTER Cutoff**.

As you've heard, the **Vibrato** modulation is very gentle and musical — which is great, unless you want to produce weird space sound FX! For more pronounced modulation effects we'll use the **LFO**, which provides six different modulation waveforms. These waveforms can modulate most of the other MiniBrute sections: the **PWM** and **Metalizer**, oscillator **pitch**, filter **cutoff** and eventually, the sound's **amplitude.**

Let's have fun modulating the **OSCILLATOR** pitch. Set all sliders, pots, and switches as shown in the initialized patch [5.1], then press a key and tweak the **LFO** section's **Pitch** knob. Try different **Rate** knob settings too. Test and try the various **LFO** waveforms; for example select the fifth waveform (random steps), set the **CONTROLS** section's **MOD Wheel** switch to **LFO Amt,** then adjust the **Pitch** knob to maximum (clockwise). Press a key and adjust the modulation amount with the **Modulation** wheel.

The four modulation knobs let you adjust not only the modulation amounts, but also their *polarity* (whether increasing modulation increases, or decreases, a parameter value). This is particularly evident when modulating the Pitch with the sawtooth modulation waveform. When turned toward the **+** mark, the pitch glides up slowly to the highest pitch, then snaps back to the lowest pitch. When turned toward the **–** mark, the pitch glides down to the lowest pitch, then snaps back to the highest pitch.

Another important sound modulation source is the **FILTER ENVELOPE.** This provides dynamic control over either the **FILTER Cutoff**, **OSCILLATOR Pulse Width,** or the **Metalizer** harshness. The **FILTER ENVELOPE** amount and polarity are controlled by the **Env Amt** knobs, which are very useful when you want to create lively sounds.

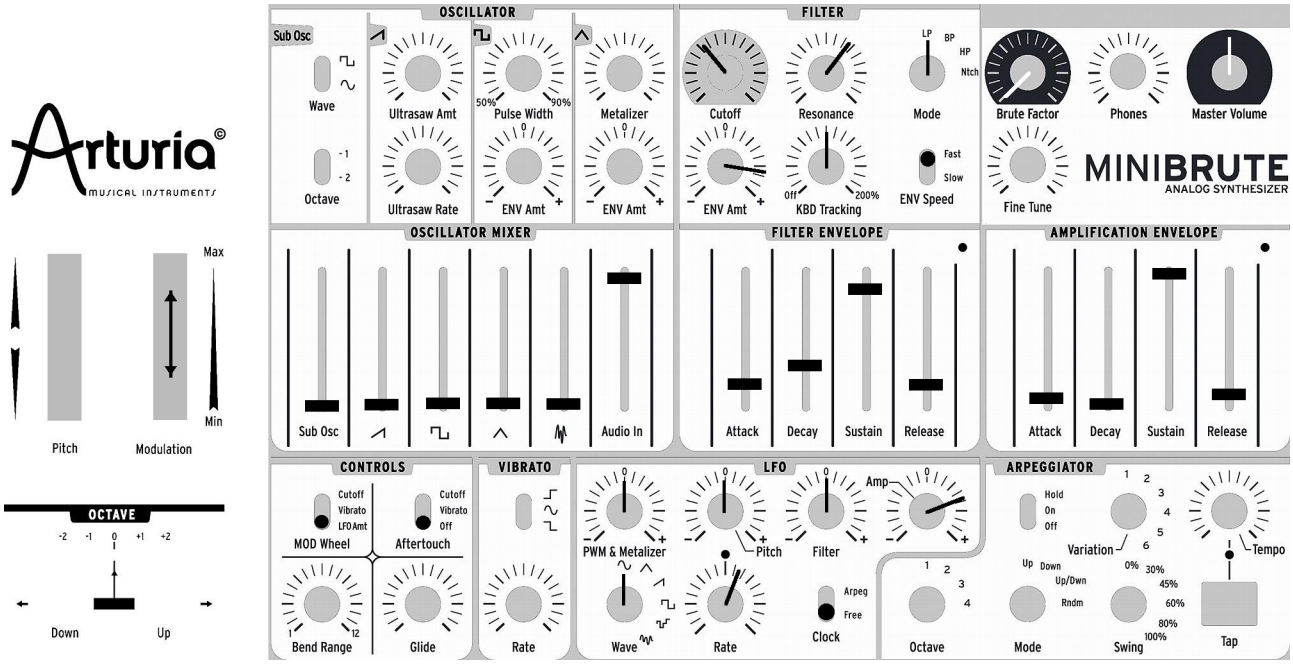
5.3 External sound processing

Plug your external audio source in the **Audio In** 1/8" jack [4.3.5] on the MiniBrute's rear panel. Your audio source must provide line level signals, so with electric guitar you'll need to patch a preamp or other processor (e.g., compressor, distortion, multieffects) between the guitar and the **Audio In**. Adjust the **OSCILLATOR MIXER**'s **Audio In** slider to the desired level.

When using an external audio input, select a **GATE Source** setting that corresponds to how you want to process the external source.

- To trigger the envelopes with the keyboard, set the **GATE Source** switch on the MiniBrute's rear panel to the **KBD** position.
- To hear the external source continuously and process it, select the **Hold** position.
- To trigger the envelopes when the external signal level exceeds a fixed threshold, select the **Audio In** position (you can change the threshold level using the MiniBrute's software; see chapter 4.4.

The following setting produces an *auto-wha* effect combined with tremolo. The **Modulation** wheel controls the amount of tremolo (make sure that the **CONTROLS** section's **MOD Wheel** switch is set to **LFO Amt**).



6 LEGAL NOTES

6.1 No liability for consequential damages

Neither ARTURIA nor anyone else involved in the creation, production, or delivery of this product shall be liable for any direct, indirect, consequential, or incidental damages arising out of the use of, or inability to use this product (including without limitation, damages for loss of business profits, business interruption, loss of business information and the like) even if ARTURIA was previously advised of the possibility of such damages. Some states do not allow limitations on the length of an implied warranty or the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

6.2 FCC Information (USA)

DO NOT MODIFY THE UNIT! This product, when installed as indicate in the instructions contained in this manual, meets FCC requirement. Modifications not expressly approved by ARTURIA may avoid your authority, granted by the FCC, to use the product.

IMPORTANT: When connecting this product to accessories and/or another product, use only high quality shielded cables. Cable (s) supplied with this product MUST be used. Follow all installation instructions. Failure to follow instructions could void your FFC authorization to use this product in the USA.

NOTE: This product has been tested and found to comply with the limit for a Class B Digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide a reasonable protection against harmful interference in a residential environment. This equipment generate, use and radiate radio frequency energy and, if not installed and used according to the instructions found in the users manual, may cause interferences harmful to the operation to other electronic devices. Compliance with FCC regulations does not guarantee that interferences will not occur in all the installations. If this product is found to be the source of interferences, which can be determined by turning the unit "OFF" and "ON", please try to eliminate the problem by using one of the following measures:

- Relocate either this product or the device that is affected by the interference.

- Use power outlets that are on different branch (circuit breaker or fuse) circuits or install AC line filter(s).
- In the case of radio or TV interferences, relocate/ reorient the antenna. If the antenna lead-in is 300 ohm ribbon lead, change the lead-in to coaxial cable.
- If these corrective measures do not bring any satisfied results, please the local retailer authorized to distribute this type of product. If you cannot locate the appropriate retailer, please contact ARTURIA.

The above statements apply ONLY to those products distributed in the USA.

6.3 Canada

NOTICE: This class B digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulation.

AVIS: Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

6.4 Europe

CE This product complies with the requirements of European Directive 89/336/EEC.