OWNER'S

INTER CONTINENTAL CAPACITIVE BALLISTIC SYNTH

MANUAL

Thank you for purchasing the new Inter Continental Capacitive Ballistic Synth, IC^{2}BS, from Freedom Enterprise. This small portable synth was designed to be a new tool in your inventory of sound equipment to help you get started in the world of sound synthesis. By reading this manual you'll become familiar with the IC^{2}BS, how to use it and how to make the most of it. Good luck, and have a great experience with your brand-new synth from Freedom Enterprise.
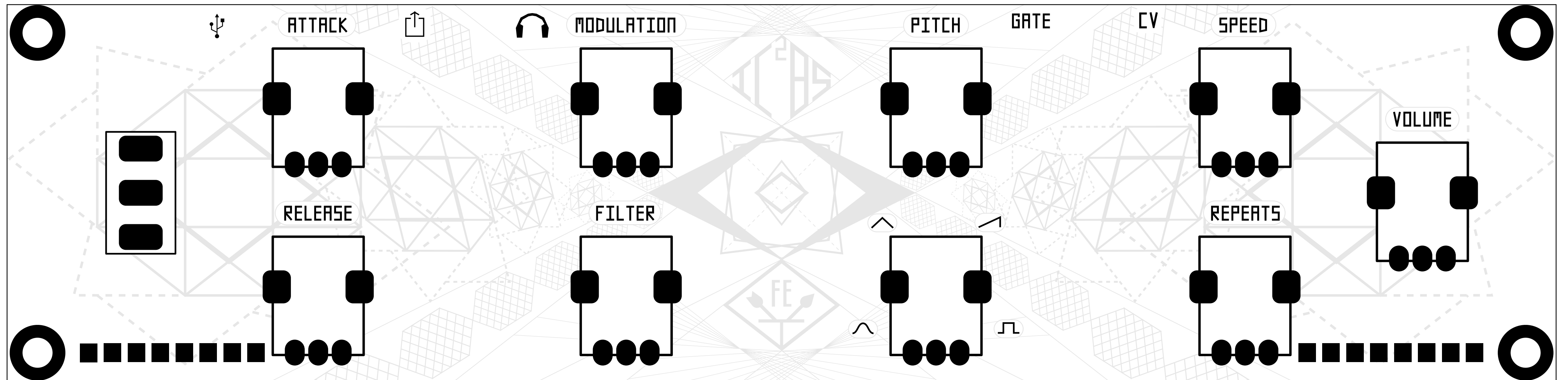
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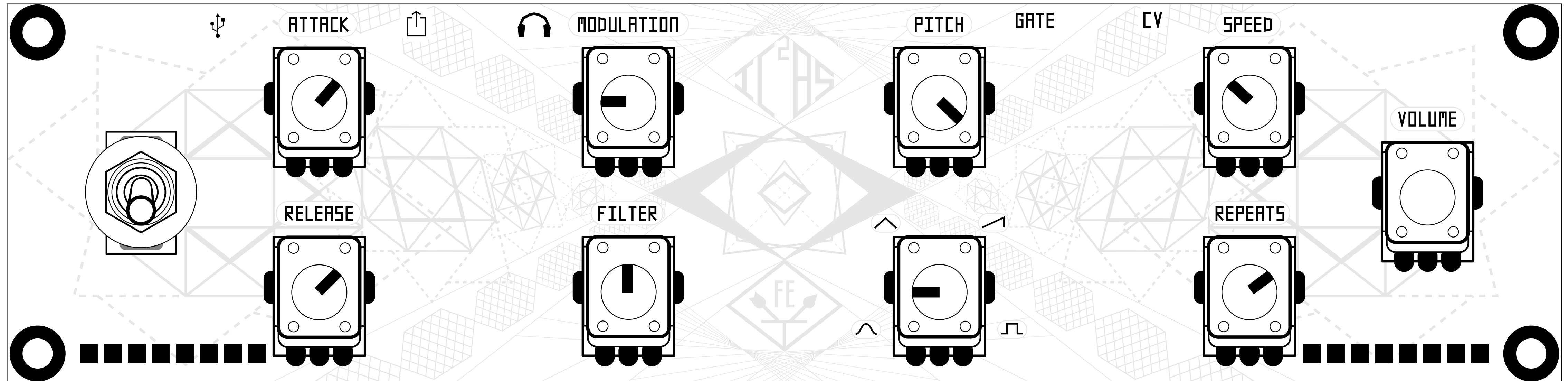# INTERFACE

Figure 1. User Interface.

BOOTING UP

Figure 2. Preset example.

Insert a Li-Ion 18650 cell in the battery holder with the correct polarity.
Connect a micro-USB cable and a red led should light up on the Li-ion charger
indicating the battery is charging.
Flip the power switch and the LED in the middle of the Main PCB should light up, as
well as a red LED on the DC Booster.

MODES OF OPERATION

Monophony and Polyphony

This synth contains two different modes that can be switched by the user during boot up.
In Monophony mode, only one note can be played at the time, however the two built in DCOs are used to create a ring modulator. This is the default boot up mode.
In Polyphony mode, two notes can be played at the same time. There's a DCO, DCF and DCA for each voice. However, in this mode the ring modulator is not present.
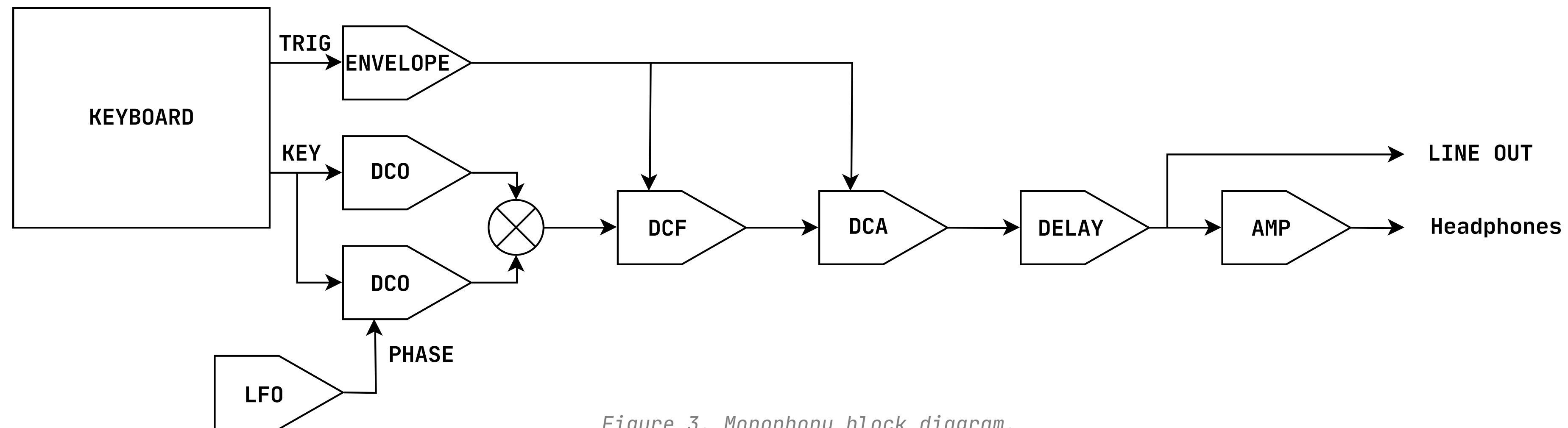To access this mode, press and hold SW1 during power up.
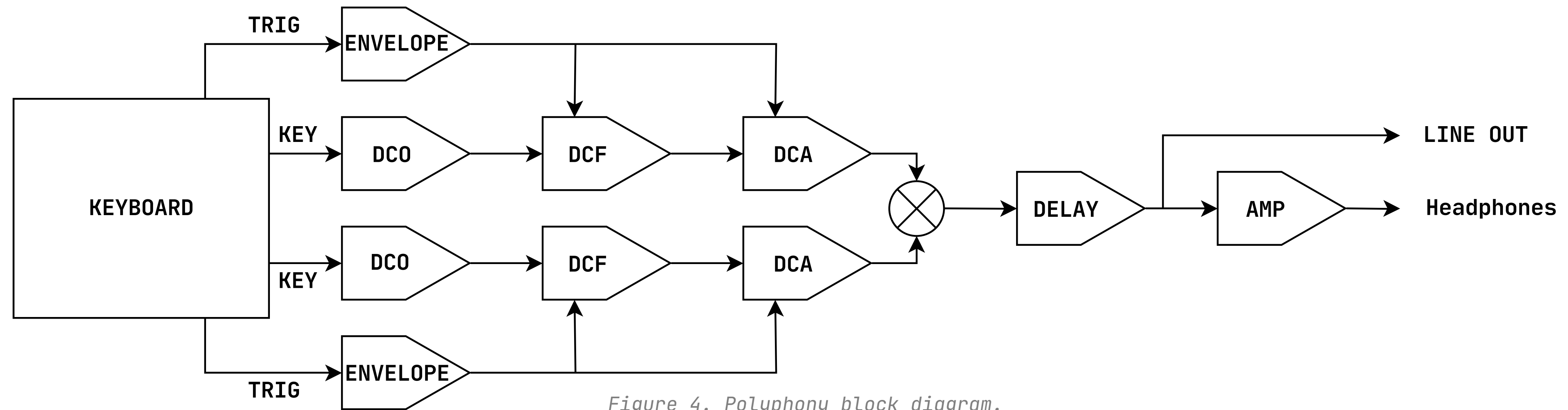
Figure 3. Monophony block diagram.

Figure 4. Polyphony block diagram.

CV and Gate

The keyboard generates a CV and Gate signals that can be used to control other equipment. The CV follows the 1V/Octave standard. This is the default boot up mode. To use the CV and Gate as inputs, thereby allowing other equipment to control the IC^2BS, press and hold the SW2 switch during power up.

Both input and output modes, the CV and Gate can only control one note at a time.

FEATURES AND CONTROLS

DCO [DIGITALLY CONTROLLED OSCILLATOR]

The oscillator is the primary component that generates the sound. Its frequency is controlled through the keyboard, while the pitch knob controls the octave. The wave selector knob switches between various waves being generated such as Sine, Triangle, Sawtooth and Square.

DCF [DIGITALLY CONTROLLED FILTER]

This digital filter simulates the filters found in conventional analog synths. Turn it CCW for a mellow sound and CW for a brighter sound filled with harmonics.
The filter is internally connected to the Envelope Generator, ramping up and down when a key is pressed and depressed.

DCA [DIGITALLY CONTROLLED AMPLIFIER]

The output amplitude of the audio signal, also known as volume, is controlled through the DCA, following the envelope generator.

MODULATION

When in Monophony mode, the two internal DCO are used to create a ring modulator. The speed rate of the Ring modulator is controlled through the Modulation knob.

ENVELOPE GENERATOR

The envelope generator creates an envelope to control the previous circuits. This envelope is controlled with two parameters, the attack and release.

Attack: When a key is pressed, the attack knob dictates the speed at which the envelope rises from 0 to 100. At full CCW, the rise time is instantaneous. At full CW, the envelope rises slowly from 0 to 100.
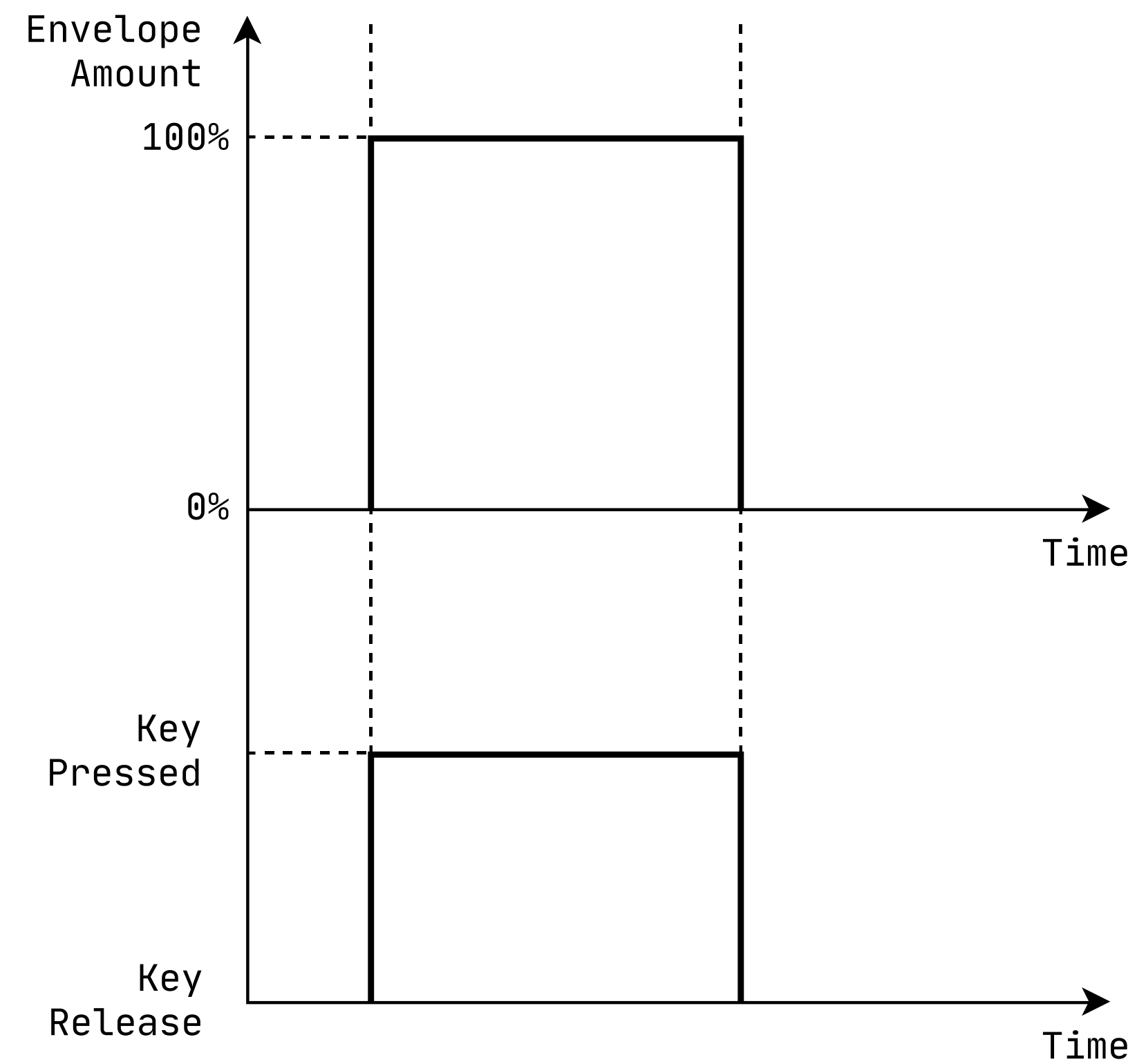

Figure 5. Attack and Release at full CCW.

Release: The time it takes for the envelope to go from 100 to 0 when a key is released is controlled with the release knob. At full CCW, the envelope will decay to 0 instantly when a key is released. At near full CW, the envelope will slowly decay once the key is released. At full CW, the envelope will maintain its position, sustaining the last note played.
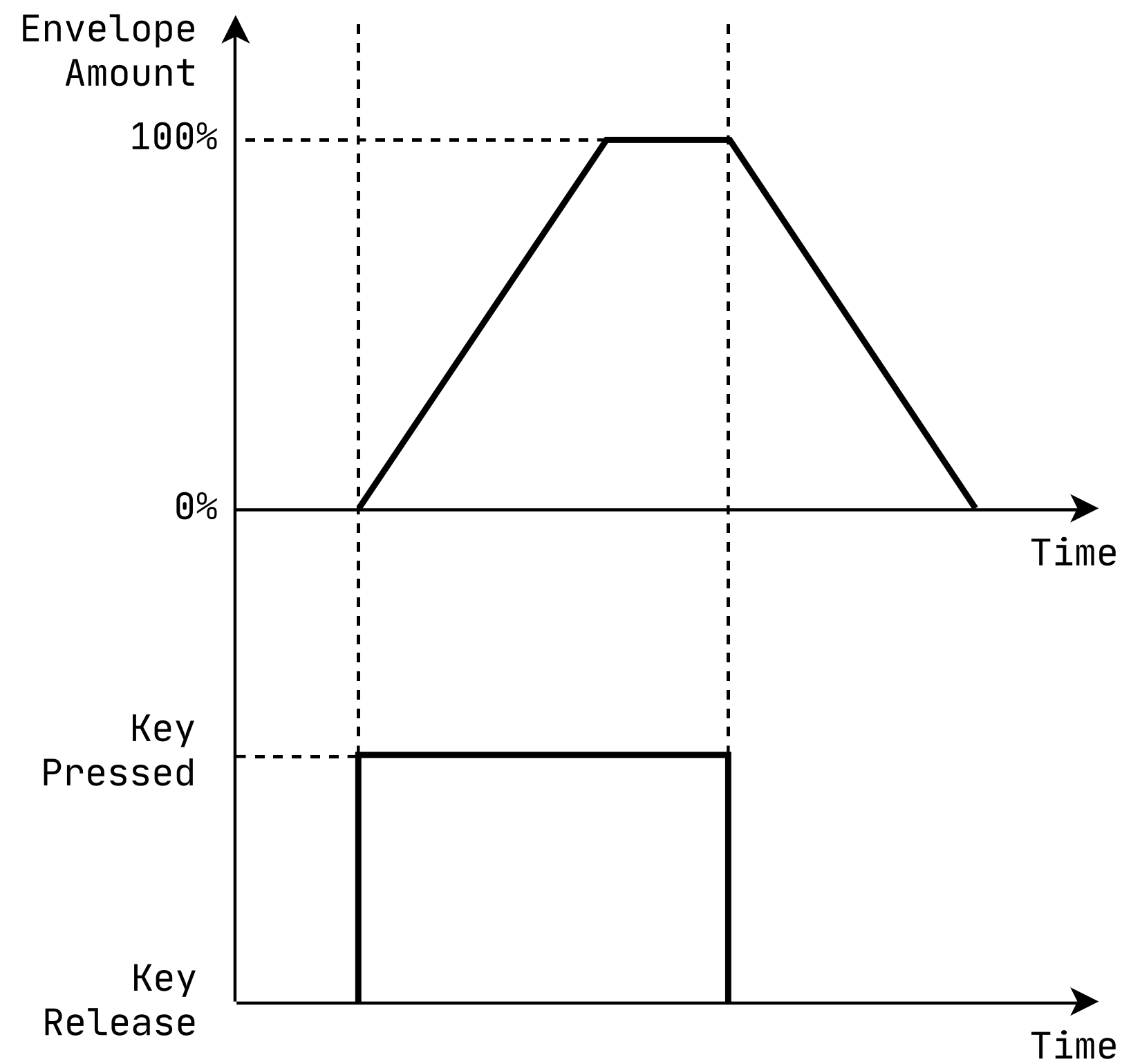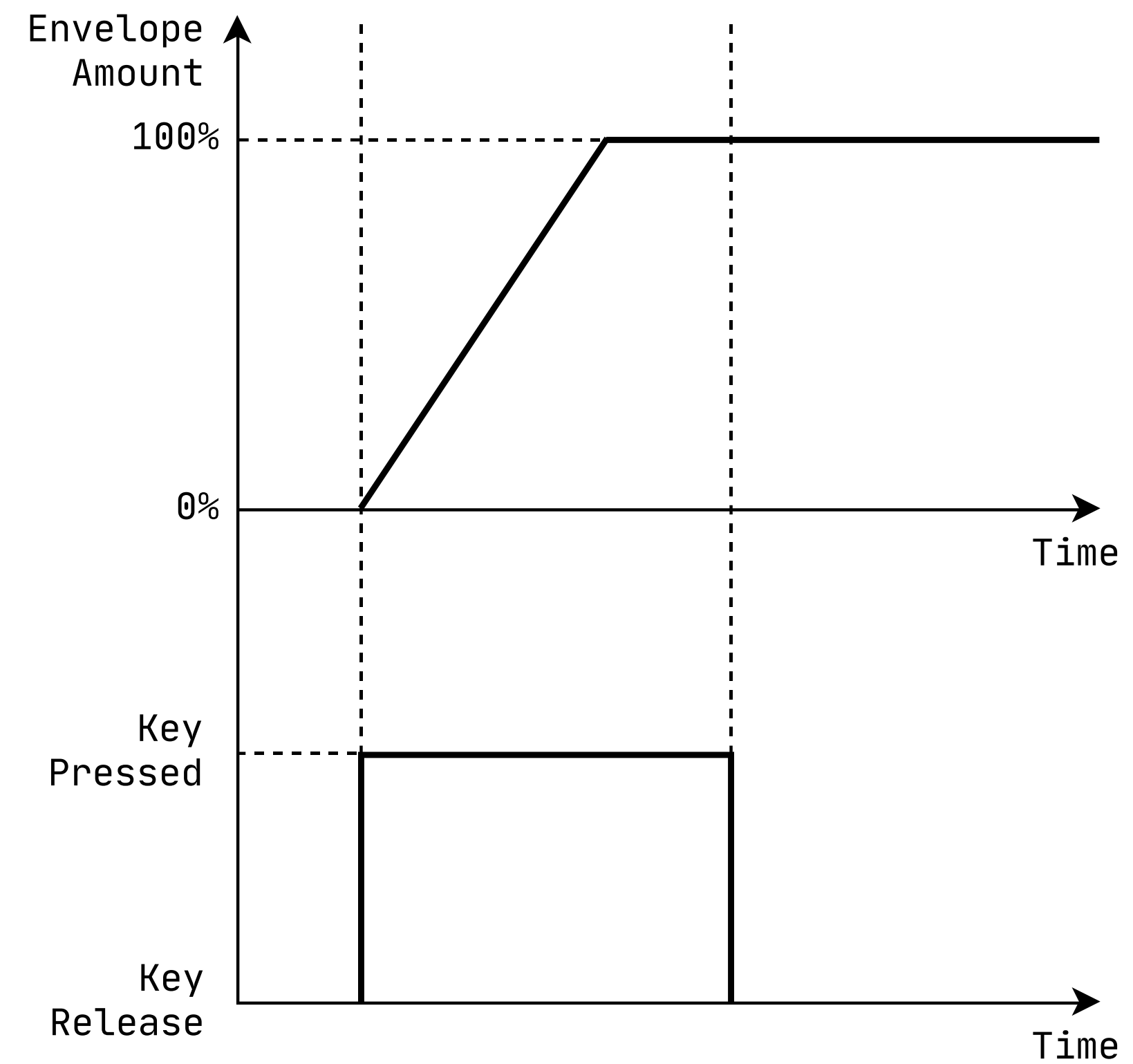

Figure 6. Attack and Release near full CW.

Figure 7. Attack near full CW, Release at full CW.

SPECIFICATIONS

Dimensions in Milimeters (W/O Side Panels)	
Width	120
Height	35
Length	190

Power
3.7 V @ 25 mA
1860 Li-Ion Cell
Micro USB charge port

Sound	
PWM	35KHz

Connectivity
0-5V, 1V/Octave CV
0-5V Gate

WARRANTY

Fully assembled versions of this product are covered by warranty for one year following the date of purchase. This warranty covers any defect in the manufacturing of this product, such as assembly errors or faulty components. This warranty does not cover any damage or malfunction caused by incorrect use, such as, but not limited to, power cables connected backwards, excessive voltage levels, or exposure to extreme temperature or moisture levels. The cost of returning a product for repair or replacement is paid for by the customer. DIY kits and bare printed circuit boards are not covered under any warranty and come with no guarantee of assembly troubleshooting or customer support (although I'll try help you out).

IC²BS

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Written by Pedro Silva

Art by Seni