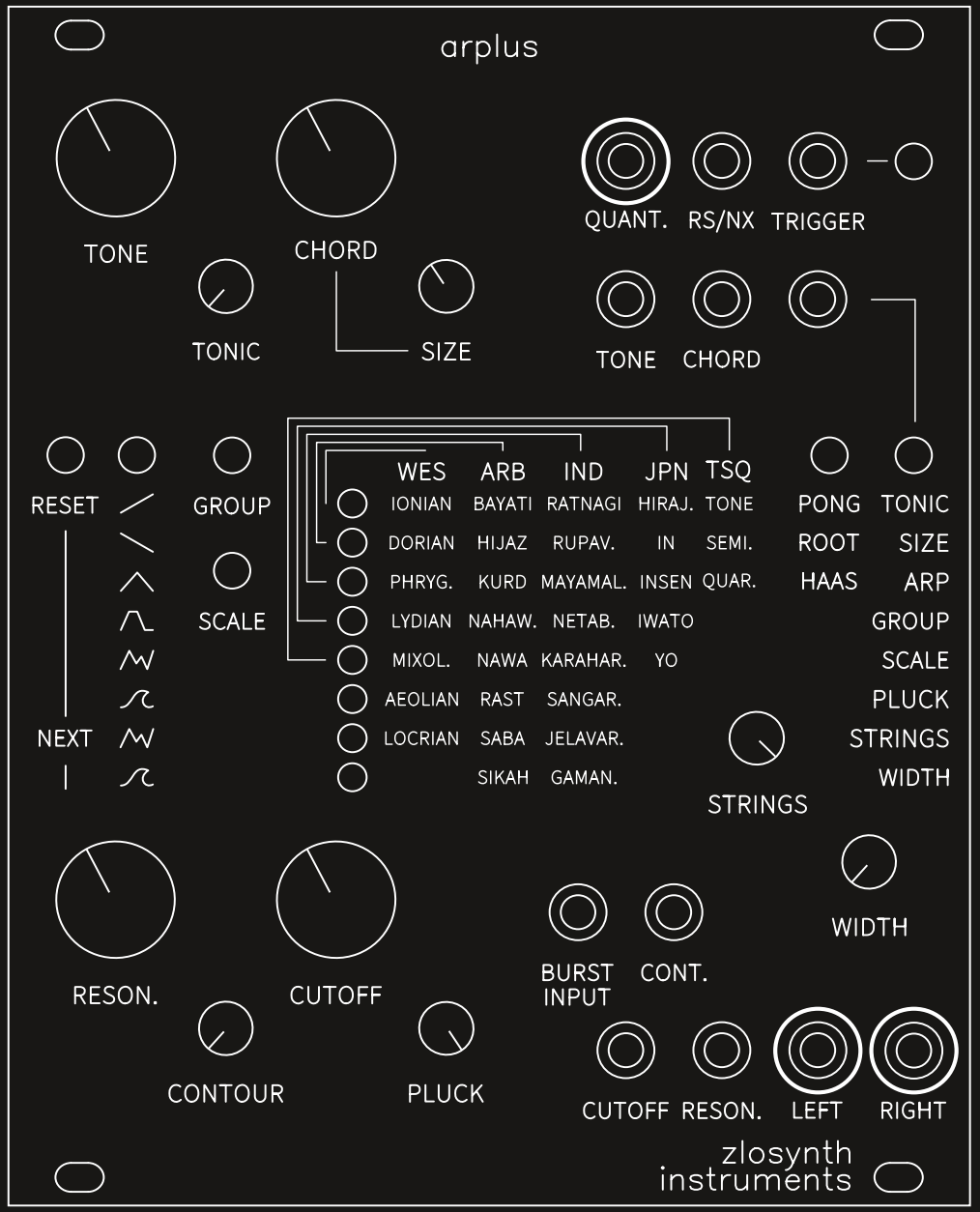
# MANUAL

Arplus combines a quantizer, arpeggiator, and string synthesizer into one module. Select from a variety of scales, including Western diatonic scales, microtonal Arabic maqam, Indian melakarta, Japanese pentatonics, or quarter, semi, and whole tone scales. Use the arpeggiator to create note patterns based on a selected chord and scale. Control other modules using 1V/oct output, or take advantage of the built-in 6 channels of string synthesis to produce anything from subtle plucks and staccatos to ensemble-like pads and resonating soundscapes.

| | |
|---|---|
| Width | 20 HP |
| Depth | 28 mm |
| Power | +12 V (104 mA), −12 V (8 mA) |
| Input impedance | 100 kΩ |
| Trigger inputs | 0 to +5 V, 1 kHz |
| CV inputs | −5 to +5 V, 16-bit, 1 kHz |
| CV outputs | 0 to +5 V, 16-bit, 1 kHz |
| Audio | 24-bit, 96 kHz |

- Karplus-Strong string synthesis with 6-voice polyphony
- External audio input for custom excitation sources
- 31 different scales and chords of up to 8 notes
- Configurable scales
- CV-controllable arpeggiator patterns
- Quantized 1V/oct output
- Three different stereo output modes



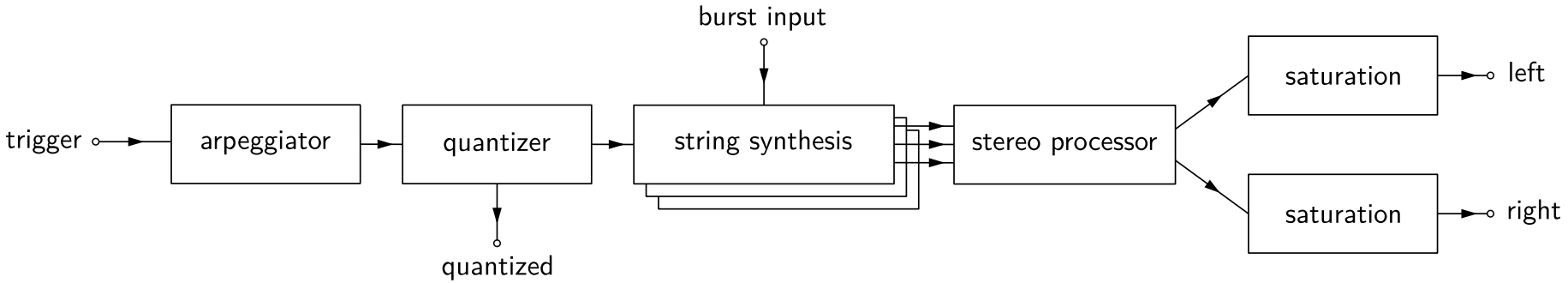
# 1 Installation

Before installation, disconnect power from your case. While handling the module, avoid touching exposed components on the back of the PCB. Connect the power cable to your case power bus (2x5 connector on module side, 2x8 on bus side), ensuring the red stripe aligns with the -12V marking on both the module and power bus. Position the module on the rails and secure it with screws.

# 2 Quick start

Turn all the knobs to the initial position illustrated on the front page of this manual. Click the ⟋ (ARP type), GROUP, SCALE, and PONG buttons until each of them lights up the top-most LED. Connect a clock source to the TRIGGER input, and connect the LEFT or RIGHT output to your mixer. You should now hear string plucks in an ascending arpeggio. Feel free to come back to this safe place if things get out of hand. Happy patching!

# 3 Signal flow

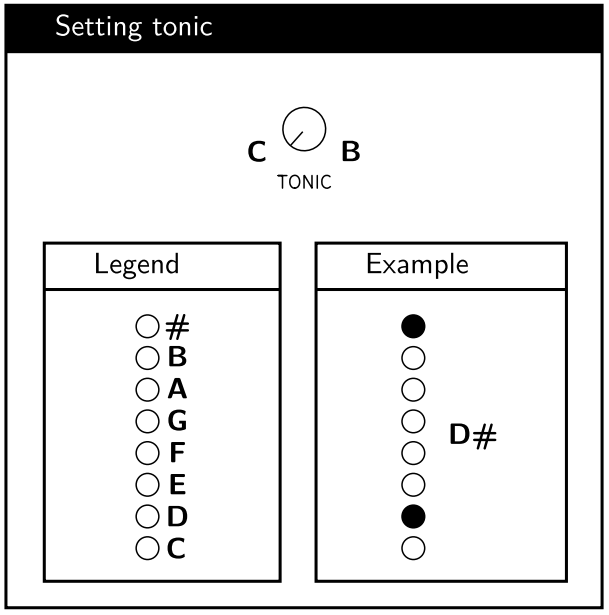


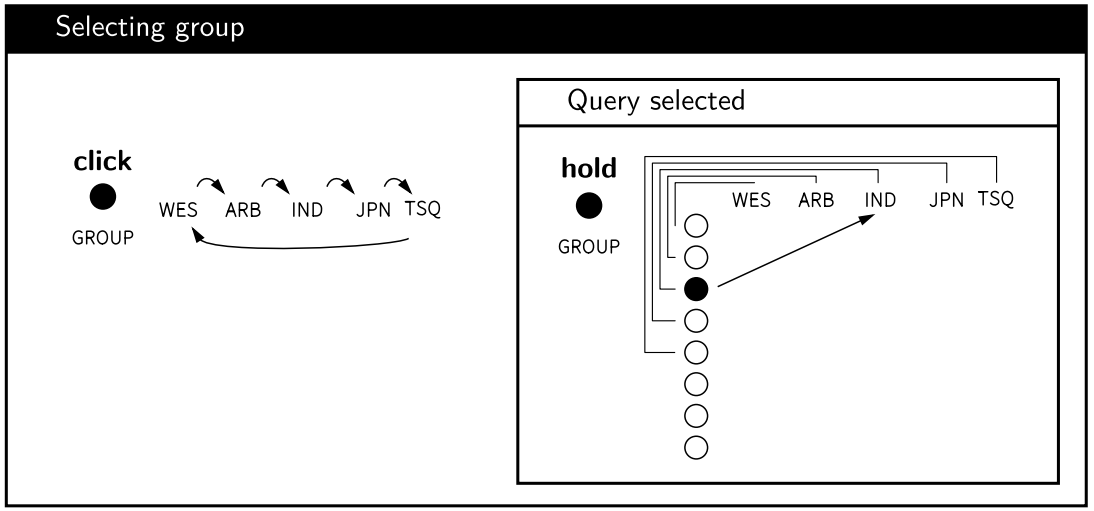
# 4 Scale

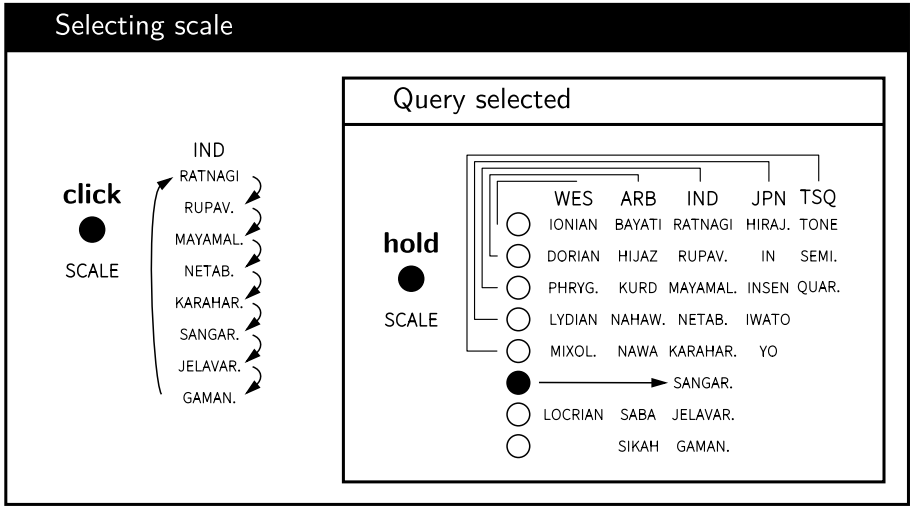
Select one of the 31 available scales, divided into 5 groups: Western diatonic, Arabic maqam, Indian melakarta, Japanese pentatonics, and even scales. All the available scales are listed at the end of this manual.

You can also set the tonic – the first note of the scale, also known as the tonal center, or the scale's "home".

Holding the GROUP or SCALE button will query the currently selected value, while clicking the button will jump to the next one.



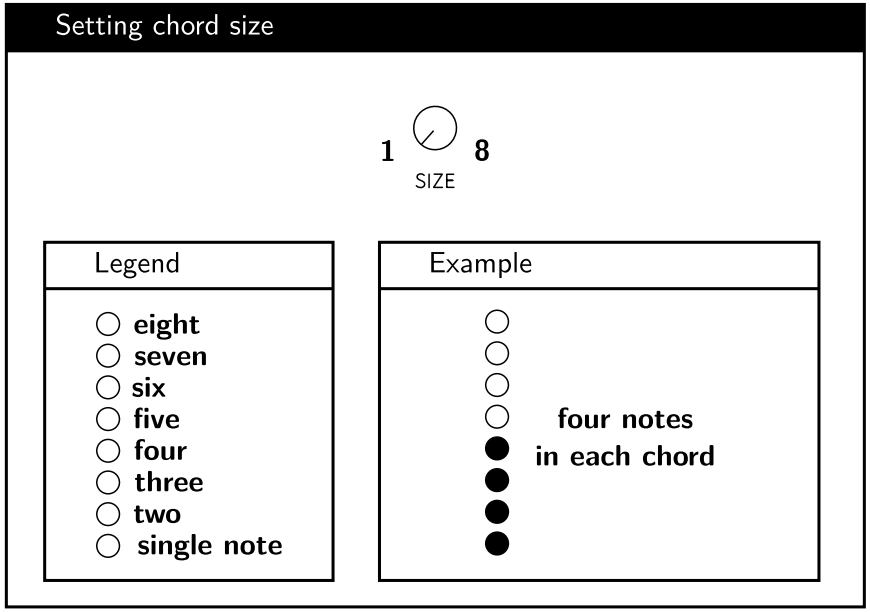



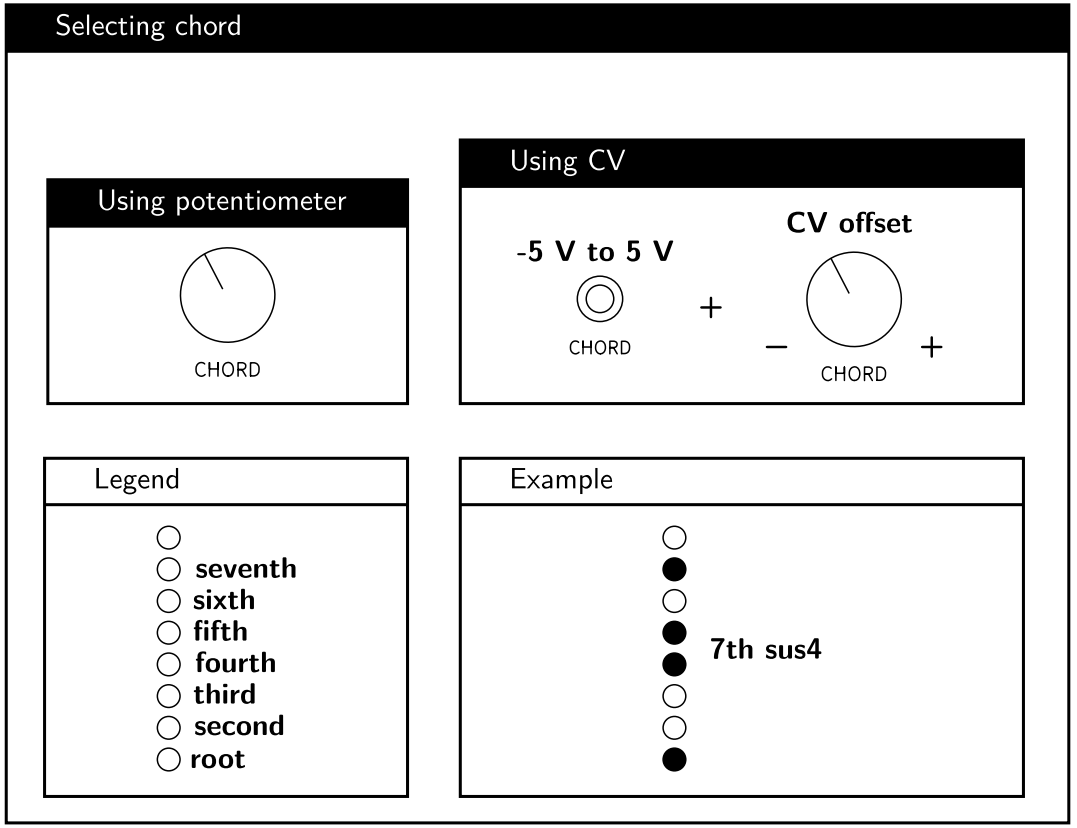



# 5 Chord

Select from an assortment of chords grouped by size. All available chords are listed at the end of this manual.

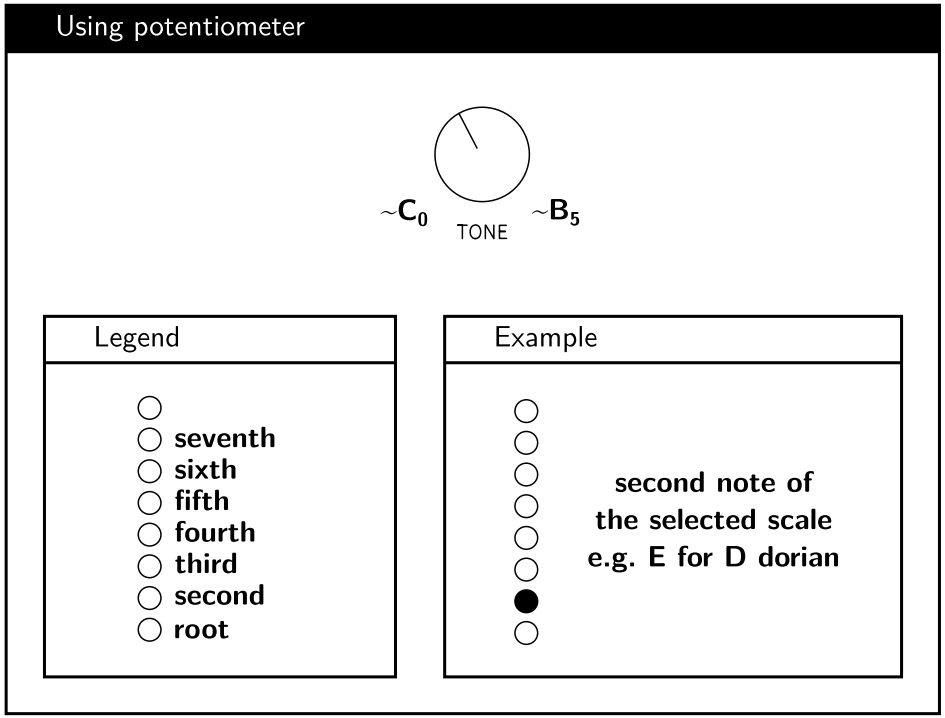
When CV is connected to the CHORDS input, the knob functions as an offset control. With the knob at minimum, a CV range of -5 to 0 V will access all chords. With the knob at maximum, a CV range of 0 to 5 V will access all chords.

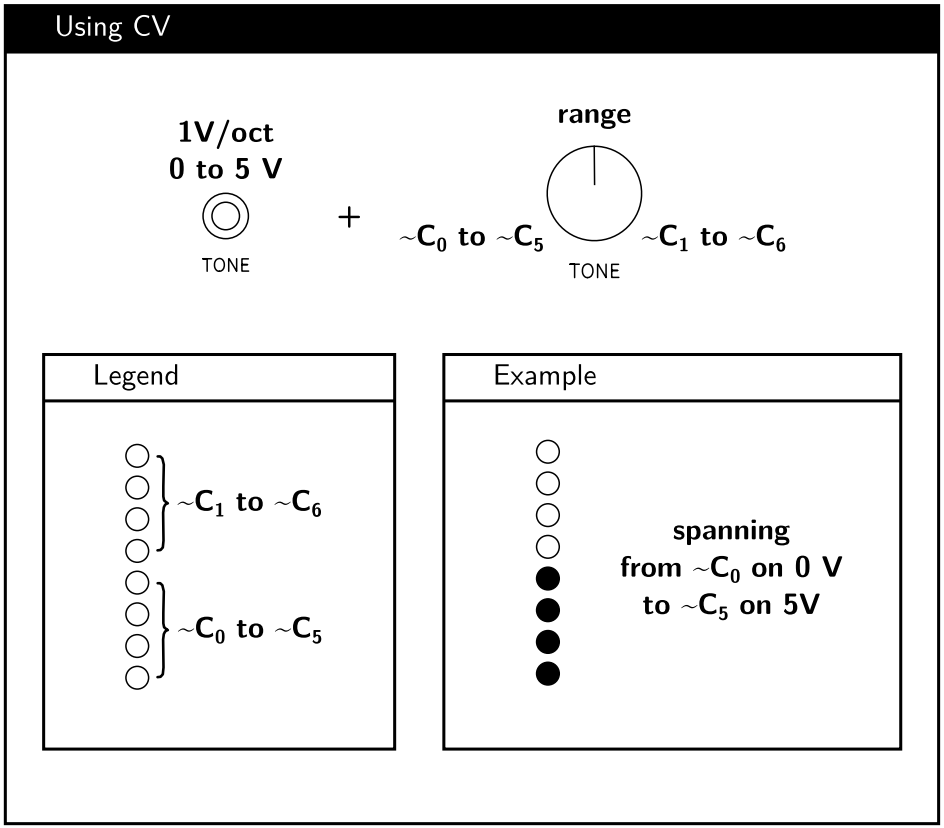


# 6 Root note

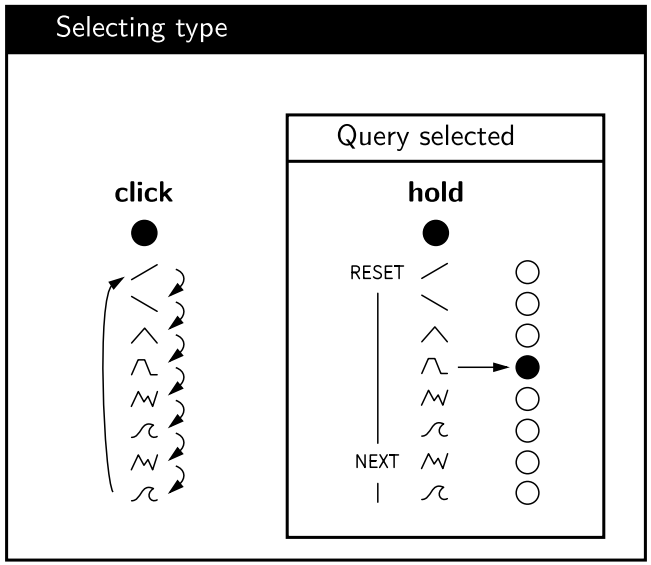
Select the root note of the playing chord. This sets the pitch of the lowest playing tone in the arpeggio.

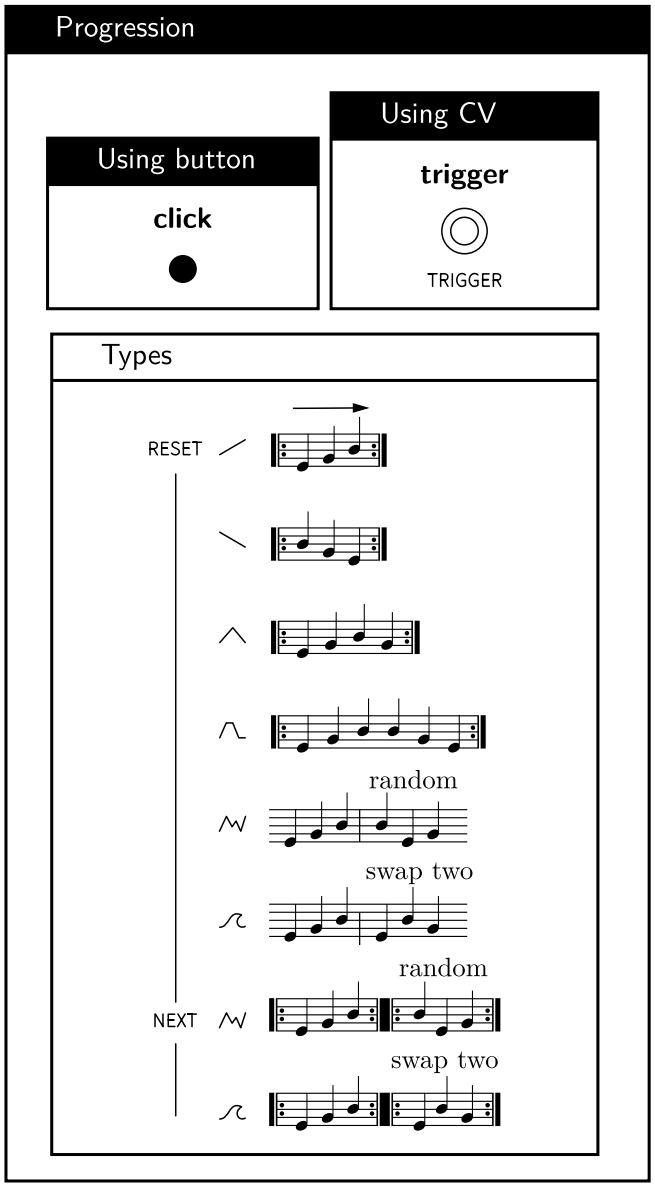


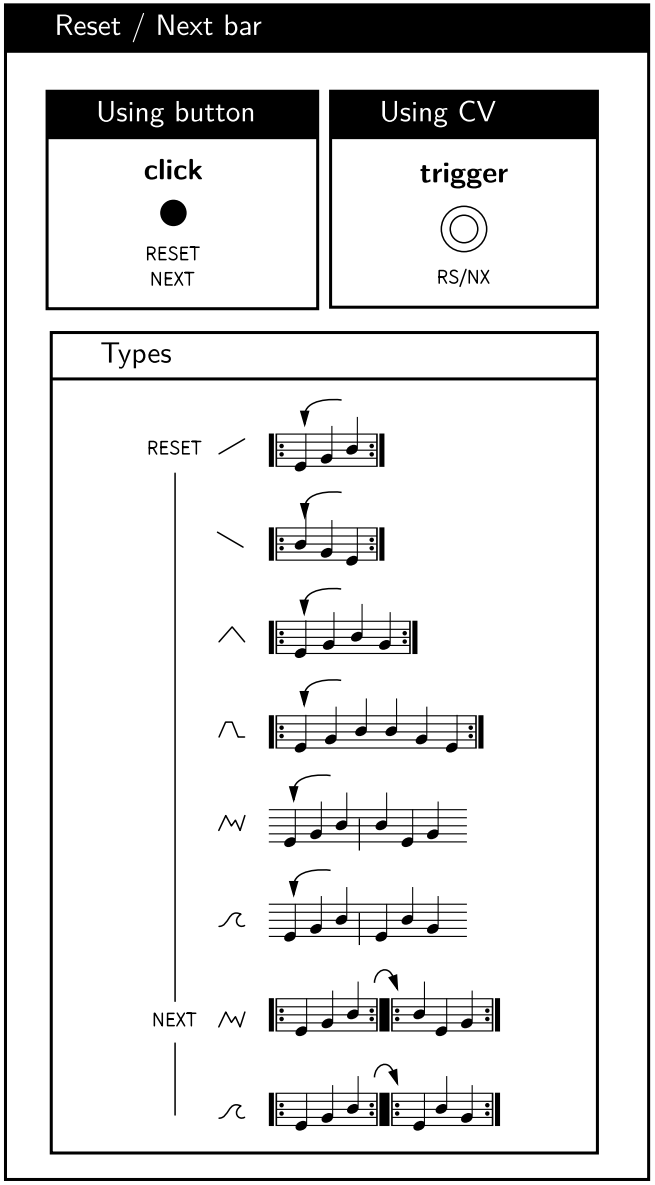



# 7 Arpeggio

With arpeggio, notes of the selected chord are triggered individually. The selected type defines how the notes get ordered. Some types can be RESET to their initial position – use two different clock sources for TRIGGER and RS/NX to create interesting patterns. Other types are repeating the same sequence until NEXT is triggered.

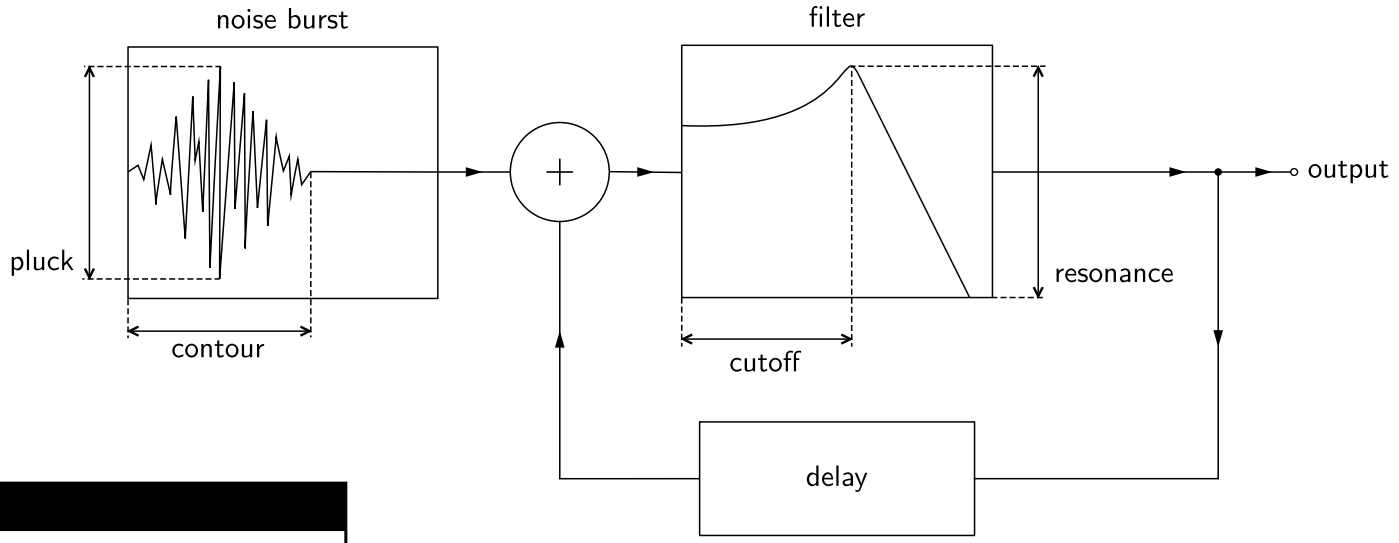


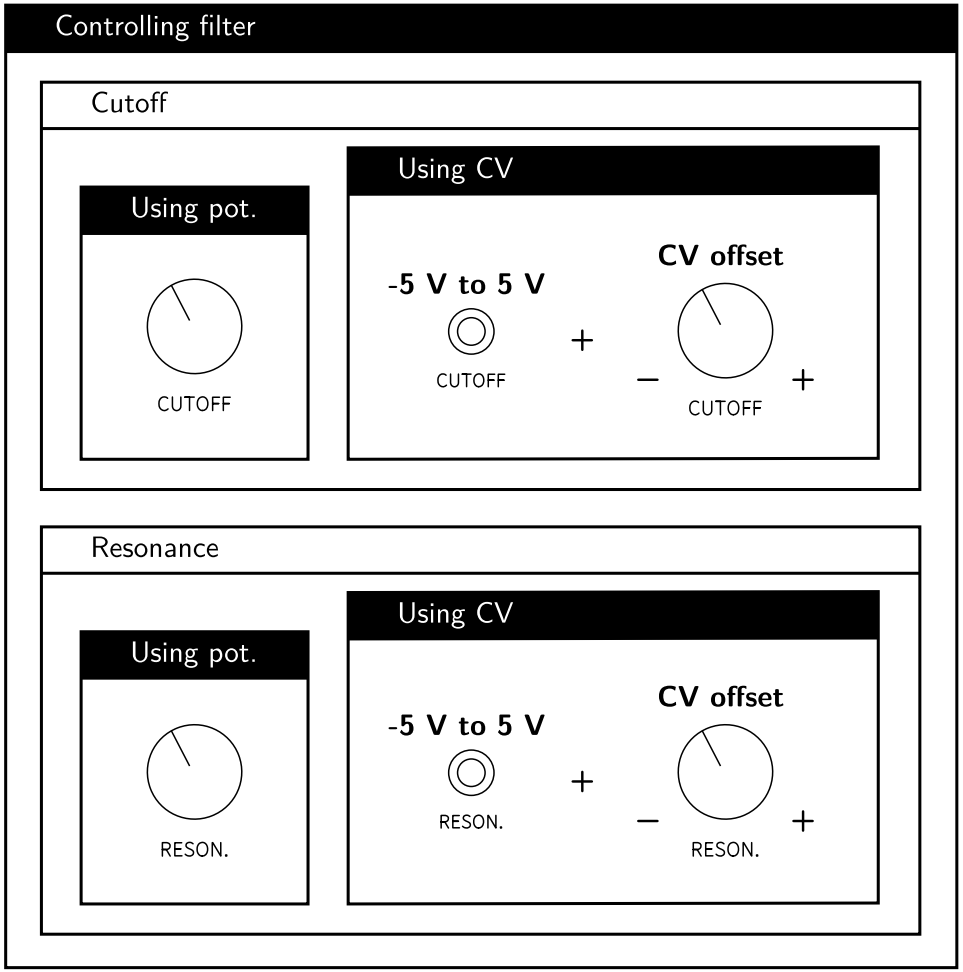



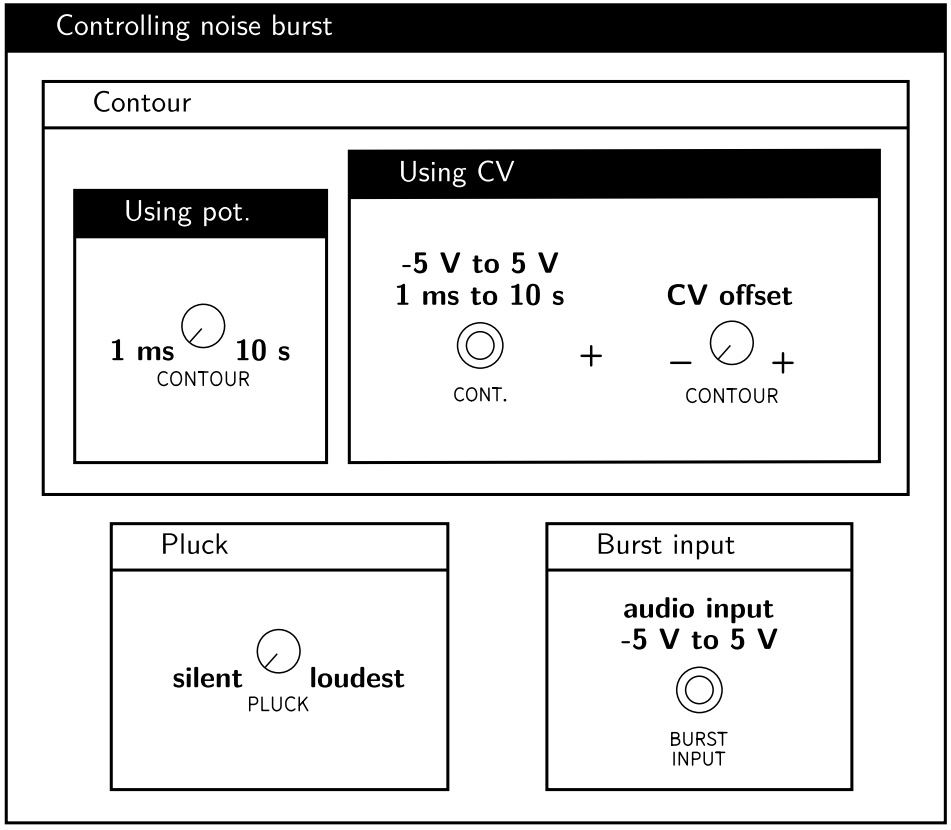



# 8 String synthesis

The arpeggiator strums up to 8 virtual strings driven by the Karplus-Strong synthesis. Noise burst is internally generated if no BURST input is connected.

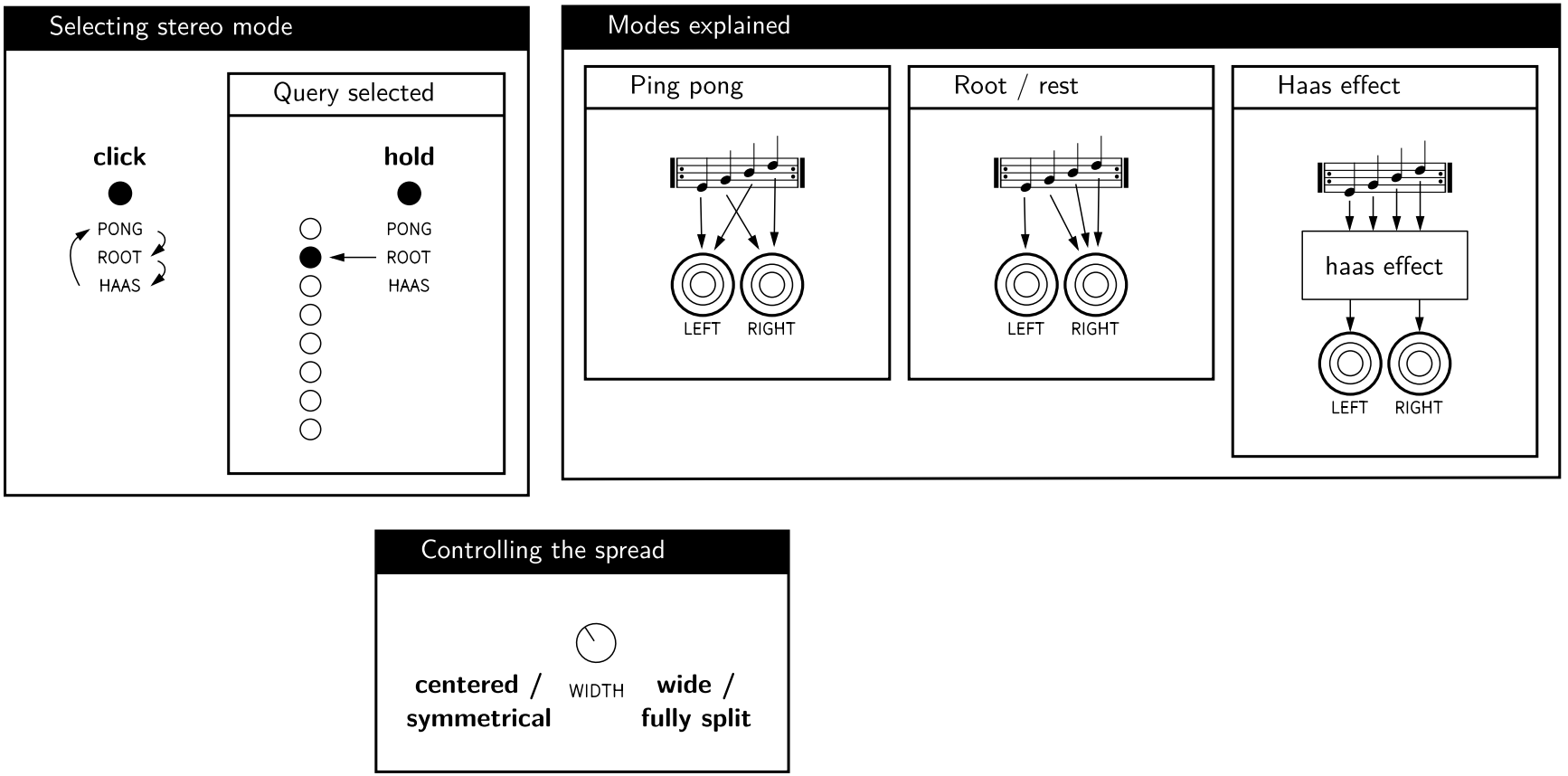


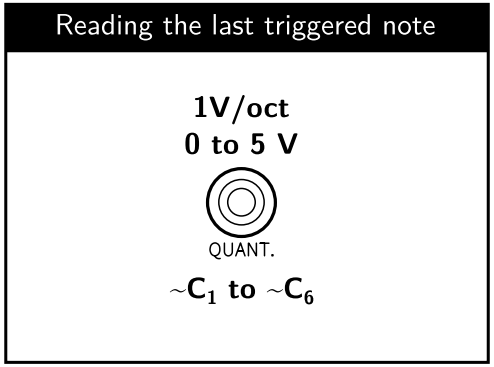
# 9 Stereo

There are three different modes of routing of the individual strings sound to the audio output.



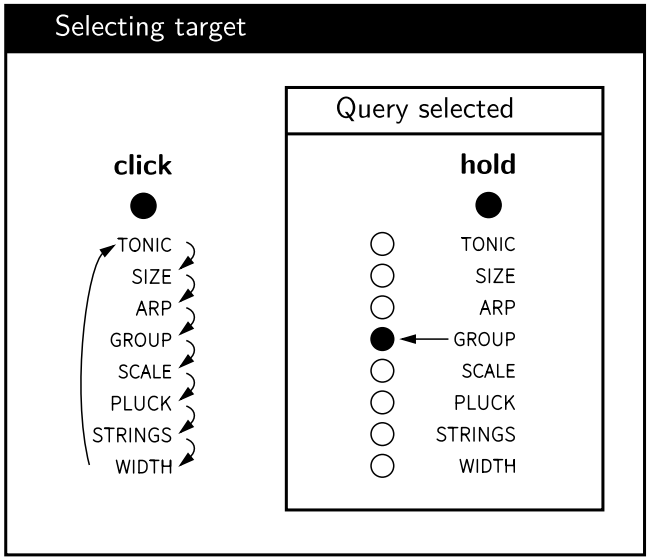
## 10 Quantized CV output

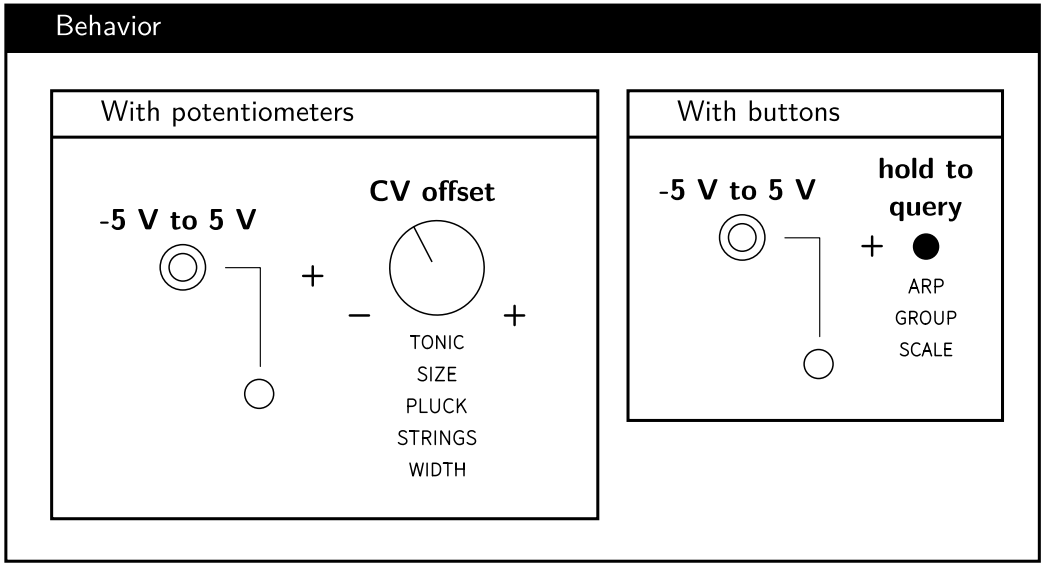
The quantized arpeggiato output used to drive the internal string synthesizer can be also routed out as 1V/oct CV.




## 11 CV mapping

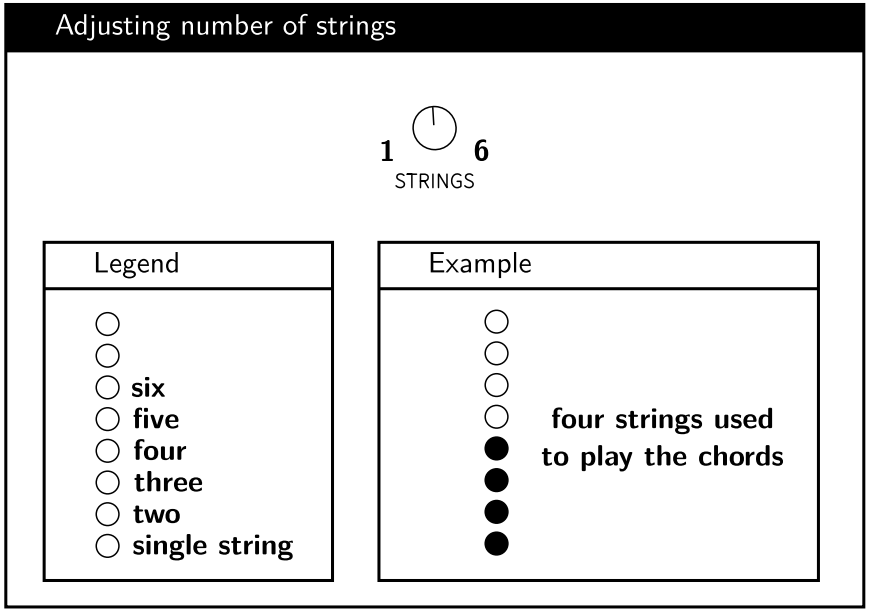
Assign a jack to attributes that otherwise don't have a dedicated CV input.

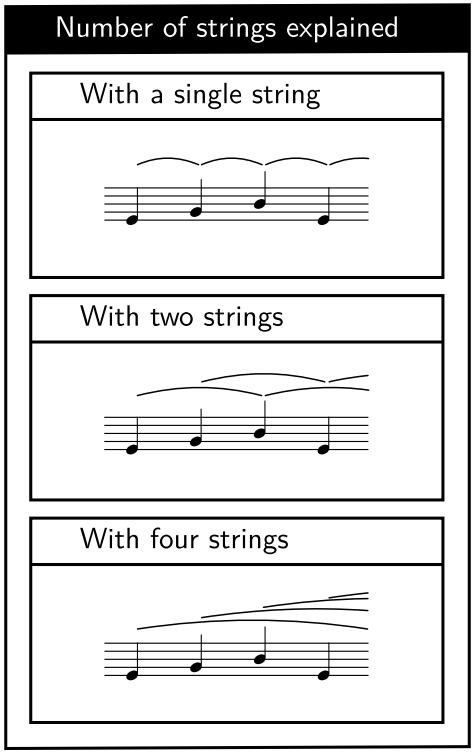


# 12 Strings

The number of strings used to play the chords.



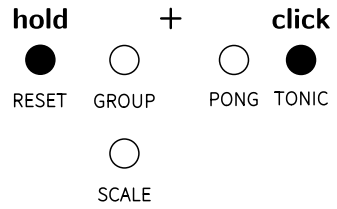



# 13 Scale customization

Customize a scale by offsetting its steps by up to 4 quarter tones. During the procedure, the offset is always applied the most recently triggered note.

## Configuring offsets

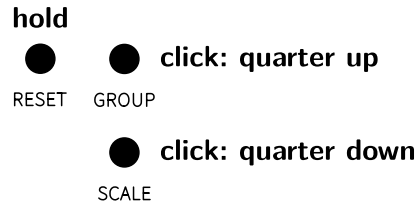
**1. Unlock the scale edit mode**




**2. Select a scale**

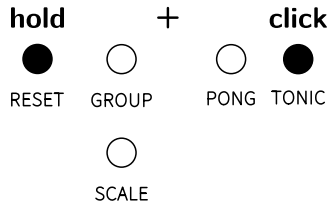
**3. Trigger a note**

**4. Adjust its offset:**




**5. Repeat 3 and 4 if needed**

**6. Lock the scale edit mode**




## Querying the current offset

**1. Trigger a note**

**2. Query the offset:**


### Legend

**without offset {**

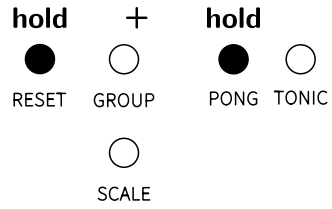
- **+1 tone**
- **+3 quarter tones**
- **+1 semitone**
- **+1 quarter tone**
- **−1 quarter tone**
- **−1 semitone**
- **−3 quarter tones**
- **−1 tone**

## Resetting scale offsets

**1. Unlock the scale edit mode**

**2. Select a scale**

**3. Reset the steps:**




**4. Lock the scale edit mode**

## 13 Calibration

To improve tracking of 1V/oct TONE input, calibrate the module:

1. While holding the RESET button, connect a CV source to TONE.
2. Play note C on the CV source and press the RESET button.
3. Play C one octave higher and press the RESET button again.
4. Successful calibration is confirmed by all LEDs litting up.

To improve the accuracy of the 1V/oct QUANT. output, calibrate it against the source that was previously used to calibrate the TONE input:

1. Complete TONE input calibration.
2. Press down the ⟋ (ARP type) button.
3. Connect a cable between the QUANT. output and TONE input.
4. Release the ⟋ (ARP type) button.

## 14 Reset

Calibration, CV mapping and all other attributes are persisted between restarts of the module. To reset their values, hold the RESET button while powering the module on.

## 15 Questions

Feel free to reach out.

You can also find more information about the module on the website **https://zlosynth.com/arplus**.

petr@zlosynth.com

## 16 Kudos

Kudos to all the eurorack, DSP, and embedded programming communities online. Here are some of the people who helped shape this module:

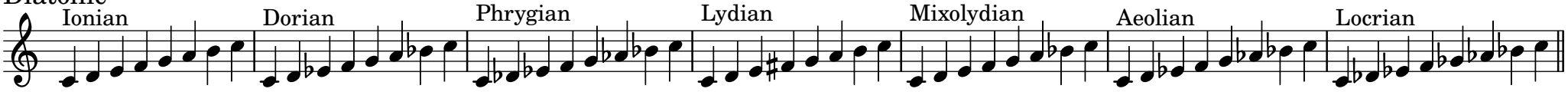
Tomas Niesner, for his extensive testing and thoughtful feedback on the interface, features, and functionality. His insights shaped much of this module.

Jan Isolar, whose feedback and clever suggestions to the manual of Kaseta (sorry I did not get to implement those) inspired the approach I took with this manual.

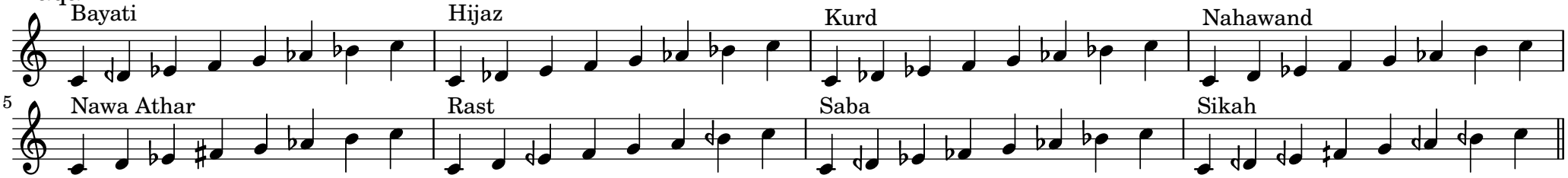
# Appendix: Scales

All the available scales divided into groups.

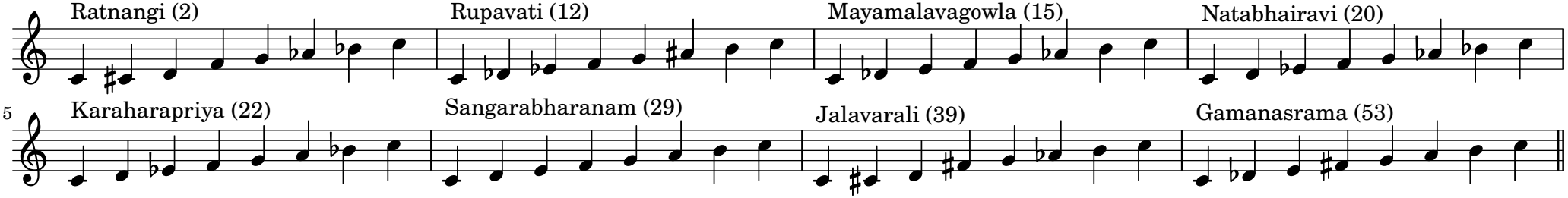
## Diatonic



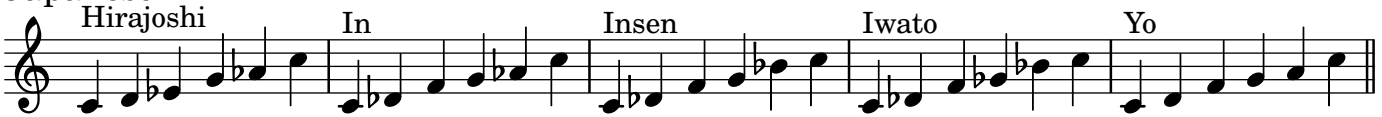

## Maqam



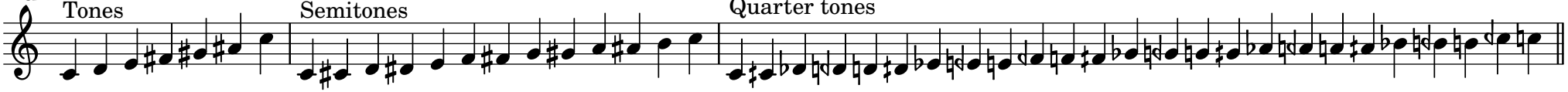

## Melakarta




## Japanese



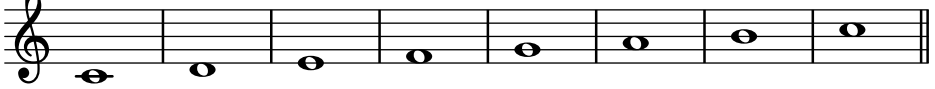

## Full



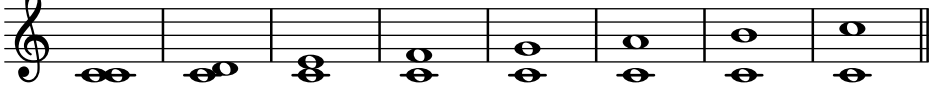
# Appendix: Chords

All the available chords grouped by size. The actual notes will differ based on the selected scale and tonic.

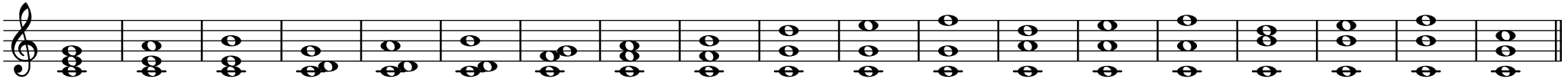
Size: 1



Size: 2



Size: 3



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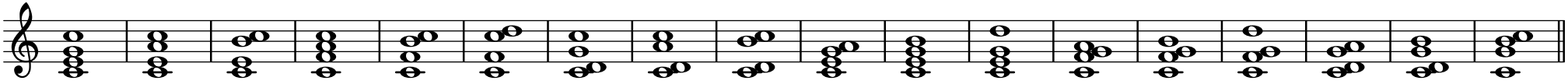
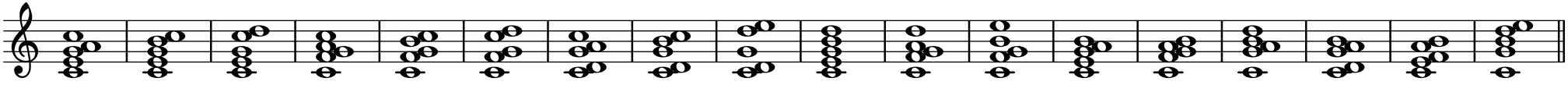


Size: 5



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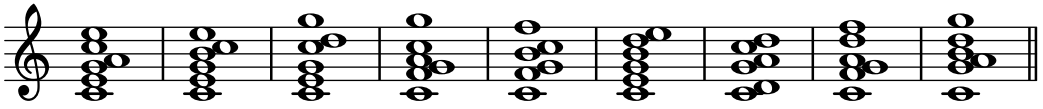

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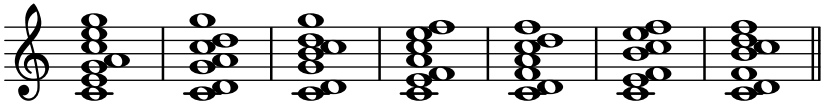

Size: 8