

# Arithmophone EDO x3 MIDI - quickstart guide

## INTRODUCTION






The Arithmophone EDO x3 is a browser-based MIDI keyboard/control surface. 'EDO' stands for 'Equal Divisions of the Octave'. The Arithmophone EDO features a keyboard that can be set to two such divisions: one with the common 12 notes per octave and one with 31 notes per octave. Read on below for a description of all the functions of the Arithmophone EDO x3.

Please note: this quickstart guide assumes you have already taken the preliminary steps necessary to get your browser-based MIDI interface working. These are detailed on this page: [chielzwinkels.net/arithmophone/midi/](https://chielzwinkels.net/arithmophone/midi/)

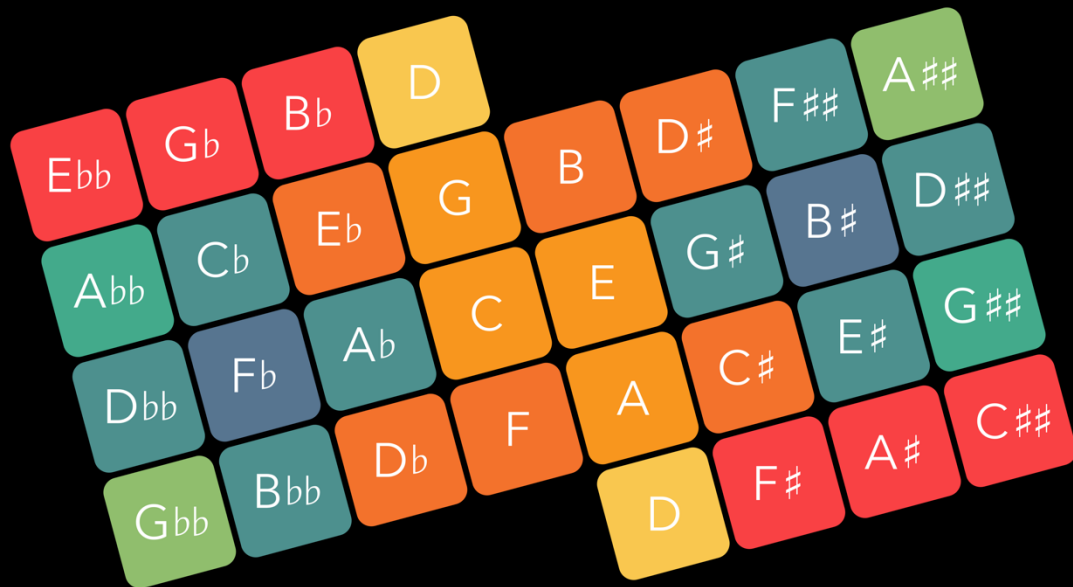
## KEYBOARD

On the Arithmophone EDO, the colours of the keys reflect their approximate ratios with respect to the central note (1/1 ratio), like this:

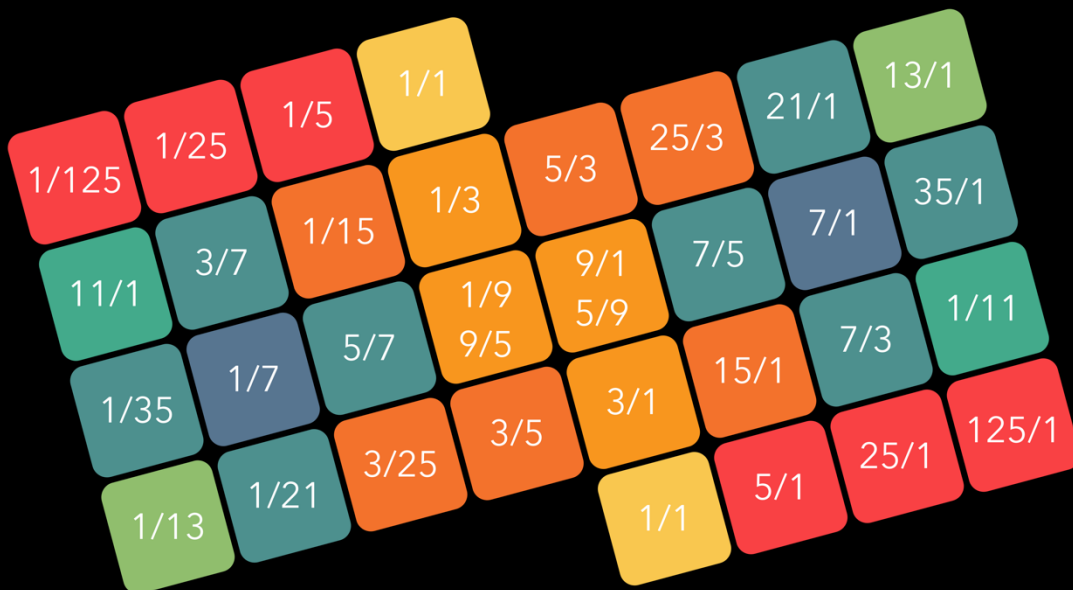
### COLOURS ON THE ARITHMOPHONE EDO

	Ratios of 1 and 2
	Ratios of 3 and 2
	Ratios combining 5, 3 and 2
	Ratios of 5 and 2
	Ratios combining 7, 5 or 3 and 2
	Ratios of 7 and 2
	Ratios of 11 and 2
	Ratios of 13 and 2

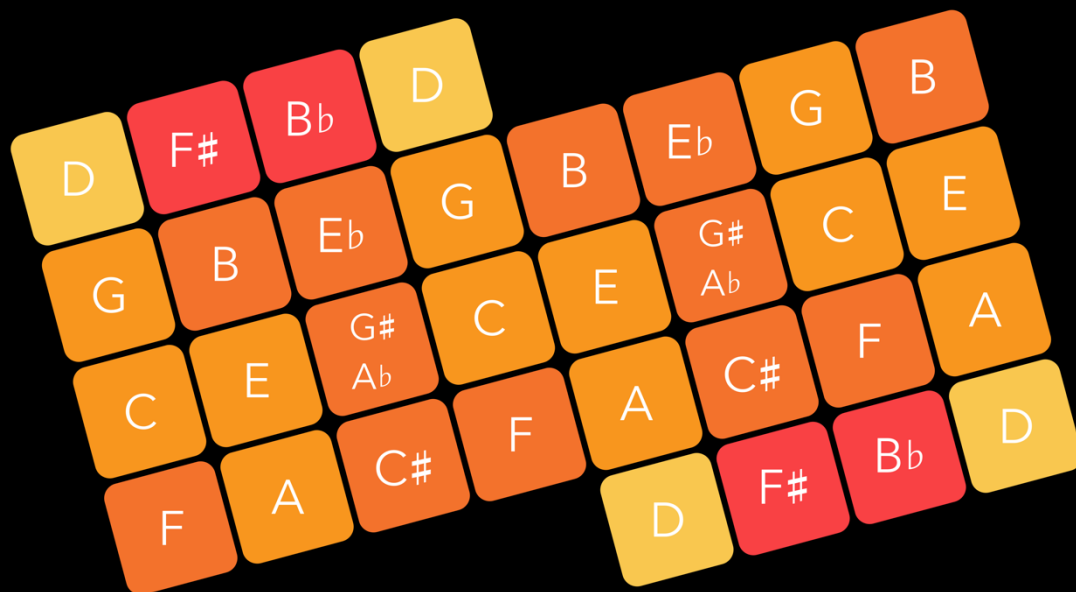
In 31-EDO mode, the notes are arranged as follows:



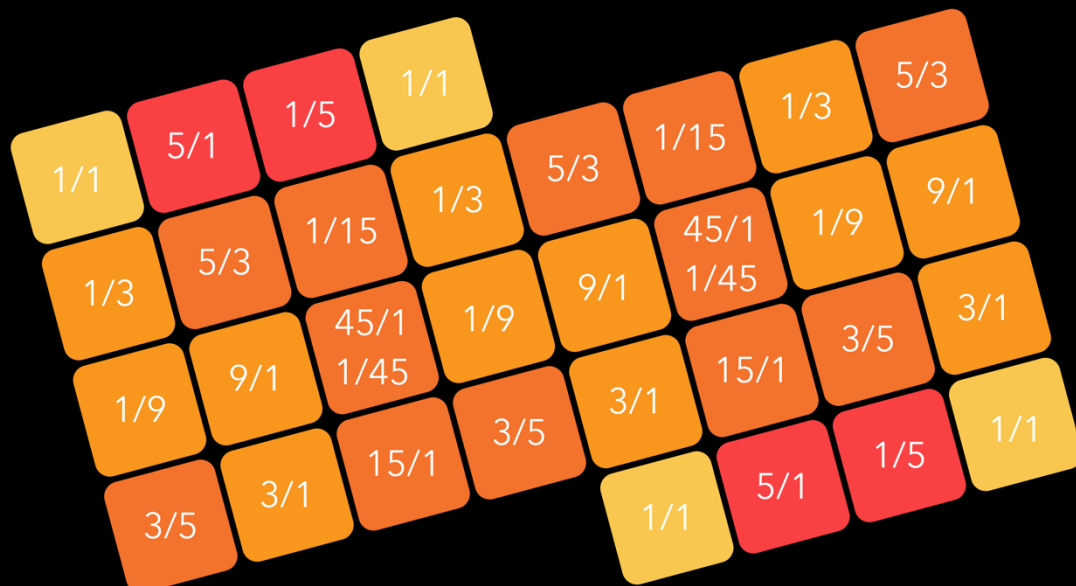
The approximate harmonic intervals of these notes are as follows:



In 12-EDO mode, the notes are arranged as follows:



The approximate harmonic intervals for these notes are:



Some notes on the illustrations above:

- The note names in the 31-EDO illustration follows the 'double sharp/double flat' convention commonly used for this tuning system. There is a different convention using half sharps and half flats, that is equally valid, but slightly less convenient for our current purposes.
- In 31-EDO, notes with double sharps or double flats are not just 're-spellings' of natural notes, as they are in 12-EDO. In standard tuning, "F $\sharp\sharp$ " and "A $\flat\flat$ " are identical to G, but in 31-EDO these are actually different notes.
- Each note is split up into two or three keys, depending on the 'range' setting. These keys offer the same note across different octaves. This gives the instrument a range of 2 or 3 full octaves in 31-EDO mode. In 12-EDO mode, the range is greater: because there are only 12 different notes in this mode, each is repeated 2 or 3 times across the keyboard, allowing one or two extra octaves per note.
- In the illustrations with ratios, these are shown in their 'pure' form, without octave reduction. In actuality these ratios may be multiplied or divided by two any number of times, depending on the octave they are in.
- The ratios selected and the corresponding colour scheme are approximate and are just one possible interpretation among many. For example, the key with ratio 13/1 inscribed produces a note whose frequency is actually more closely approximated by the ratio 105/1. In cases like these, I have chosen the simplest ratio that provides a fairly close approximation (with 'simple' interpreted as 'existing of small numbers'). There are good musical reasons for doing it like this, which I discuss elsewhere. The point here is to stress that the colouring of the keys should be viewed as a helpful aid in navigating the keyboard and understanding pitch relations between keys, but not as an absolute truth of any kind.

For more detailed information about different tuning systems, the layout of the EDO keyboard and the rationale behind this design, please visit these pages: [chielzwinkels.net/arithmophone/background/](http://chielzwinkels.net/arithmophone/background/)

## CONTROLS & OPTIONS

When you open the Arithmophone EDO in your browser, you will see the keyboard and some additional controls. A good first step would be to switch to full screen mode with the button labeled **F** at the top left. This will maximize the available playing surface.

With the button labeled **O** at the top right you can open the options screen. Here you can see the available MIDI inputs and select the one you'd like to use (if necessary; by default the first available output is selected). Here you can also customize the MIDI channels and Continuous Controllers and adjust some other options.

The first option is the all important **EDO** button. This lets you switch between 12-EDO, also known as 12 tone equal temperament or simply as 'standard tuning', and 31-EDO or 31 tone equal temperament.

When you select 12-EDO, you will have a familiar 12 notes per octave at your disposal, the same as on any regular MIDI keyboard or piano. In this mode the Arithmophone EDO x3 will work with any MIDI compatible instrument and no special tuning file is needed.

When you select 31-EDO, the keyboard is tuned to have 31 different notes per octave. All the familiar notes from 12-EDO are still present in the central area of the keyboard (in slightly altered tuning), but towards the sides of the keyboard you will find many new notes not available on any standard piano keyboard. This mode requires an instrument with microtuning capabilities and a special tuning file.

The second option is for adjusting the **range** of the keyboard. On the Arithmophone EDO, notes that are exactly an octave apart are grouped together. You can switch between 'double' (two octaves grouped together) and 'triple' (three octaves grouped together). Triple mode gives you a larger range, but at the expense of having to play on smaller keys.

The last option is called **focus**. When focus mode is activated, all options and sliders are hidden. This can be helpful if you don't need any additional controls and just want to concentrate on playing the keyboard.

After closing the options screen by pressing the **O** button once more, you should be able to play some notes on the keyboard and have these send MIDI messages to your DAW/instrument.

You can control three separate instruments (or three instances of the same instrument if you prefer) from within the Arithmophone. You can switch between them with the buttons labeled **A**, **B** and **C** at the top of the keyboard. By default, these control MIDI channels 1, 2 and 3, but this can be adjusted in the options screen.

Each channel not only has its own keyboard but also its own sliders that you can use to control sound parameters. The slider at the bottom left is assigned to pitch bend, in 3 discrete steps (minimum, center, maximum). This allows precise and instant switching between the center position and the (all the way) up and down positions. Try setting the pitch bend range of your instrument to 7, so you can jump up or down a perfect fifth from the center pitch, or to 12 so you can switch octaves.

The other three sliders send out Continuous Control (CC) messages on the same channel as the keyboard. They are assigned to CC 1,2 and 3 by default.

There is another button at the top labeled **M**, pressing this will open the Master sliders window, providing 8 additional CC sliders that output to a separate MIDI channel (channel 4 by default). This can be useful for controlling global parameters like track levels, master volume, tempo et cetera.

Below the keyboard you will find two more buttons labeled **H** and **R**. These are for holding and releasing the keys of the keyboard. When you press a key on the Arithmophone keyboard, a 'note on' MIDI message is sent. When you lift your finger again, a 'note off' message follows. When the 'hold' key is pressed while you lift your finger from the keyboard, the 'note off' message is not sent and the key remains pressed. Only when you touch the same note again is it stopped. This way you can add and remove individual notes to the selection of held notes. Once a note is held, it will stay on indefinitely. This is great for arpeggiators and other "self-playing" sounds. You can hold a selection of notes on one channel and then switch to a different channel to layer sounds. The held notes for each channel will always be shown as darker keys to help you keep track of what's playing. Pressing the 'release' button will reset all notes on the selected channel.

