1010music

Synthbox User Manual

Welcome

Thank you for buying synthbox. We hope you are as excited as we are to get playing with your synthbox. In this manual, we will start with an overview of the parts of the synthbox front panel and Main screen so we can show you what we call the various components of the module. Next we will give an overview of the workflow used when working with synthbox to provide context for the detailed instructions that follow. We will provide step-by-step instructions for the process of setting up synthbox and then creating a new preset that uses all of the features of Synthbox. We will then review a few file management tasks and cover the process of updating the Synthbox firmware or swapping to firmware from another Series 1 module. Lastly, we will include a few technical specifications for completeness.

If you would rather get a quick overview of how to use the module, see the Synthbox Quick Start Guide that came with the module and that is also available online at https://1010music.com/synthbox-documentation-software.

We use the following text formatting conventions in this document:

On Screen References:	Used for text that refers to names of screens or on screen graphical elements.
Front Panel Hardware:	Used for text that refers to physical elements on the front panel of the module, but not on the touchscreen.

Overview

Synthbox is a polyphonic synthesizer that you can control via MIDI or analog control voltage. It includes several internal blocks to shape and manipulate the sound. You can also connect it with other modular gear to further refine the sound.

Synthbox supports 4-note polyphony. It can play back up to four notes at one time from any one synthesizer preset at a time. Notes can be triggered by MIDI input, control voltage (CV) input, or both at the same time. It includes several effects processors that can be modulated by CV inputs. The modulation can be sequenced using an on screen sequencer. Settings can be saved in presets for future use.

Front Panel Overview

The diagram on the next page identifies the various components of the synthbox module and shows the terms used when discussing the module in this document.

The **INFO** and **HOME** buttons at the top of the front panel of synthbox are used to navigate the screens. Press **INFO** to view the information screen for the current selection. In some cases, you can press **INFO** more than once to get to deeper information. The **HOME** button generally takes you back a screen. If you get lost, you can press **HOME** until you get back to the Main screen.

The **Control Knobs** are used to cycle through options on the screen. When there are several parameters on the screen, use the **Control Knob** closest to a parameter to set its value.

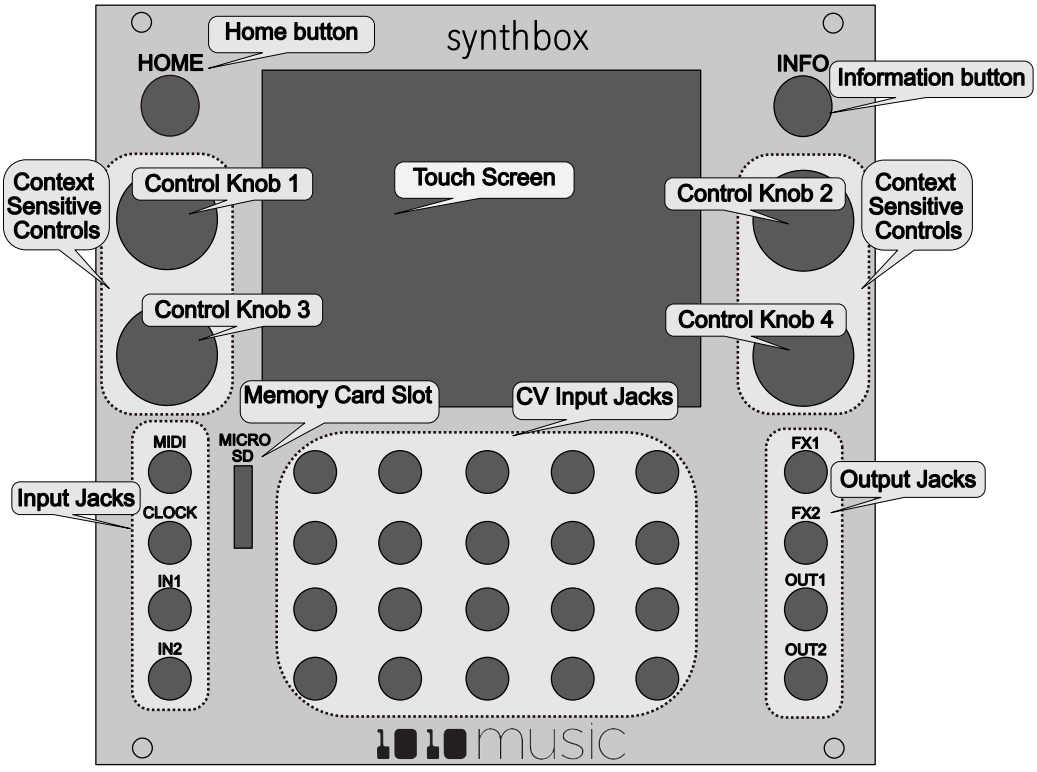

Figure 1: Front Panel Overview

Main Screen Overview

Synthbox is equipped with a touchscreen. You can touch areas of the screen to select them, and touch on-screen buttons to take an action.

When you first turn on synthbox, the Main screen is displayed. The clock in the top left corner shows the current clock time in measures and beats. The row below that shows the name of the current selected preset and allows you to navigate between presets. Below the **Preset Name** is a visual display of the two wavetables that have been selected for this preset. Below the wavetables there are two rows of buttons that provide access to features used to configure the current preset. The **OSC** button allows you to select a different Oscillator. The four buttons to the right of the **OSC** button control sound effects. The row of buttons below this control the modulators. The bottom row of the touch screen displays CV Indicators that map to each column of **CV Inputs** below the screen. The CV Indicator names provide labels for the functions that are controlled by each column of **CV Inputs**. The blue bars that appear behind the names move across the width of the column to represent the current voltage input for that column from the **CV Input** in the bottom row of the grid.

You can touch every on-screen element between the **Preset Name** at the top and the modulators at the bottom to access parameter screens related to these on-screen elements, including the two waveforms.

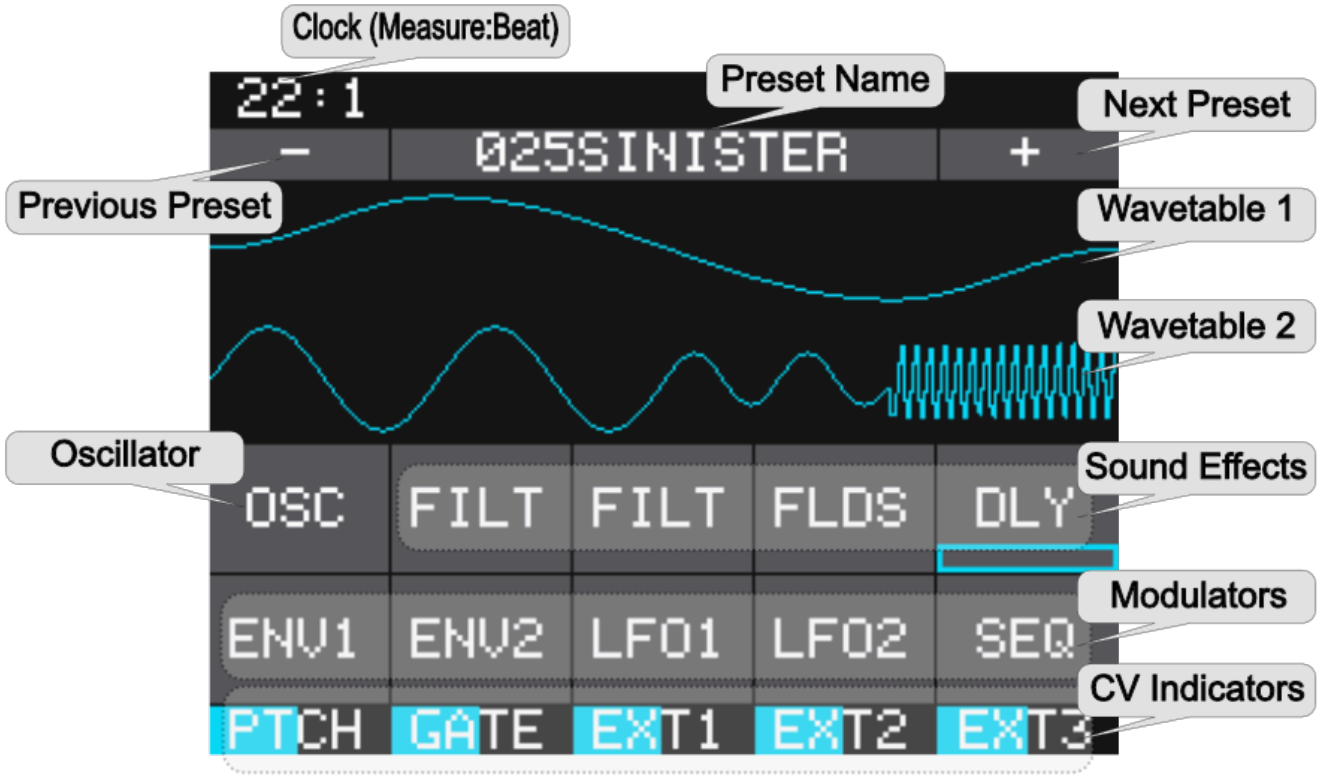

Figure 2: Main Screen

Series 1 Compatibility

Synthbox is a Series 1 module and firmware. This means that a synthbox module can be reprogrammed to run the firmware for any of 1010music's Series 1 modules. Any Series 1 module can be reprogrammed to run Synthbox. You can download the firmware for Series 1 modules by registering at forum.1010music.com. Instructions on how to reprogram a module are on the forum and later in this document.

Synthbox Workflow Overview

To set the stage, let's first discuss the workflow used with synthbox. In the next section we will cover the step-by-step process to perform this workflow.

Start by setting up the module in your rack and making sure the included microSD card is in the **Memory Card Slot**. Next connect the inputs to your module. Synthbox is designed to allow you to use your external MIDI controller or Control Voltage generator to trigger notes. The **MIDI** and **CV Input Jacks** can be used simultaneously. Then configure the Control Mode. The module works in two Control Modes: **`Global`** and **`Per Voice`**. In **`Global`** mode, only the bottom row of **CV Input Jacks** is enabled. The inputs to these jacks control all of the voices at the same time. In **`Per Voice`** mode, all of the **CV Input Jacks** are used, one row per voice.

In order to hear what the synthesizer is playing, connect the outputs. Connect **Out 1** and **Out 2** to your mixer or speakers. You can also choose between two output modes, **`Stereo Mix`**, and **`Voice X 4`**.

At this point, pressing a note on your MIDI controller or sending a control voltage signal to the CV input jacks would start playing one of the synthbox presets.

To fully explore synthbox, we will next create a new Preset. The Preset is the container that holds a combination of settings that are designed to work together. Synthbox comes with 50 built-in presets that you can work with and modify to meet your needs. When creating or modifying a preset, the first step is to select the desired wavetables and oscillator that are used to generate the audio signals. Then alter the sound by applying sound effects. You can further control the sound by configuring the envelope and LFO modulation. Then configure CV Inputs in EXT1 through EXT3 to control the effects and modulation. You can also sequence the modulation using an onscreen sequencer. Once you have configured everything, save the preset to make sure you don't lose the work.

Setup Synthbox

In this section we will discuss how to install synthbox in your Eurorack, insert the microSD card, select a control mode, and configure the basic input and output signals.

Rack Installation

First let's make sure you have a compatible Eurorack. Synthbox requires a +12V connection and uses the standard 16-pin ribbon cable to connect to the rack. You should always power down the Eurorack when connecting new modules. Remove synthbox from the packing material and attach the ribbon cable to the back of the module. The cable is bi-directional so it does not matter which end is inserted into the module. However, the connector must be in the correct orientation. The connector on the module is keyed so the ribbon cable won't fit in the wrong orientation. The correct orientation places the edge of the ribbon cable with the red line on the left side of the module as shown in Figure 3 to the right. Next, connect the other end of the ribbon cable to the power supply for your Eurorack. When connecting to the Eurorack power supply, extra care is needed because not all power supplies are keyed to ensure correct orientation. The ribbon cable should be connected to the power supply so that the edge of the ribbon cable with the red line is aligned with the -12V pins on the power supply bus. When you power up, watch closely to make sure that the module powers up. If the touch screen doesn't respond right away, turn off the rack and confirm the cable orientation. 1010music modules do contain some buffering to prevent burning out the module but that only buffers for so long. Don't power up yet.

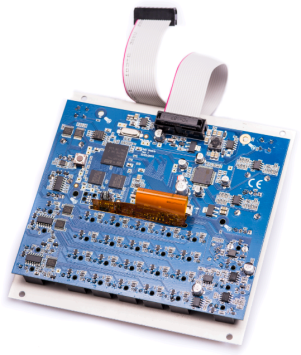

Figure 3: RIbbon Cable Orientation on Module

Next make sure the microSD card that came with the module is inserted into the Memory Card Slot. Most modules come with the microSD card already inserted. The card should be inserted with the notched edge down. Now you can power up the rack. The module should start up in under 10 seconds and you will see the Main screen as shown in Figure 2: Main Screen above.

Connect a MIDI Controller and CV Inputs

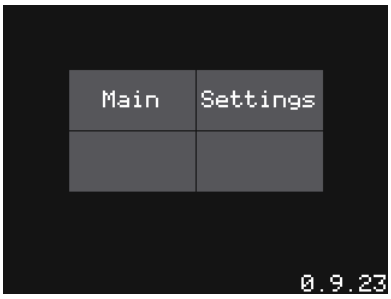

Figure 4: Menu Screen

Synthbox does not make music by itself. You must trigger the notes using either a MIDI or CV input or both. Start by connecting your MIDI controller to synthbox. If your controller has a Stereo Minijack connector, then you can try to plug it directly into the **MIDI Input Jack**. However, there are competing standards for implementing stereo minijacks for MIDI, so you may need to use a MIDI adapter. If it has a 5 Pin DIN connector, use an appropriate MIDI Adapter. Read the blog post Stereo Minijacks for MIDI Connections Compatibility Guide on our website at https://1010music.com/stereo-minijacks-midi-connections-compatibility-guide for more details about the MIDI adapter.

MIDI signals can be sent over multiple channels. By default, synthbox accepts input from MIDI channel 1. You can change this in the **Global Settings** screen by following these steps:

1. On the synthbox, press **HOME** until you see the **Menu** screen.
2. Touch **Settings** to go to the **Settings Screen**.
3. Turn the **Control Knob** next to **MIDI Ch** to select the MIDI Channel that synthbox will use for input.
4. Configure your MIDI input device to use the same channel.

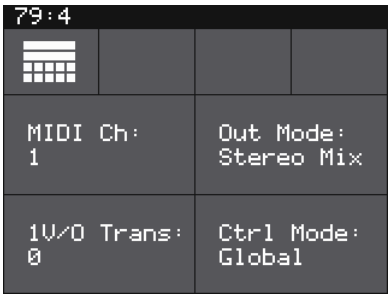

Figure 5: Settings Screen

A MIDI signal specifies note numbers and the frequencies for the notes. We support the entire range of notes supported by MIDI, but the typical range is about note number 24-84.

Next, connect CV signals to the module. The functions of the **CV Input Jacks** are organized in columns and rows. The bottom row controls the first voice and the top row controls the fourth voice. Each column across controls a different function. The functions from left to right are as follows:

On Screen Label	Full Name	Description
PTCH	Pitch	Alters the pitch of the note.
GATE	Gate	Controls when the note starts and stops.
EXT1	External Modulator 1	The three external modulators are used to modulate the waveforms, the filters and the depth of the LFOs.
EXT2	External Modulator 2	
EXT3	External Modulator 3	

For now, connect the two left input jacks in the bottom row of **CV Input Jacks** to control pitch and gate in Global Mode. You can connect more CV inputs later, but this is enough to get started.

Synthbox maps the incoming **CV input signal** for **Pitch** to 1 volt per octave and supports a range of 0 to 5 volts. Middle C by default it is at 2 volts, but it is adjustable in **Global Settings**:

1. On the synthbox, press **HOME** until you see the **Menu** screen.
2. Touch **Settings** to go to the **Settings Screen.**
3. Turn the **Control Knob** next to **1V/O Trans** to select the number of semitones to shift middle C away from the starting value of 2V. For example, if your controller uses 0v for middle C, set this value to -24.

The CV Input for the gate should be configured to send a high signal when the note should be triggered and a low signal when it should end. Synthbox starts a new note when it detects a leading edge in the rise of a signal, and ends the note when it detects a falling edge. The exact voltage value does not matter. The gate input is calibrated for +5V gate signals, but other values may still work.

Along the bottom of the Main screen, there are bar graph CV indicators that show the current value for the corresponding CV Input Jack. The label for each CV Indicator indicates the mapping of the CV inputs to Pitch, Gate, Ext1, Ext2, and Ext3. The blue bar that moves across the label for each CV column represents the value of the CV input for the bottom row of CV input jacks. There is no indicator for the other rows of CV input jacks.

Synthbox can play up to four notes simultaneously. CV, MIDI or both can trigger notes. Generally, when a fifth note is triggered, synthbox will stop playing the oldest note and replace it with the new note. This works slightly differently when the **Control Mode** is **Per Voice**. See Select a Control Mode below for more details.

Connect and Configure Outputs

Now your synthbox is ready to make music, but you won't hear it until you connect some outputs. Start by connecting the **Out1** and **Out2** output jacks to your mixer or speakers. This will enable stereo output. Synthbox has two available output modes: **Stereo Mix** and **Voice x 4**.

Stereo Mix: All 4 voices are mixed together, sent through the Flanger, Distortion and Delay effects and then output as stereo signals through the **Out1** and **Out2** output jacks.

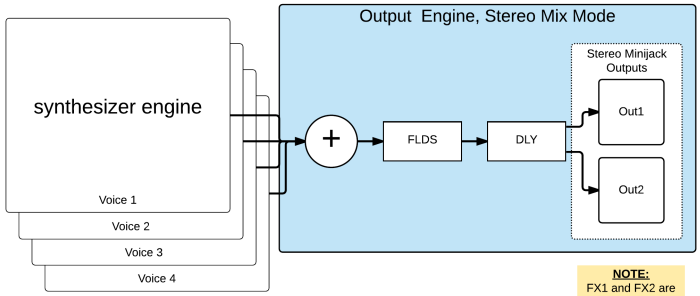

Figure 6: Out Mode set to Stereo Mix

Voice X 4: Synthbox sends the output from the individual voices directly to the output jacks **FX1**, **FX2**, **Out1** and **Out2**. The 4 voices bypass the Flanger, Delay and Distortion effects. The output jacks are arranged in line with the rows of corresponding CV input jacks. The Flanger, Distortion and Delay effects are not used in this mode.

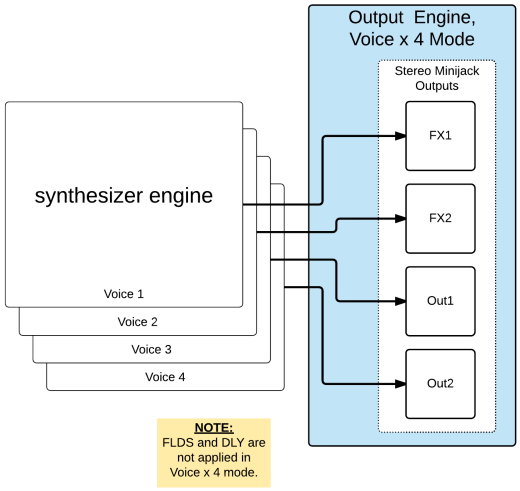

Figure 7: Outmode set to Voice x 4

Because synthbox is doing so many things (filtering, enveloping, applying effects, playing multiple voices), you will find the output signal is normally under 5V. If you want a hotter signal you can mix yourself, use the **Out Mode: Voice x 4**. It will put more control (and responsibility) in your hands.

Follow these steps to configure the **Out Mode**:

1. Push the **Home** button to display the **Menu** screen with menu choices of **Main** and **Settings**.
2. Touch **Settings** to display the **Settings** Screen.
3. Use **Control Knob 2** to set the value of **Out Mode** to **Stereo Mix**.

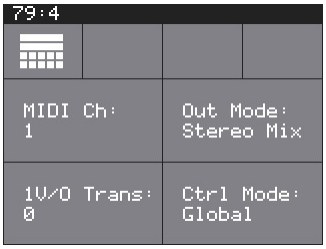

Figure 8: Settings Screen

Select a Control Mode

Synthbox can accept Control Voltage (CV) inputs in two different Control Modes: **Global** and **Per Voice**.

In **Global** mode, only the bottom row of **CV Input Jacks** is used. The inputs received in these jacks are globally applied to all voices. The CV Pitch and CV Gate signals are sent to all four voices at once. If a MIDI note is played while the CV notes are still playing, the MIDI notes will gradually replace the CV notes, one voice at a time. Figure 9: Voice Architecture - Global Mode below shows how the signals then move through the synthesizer engine.

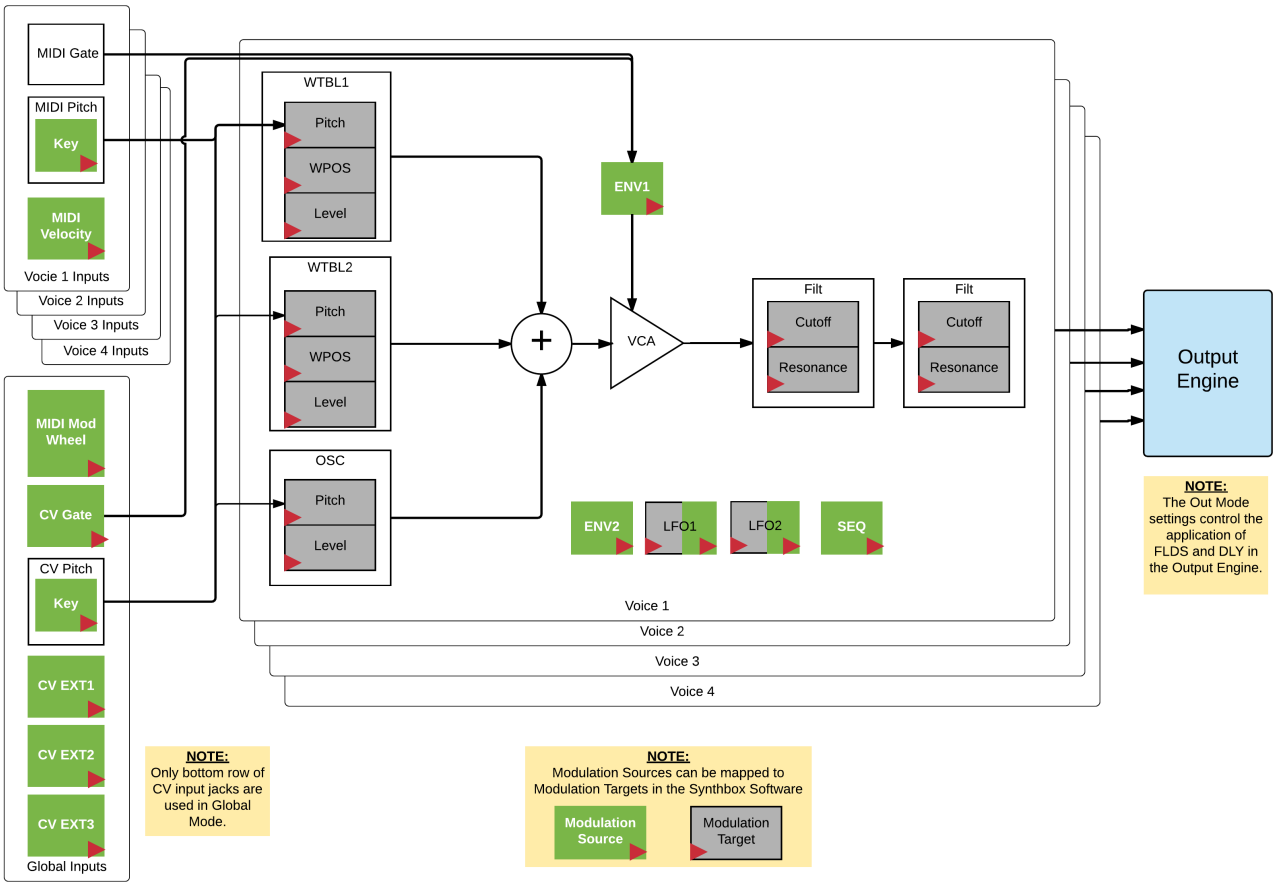

Figure 9: Voice Architecture - Global Mode

The diagram shows that some elements are modulation sources, while others are modulation targets. The LFOs are both targets and sources. A modulation target is an element that can be controlled or modulated by up to three modulation sources. We will discuss how to configure these mappings later. The modulation sources of **ENV1**, **ENV2**, **LFO1**, **LFO2**, and **SEQ** are all applied per voice. For example, there will be four instances of **ENV2** running, one for each of the four voices. However, they all share the same values for the envelope settings. In contrast, in **Global** mode, the **CV inputs** are all applied globally. There is one CV signal for each of these global modulation sources that controls all of the voices in real time the same way. The available global modulation sources are **Key** (which is controlled by **CV Pitch**), **CV Gate**, **CV Ext1**, **CV Ext2**, and **CV Ext3**. The MIDI Mod Wheel (**MODW**) is always a global modulator. For example, when a **CV Ext2** signal is received, all of the voices receive the same value for Ext2 at the same time. The MIDI signals for **Gate**, **Pitch**/**Key** and **Velocity** are always applied per voice. As each voice signal is generated, it is sent to the Output Engine and is processed according to the selected **Out Mode.**

In **Per Voice** mode, all 4 rows of **CV Input Jacks** are used, one row per voice. Figure 10: Voice Architecture - Per Voice Mode below shows the signal process for Per Voice mode.

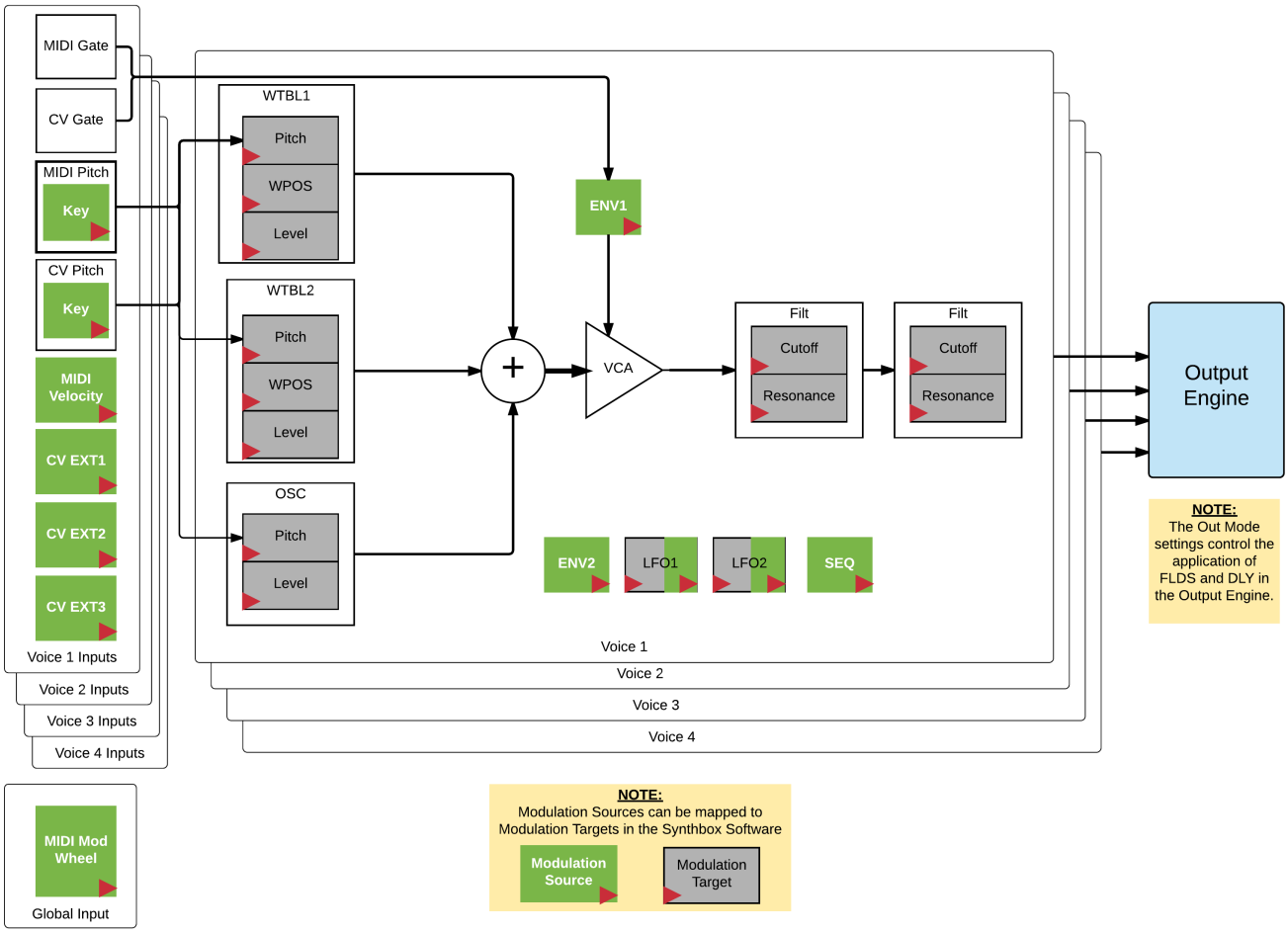

Figure 10: Voice Architecture - Per Voice Mode

In this mode, each row of CV inputs controls an independent voice that will play out the **CV Output** jack in the same row when the **Out Mode** is set to **Voice x 4**. In this mode, only the **MIDI Mod Wheel** is applied globally. All other Modulators are applied per voice.

Keep in mind that when using the MIDI input with CV Inputs, the MIDI Input can take over the voices played via CV. Each note or voice that comes in via MIDI will replace the oldest note amongst the four voices, even in Control mode of Voice X 4. However, in Per Voice mode, when a note is played on a voice, that voice will start to play the new CV note, even if the MIDI note on that voice is not the oldest note. So when you are playing MIDI and CV together, you can never quite be sure which voice the MIDI note will play on.

One instance of the synthesizer is used for all four voices. Therefore, the same selection of wavetables and oscillators will be used for all 4 voices. However, they can be controlled independently using **MIDI inputs,** or using **CV inputs** in **Per Voice** mode.

Follow these steps to configure the Control Mode:

1. Push the **Home** button to display the **Menu** screen with menu choices of **Main** and **Settings**.
2. Touch **Settings** to display the **Settings** Screen.
3. Use **Control Knob 4** to set the value of **Ctrl Mode** to **Stereo Mix**.

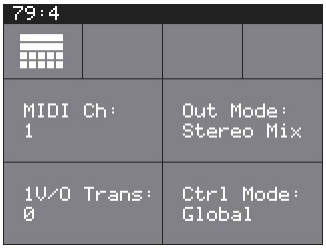

Figure 11: Settings Screen

Start Playing

If you have performed all of the steps in Setup Synthbox above, your module is now ready to play using the default preset. Start playing notes on your MIDI Controller or drive some CV to the CV Input jacks for Pitch and Gate in the bottom row of CV inputs.

Create and Configure a New Preset

Now that the module is setup, we will go through the process of creating a new preset. For this example, we will use Wavetables and an Oscillator that come with the module. We will go into the details of using your own custom wavetable files in Use Custom Wavetable Files below.

Create and Name the Preset

Create a new preset to store your own synthesizer configuration by following these steps:

1. Push the **HOME** button to return to the Main screen if needed.
2. Touch the preset name at the top of the grid (or the space above it) to display the **Presets** screen.
3. Touch the **New** button at the top of the screen. Synthbox adds a new preset to the list with the name **New Preset X**, where X is an incremental number.
4. Turn a **Control Knob** to select the newly created preset and then touch the **Edit** button in the top row of the **Touch Screen** to display the **Preset Edit Menu**.
5. Touch the **Rename** menu button to display the on screen keyboard.
6. Touch the back arrow **<-** to erase the preset name. Then use the onscreen keyboard to type in a new name. Use the carat button **^** to toggle between upper and lower case letters. Touch the **123** button to display the numeric keyboard if needed. When the name is complete, touch **Return** to save the name and return to the **Presets** screen with the new preset selected.
7. Touch the **Load** button to start working with your new preset.

Figure 12: Presets Screen

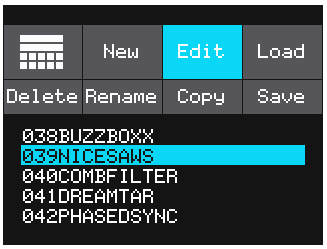

Figure 13: Preset Edit Menu

Select and Configure Wavetables

By default, synthbox will select the first wavetable in the Factory folder for both wavetables in the new preset. Configure the wavetables as follows:

1. From the Main screen, touch **Wavetable 1** or **Wavetable 2** to display the **Wavetable Parameters** screen.
2. Turn the **Control Knob** next to each parameter to adjust its value. Here are the available parameters for **Wavetable 1** and **Wavetable 2**:

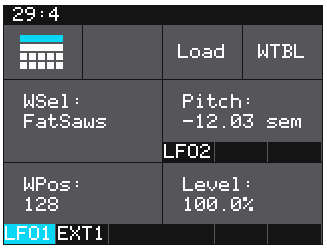

Figure 14: Wavetable Parameters

Parameter	Description	Range of Values
WSel	Selects the waveform. There are over 100 wavetables included with synthbox. You can also create and load your own wavetables. See Use Custom Wavetable Files below for more about this.	List of wav files on the microSD card
Pitch	Selects how many semitones up or down you want to shift the pitch.	-24 to +24 semitones

Parameter	Description	Range of Values
WPos	Sets the position within the waveform that will be looped. Each waveform has slight variations in the different cycles of the wave. This knob sets the cycle of the wave that will be looped. This cycle will be looped until the **WPos** is changed either by modifying the value here or via modulation.	0 to 255
Level	Sets the relative audio level of this waveform.	0% to 100%.

You can also apply modulators to the **Pitch**, **WPos** and **Level** parameters. We will discuss modulation in Apply Modulators below.

3. Once you have selected all the settings for this wavetable, touch the screen icon in the top left or press **HOME** to go back to the Main screen.
4. Repeat the steps above for the other wavetable.

Select and Configure an Oscillator

By default, synthbox selects the **Triangle** Oscillator when a new preset is created. Here's how to choose and configure a different one:

1. From the Main screen, touch **OSC** to display the **Oscillator Parameters** screen.
2. Turn the **Control Knob** next to each of the following parameters to set their values:

Parameter	Description	Range of Values
Waveform	Choose the desired Oscillator.	• **Saw** • **Sine** • **Triangle** • **Noise** • **Square**
Pitch	Selects how many semitones up or down you want to shift the pitch.	-24 to +24 semitones
Duty Cycle	This parameter only applies when **Square** is selected for the **Waveform**. This value specifies the portion of the wave that will have a high signal. A value of 50% will create a wave that is high half the time and low half time. A value of 75% will create a wave that is high ¾ of the time and low ¼ of the time.	0 to 100%
Level	Sets the relative audio level of this waveform.	0% to 100%.

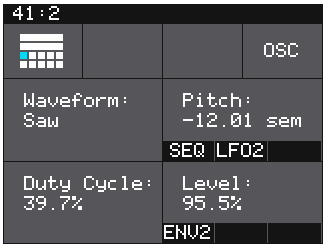

Figure 15: Oscillator Parameters Screen

3. Touch the screen icon in the top left, or press **HOME** to go back to the Main screen.

Apply Effects

Next we are going to apply sound effects to the audio signal. Synthbox can apply two filters, a flanger, distortion and a delay to the audio signal. The flanger, distortion and delay are only applied by synthbox when the **Out Mode** is set to **Stereo Mix**. These settings are ignored when **Out Mode** is set to **Voice x 4**.

The two filter effects are applied in series to each individual voice, while the flanger, distortion and delay are applied to the mixed signal of all four voices. However, all of the effects use the same configuration settings for all voices.

Follow these steps to apply a sound effect to the audio signal:

1. From the Main screen, touch the name of the effect to display the corresponding parameters screen. The parameters available on this screen vary by effect.
2. Turn the Control Knob closest to the parameter to set the value for the parameter. The table below describes the parameters for the available sound effects:

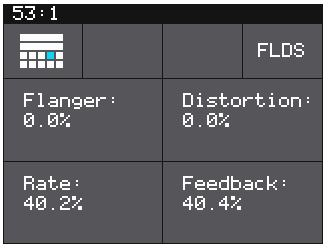

Figure 16: Sound Effects Parameters Screen - FLDS

Effect	Parameter	Description	Range of Values	Can be modulated?
FILT	**Cutoff**	The cutoff frequency ranging from 80Hz at 0% to 10kHz at 100%	0 to 100%	Yes
FILT	**Type**	The type of filter to be applied	LP (Low Pass) HP (High Pass)	No
FILT	**Res**	The amount of resonance to be applied	0 to 100%	Yes
FILT	**Filter**	Controls whether the filter is used	**On**, **Off**	No
FLDS	**Flanger**	The amount or depth of the flanger effect	0 to 100%	No
FLDS	**Distortion**	The amount or depth of the distortion effect	0 to 100%	No
FLDS	**Rate**	The rate at which the flanging is applied.	0 to 100%	No
FLDS	**Feedback**	The amount of feedback used on the Flanger effect	0 to 100%	No
DLY	**Delay**	The amount of time between repeats expressed in beats	**1/64**, **1/32**, **1/16**, **1/8T**, **1/16D**, **1/8**, **1/4T**, **1/8D**, **¼**, **1/2T**, **½**, **1 bar** (**T**=Triplet, **D**=Dotted)	No
DLY	**Feedback**	The amount of regeneration included in the delay.	0.0% to 100.0%	No
DLY	**Amount**	The level of the wet signal heard in the output.	0.0% to 100.0%	No
DLY	**Trigger**	Specifies whether the delay is engaged (ON) or disengaged (OFF)	**On**, **Off**	No

Apply Modulators

Now that we have all of the sound effects configured, we can start to apply some modulators. First we will go through the process of applying a modulation source to a modulation target. Then we will configure the internal modulators of envelopes, and LFOs, followed by sequencer modulation configuration. Lastly, we will setup and configure the external modulation.

Applying a Modulation Source to a Modulation Target

Synthbox provides the ability to modulate sound using both internal signals and external CV and MIDI inputs. The following sound elements are referred to as **Modulation Targets** because modulation can be applied to them:

Sound Element	Parameter	Example usage
WTBL1 and **2**	**Pitch**	Use an LFO to introduce vibrato to the sound
WTBL1 and **2**	**WPos**	Use an LFO to adjust the tone of the sounds slowly over time
WTBL1 and **2**	**Level**	Use the modulation signal to adjust the signal level up or down
OSC	**Pitch**	Use an LFO to introduce vibrato into the sound
OSC	**Level**	Use the modulation signal to adjust the signal level up or down
FILT1 and **2**	**Cutoff**	Use ENV2 to shape the tone of the oscillators as the note plays
FILT1 and **2**	**Resonance**	Use an LFO to adjust the resonance in addition to other filter movement to change the sound
LFO1 and **2**	**Depth**	Use the Mod Wheel to control the intensity of other modulations relying on the LFO.

Figure 17: Modulation Targets

To apply a modulator to a specific modulation target:

1. From the Main screen, touch the name of the modulation target, such as **FILT**, to display the corresponding parameters screen.
2. The parameters that can be modulated will have three black boxes below them. This allows you to apply to up to three modulators to each of these parameters. Touch one of the boxes below a parameter to open the **Modulation Selection Screen**.
3. Adjust the modulation parameters by turning the Control Knob closest to the parameter.

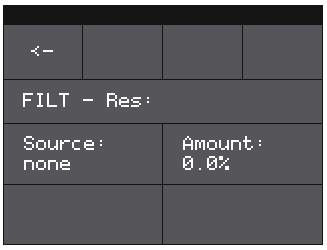

Figure 18: Modulation Selection Screen for Filter Resonance

Parameter	Description	Range of Values
Source	The source of modulation to be applied.	• **None** • **VEL** • **ENV1** • **KEY** • **ENV2** • **MODW** • **LFO1** • **EXT1** • **LFO2** • **EXT2** • **SEQ** • **EXT3**
Amount	Choose the amount of modulation that will be applied.	-100% to +100%

4. Once you have selected all the settings, touch the arrow (**<-**) in the top left or press **HOME** to go back to the parameters screen.
5. Touch another black box below a parameter to add more modulation.

Configure Envelope and LFO Modulation

Each synthbox voice includes two envelopes (ENV1 and ENV2) and two low frequency oscillators (LFO1 and LFO2) as modulators. Envelopes are used to shape a note by giving you control of note parameters at the beginning, middle and end. Low frequency oscillators are constantly running patterns that can introduce shape or movement in the sound.

The first envelope, **ENV1**, is always applied to the gate signal for each voice. However, it can also be used to modulate other sound elements. Here are the steps to configure the parameters for envelopes and LFOs:

1. From the Main screen, touch the name of the modulator to display the corresponding parameters screen.
2. Press the **Info** button to toggle between page 1 and page 2 of the parameter screens.
3. Turn the **Control Knob** closest to the parameter to adjust its value. The parameters for Envelopes and LFOs are described in the following table:

Modulator	Parameter	Description	Range of Values	Can be modulated?
ENV1 & **2**	**Attack**	Establishes the length of time it takes for the note to rise. The range maps to 0 to 9 seconds.	0 to 100%	No
ENV1 & **2**	**Sustain**	Sets the level of the note after the attack and decay while the key is held down.	0 to 100%	No
ENV1 & **2**	**Decay**	Establishes the length of time the note spends in the second phase after attack and before sustain. The range maps to 0 to 9 seconds.	0 to 100%	No
ENV1 & **2**	**Release**	Sets the amount of time the note will continue to play after the key released. The range maps to 0 to 38 seconds.	0 to 100%	No
ENV1 & **2**	**VEL Amount**	Controls how much the MIDI velocity of the note influences the depth or amount of the envelope. This is an easy way to introduce velocity control of the amplitude or filter shape of the note.	0 to 100%	No
LFO1 & **2**	**Waveform**	Specifies the shape of the waveform used for the LFO.	• **Saw** • **Rev Saw** • **Triangle** • **Pos Tri** • **Sine** • **Pos Sine** • **Square** • **Pos Square** • **Random**	No
LFO1 & **2**	**Depth**	The amount or amplitude of the LFO.	0 to 100%	Yes
LFO1 & **2**	**Rate**	The frequency of the LFO from about 0.1Hz to 12 Hz. When in **Beat Sync** is **On**, this specifies the rate in beats and measures.	0 to 100%	No

Modulator	Parameter	Description	Range of Values	Can be modulated?
LFO1 & **2**	**Key Trig**	When set to **On**, the LFO will always start playback from the beginning of the waveform for each note. When it is **Off**, the LFO runs continuously.	**On**, **Off**	No
LFO1 & **2**	**Beat Sync**	Controls the operation of the rate parameter.	**On**, **Off**	No

Note that LFO is both a modulation source and a modulation target.

Use the Sequencer for Modulation

Another modulator available on synthbox is the sequencer. You can use the touch screen to draw a pattern of modulation that will repeat over a specified number of steps. To set up a sequence:

1. From the Main screen, touch the **SEQ** button to display the **Sequencer Screen**. The screen displays a series of columns that represent the sequence.
2. Press the **INFO** button to display the **Sequencer Parameters** screen.
3. Use the Control Knobs to set the values for the following parameters:

Parameter	Description	Range of Values
Length	Sets the step size for the sequencer in note length.	**1/64th** note to **2 bars**
Key Trig	Specifies if the sequencer is restarted when each note begins (**On**) or if plays constantly (**Off**). This affects both MIDI and CV control.	**On**, **Off**
Steps	The number of steps in the sequence. If the number is smaller than 16, only the number of bars specified will be used in the sequence.	2 to 16
Quantize	Specifies if the levels of the sequencer are quantized to 12 distinct values (plus the off value). Meant for introducing precise semitones in a pitch modulation.	**On**, **Off**

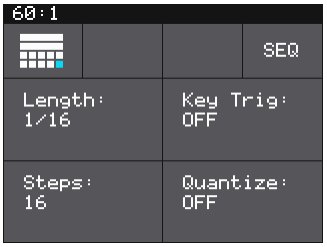

Figure 19: Sequencer Parameters Screen

4. Press the **Home** button to go back to the **Sequencer Screen**.
5. Touch a column on the screen to create a sequence bar of the selected height on the selected column. The height of the bar represents the amount of modulation, and the bar selection corresponds to the step in the sequence. Touch the bar again at a different height to modify the value assigned to the selected step.
6. You can also use the **Control Knobs** to adjust the values of the sequencer steps. Turn the upper left **Control Knob** to select a step, and the upper right **Control Knob** to control the level of the step.
7. Continue to adjust the bar height for all the steps in the sequence.
8. If **Key Trig** is **ON**, trigger a MIDI or CV gate signal to start or restart the sequence.

Note:

- It's easier to use the Control Knob to set the value of a step to zero than to use the touch screen.

Use MIDI and CV signals for Modulation

We've set up all of the internal modulators, so now let's set up the external modulators. Synthbox supports the following external modulators:

Modulator	Description	Per Voice?	CV?	MIDI?
VEL	The velocity provided by the MIDI controller.	Yes	No	Yes
Key	The key is derived from the pitch signal and is an integer representation of the pitch.	Yes	Yes	Yes
MODW	The mod wheel signal provided by the MIDI controller.	No	No	Yes
EXT1, **2** & **3**	External input jack in the corresponding EXT column of the array of CV inputs.	Yes	Yes	No

Most modulators will be applied to individual voices when the synthbox is in Per Voice mode. In this mode, each row of CV inputs applies to a separate voice. However, when set in Global mode, only the bottom row of CV jacks is used, and the signal is applied to all four voices. The Mod wheel, by the nature of the MIDI input, is always applied globally. The Mod Wheel signal will be applied to all voices.

The external modulators do not have parameter screens in synthbox. To use **MIDI** for a modulator, connect a MIDI controller to the synthbox. To use **CV** for a modulator, connect CV signals from external devices to the array of **CV input jacks** on the front panel of the module. Each row of **CV inputs** maps to a voice in synthbox. The columns are mapped from left to right as shown across the bottom of the **Main** screen: **PITCH**, **GATE**, **EXT1**, **EXT2**, and **EXT3**. The bar graphs that appear across these column labels represent the value of the CV input into the bottom row of CV input jacks only. Since **Key** can come from either **MIDI** or **CV** pitch, both **MIDI** and **CV** inputs can be used to control the **Key** modulator.

Save Your Preset

At this point, we have walked through all of the steps to configure every aspect of a new preset. However, it's important to note that synthbox does not automatically save the changes you have made to a preset. You have to manually choose to save them by following these steps:

1. From the Main screen, touch the **Preset Name** at the top of the screen to display the **Preset Selection** screen.
2. Touch **Edit** at the top of the screen to display the **Edit Menu**.
3. On the **Edit Menu**, touch **Save** to save the changes you have made to the current preset.
4. Press the **HOME** button to return to the Main screen.

Summary

We have now gone through the steps of configuring all of the different features of a preset on synthbox. Now you can go back and repeat these steps to create the sounds and music you imagine.

Manage Presets

Synthbox comes with over 100 presets and you can create many more. Here's how to work with the list of presets.

Change Selected Preset

There are two ways to select a preset. From the Main screen, you can cycle through the list of presets by touching the **–** and **+** buttons on either side of the **Preset Name** (**039NICESAWS** in the Main screen example shown on the right).

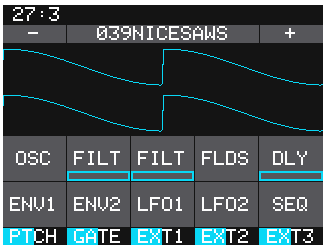

Figure 20: Main Screen

Alternatively, on the Main screen, touch the preset name at the top of the grid (or the space above it) to display the **Preset Selection** screen. Select a **Preset** by scrolling through the list with any of the **Control Knobs**, and then touch the **Load** button in the top right corner of the **Touch Screen**.

Note:

- Any changes you make to a preset's settings are *not* automatically written to the preset. You will have to manually choose to save them.
- When you save changes to a preset, the only option is to save over the currently selected preset. So if want to try something and you don't want to lose the original settings, make a copy of the preset and work with the copy.
- If you want to restore the factory presets, follow the steps in Reset Synthbox Presets to Factory Settings below.

Copy a Preset

If you prefer not to start with a blank slate, you can copy an existing preset.

1. From the Main screen, touch the preset name at the top of the grid to display the **Presets** screen.
2. Touch the **Edit** button at the top of the **Touch Screen** to display the **Preset Edit** menu.
3. Use a **Control Knob** to select the preset you want to copy, and then touch the **Copy** button. Synthbox creates a copy of the preset that appears above the source preset in the list. The name of the copy is the name of the source preset with " 2" appended to the end.

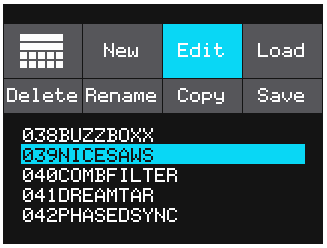

Figure 21: Preset Edit Menu

Rename a Preset

Here's how to give a preset a new name:

1. From the **Presets** screen, touch the **Edit** button at the top of the **Touch Screen** to display the **Preset Edit** menu.
2. Use a **Control Knob** to select the preset you want to rename, and then touch the **Rename** button. Synthbox displays a touch screen keyboard you can use to enter a new name. Touch the **return** button to save the changes and go back to the **Presets** screen.

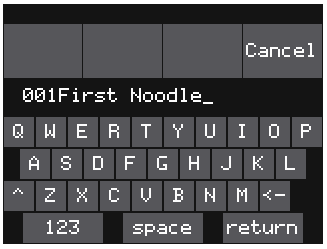

Figure 22: Preset Naming Keyboard

Delete a Preset

Follow these steps to delete a preset. Warning: there is no undo, and no prompt to ask "are you sure?" So make sure you are on the correct preset before you use this. If you do accidentally delete a factory preset, you can reload it from the factory image using the steps outlined in Reset Synthbox Presets to Factory Settings below.

1. Touch the **Edit** button at the top of the **Presets** screen to display the **Edit** submenu.
2. Use a **Control Knob** to select the preset you want to delete, and then touch the **Delete** button. The preset is immediately deleted.

Use Custom Wavetable Files

You can further customize your presets by using custom wavetable files. The wavetables that are provided with synthbox were created using Serum. You can use the Serum export feature to create files that can be read by synthbox. Custom waveforms must meet the following specifications:

- The WAV file may contain between 2 and 256 cycles to make up a wavetable. For files with less than 256 cycles, synthbox will interpolate between the existing cycles to produce a resulting table with 256 cycles.
- Each cycle must be 2048 samples in length. This makes for a very low sounding tone at 48kHz

- The sample rate of the file is not important. You can work with 96kHz files and have a higher tone to work with
- Synthbox supports 16, 24, and 32 bit files. Internal processing is done in 32-bit floating point
- The file extension must be .wav

Once you have a wavetable file, follow these steps to use it with your synthbox:

1. Remove the microSD card from your module and insert it into your computer. You may need to use a microSD card adapter.
2. Copy the custom wavetable file onto the microSD card. You can place the file in the root of the microSD card, or you can create folders to organize the files. The wavetables that come with synthbox are in the Factory folder.
3. Insert the microSD card into the module.
4. Push the **HOME** button to return to the Main screen if needed.
5. Touch a waveform on the Main screen to display the **Waveform Parameters** screen.
6. Touch the **Load** button to get synthbox to display the files on the microSD card.
7. Use the **Control Knobs** to select the relevant file and press **Load** again.

   Note:

   - The wavetable files can be organized on the microSD card in file folders. **Load** a folder to see its contents.

Update and Swap Firmware, Audio Files and Presets

Owners of Series 1 modules can update the module's firmware to get the latest features and other updates. This process can also be used to convert a module to run any Series 1 firmware. This means that your synthbox can be converted to a bitbox or an fxbox and then back again. You can also install synthbox firmware on your fxbox or bitbox. The firmware can be updated with the factory image, which includes the original presets, or just the firmware itself. You can also choose individual presets to copy over to your microSD Card.

Backup Your Presets and Wavetables

Before you re-use a microSD to update or swap firmware, backup the files that are stored on the microSD card:

1. Remove the microSD card from your module and insert into your computer. You may need to use a microSD adapter.
2. Copy the files from the microSD card onto your computer.

Install New Firmware

Here are the steps required:

1. Download the desired firmware onto your computer. You can choose to download either synthbox, fxbox or bitbox firmware, but only one set of firmware can run at a time. You can find the latest firmware images on the forum at http://forum.1010music.com. You must be a registered user of the forum to access the download files. Forum registration is free.
2. Unpack the zip file. Some browsers do this automatically for you.
3. Prepare a microSD card with the FAT32 format. The card that comes with your module is formatted properly, but you may need to reformat a card that came from somewhere else. Make sure you only have the files from one Series 1 module on the microSD card at a time.
4. If you want to replace the Presets with the factory image, copy the full contents of the zip file onto a microSD card. If you do not want to overwrite your presets, copy only the MATRIX.BIN file to the microSD card.
5. Turn off power to the Eurorack.
6. Place the microSD card in your module.
7. While powering up the unit, hold the **Home** and **Info** buttons. When you see the message about upgrading the firmware, you can let go.
8. When the upgrade finishes in about 15 seconds, the unit will restart with the new software.

Reset Synthbox Presets to Factory Settings

If you want to reset one or more of the synthbox presets to the original factory settings, you can copy individual preset files onto your microSD card.

1. Download the desired firmware onto your computer. You can find the latest firmware images on the forum at http://forum.1010music.com. You must be a registered user of the forum to access the download files. Forum registration is free.
2. Unpack the zip file. Some browsers do this automatically for you.

To restore a preset:

3. Find the .syb file in the unpacked folder that has the same name as the preset you want to restore, for example 006DEEPSPACE.syb. Copy the .syb file onto the microSD card to replace the file on the card.
4. Insert the microSD card into the module.
5. Push the **HOME** button to return to the Main screen if needed.
6. Touch the preset name at the top of the grid (or the space above it) to display the **Presets** screen.
7. Select any preset and touch the **Load** button to get synthbox to load the updated presets.

Technical Specs

Module Specs

Synthbox is designed with the following specs:

- Rack width: 26 HP
- Power supply requirements:
  - +12V: 350mA
  - -12V: 0mA
  - 5V: 0mA

Pin Mapping for Stereo Mini Stereojack to MIDI 5 Pin DIN Connectors

The musical instrument industry currently uses several different ways of mapping MIDI 5 Pin DIN signals to Stereo Minijack connectors. The diagram to the right shows the numbering of the pins on a MIDI connector and the labels of the connection components of a stereo minijack. 1010music products are compatible with cables that use the following mapping of MIDI signals between female MIDI connectors and stereo minijacks:

MIDI Signal	MIDI Connector	Stereo Minijack
Current Source	Pin 4	Tip
Current Sink	Pin 5	Ring
Shield	Pin 2	Sleeve

Table 1: MIDI Connector to Stereo Minijack Mapping

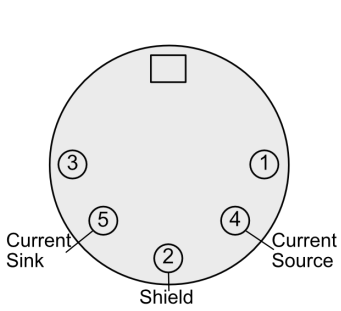

Figure 23: 5 Pin DIN and Stereo Minijack Connectors

For more information on the use of adapters, read the blog post on our website Stereo Minijacks for MIDI Connections Compatibility Guide at:

https://1010music.com/stereo-minijacks-midi-connections-compatibility-guide

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