

Polyend Synth Essentials

A Collection of Essential References
for The Polyend Synth



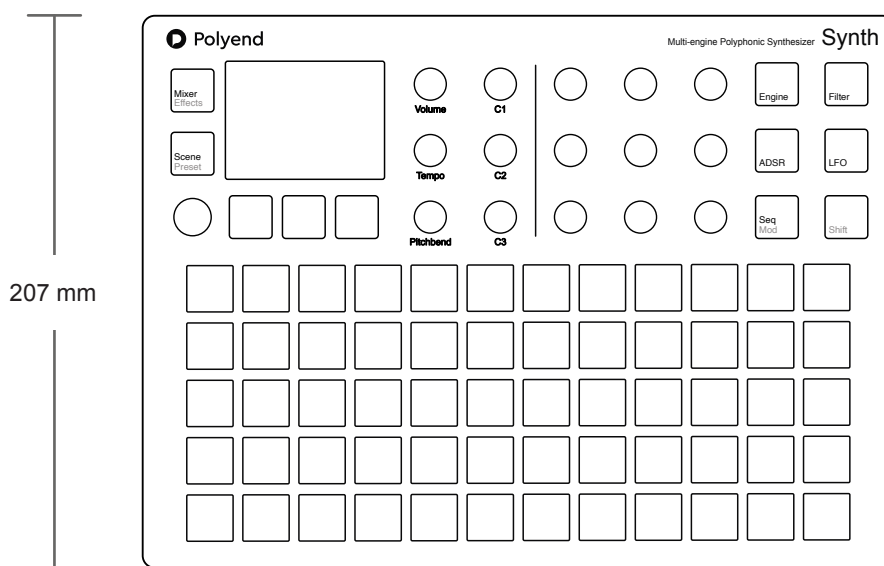
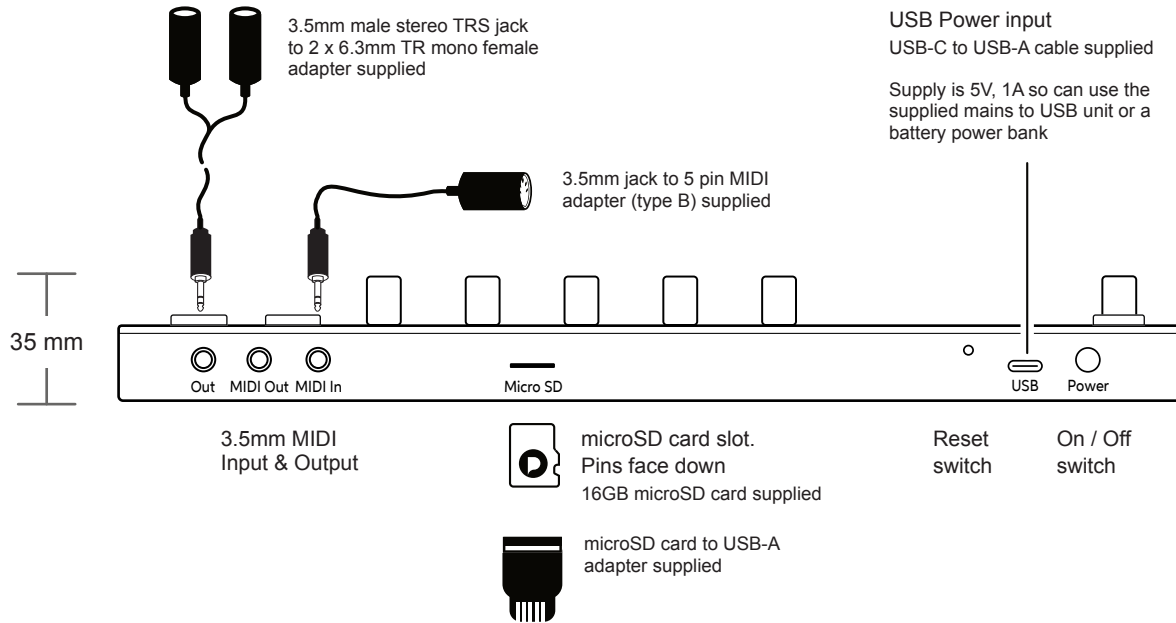
Overview

Synth is a multi-engine polyphonic synthesizer. Synth can operate with up to 3 synth engines each of which is selectable from the engine types available. Some engines have an element of familiarity, being conceived in the Polyend Tracker and Play family of devices. Others are new and expand the sonic possibilities even further. The Synth workflow and structure revolves around 'scenes'. A scene is a collection of all the elements including presets, macros, settings, effects and parameters that create the sound and pattern. These are stored as self contained functions in a library from which to assemble bigger and more complete productions.

Synth Essentials

Hardware Overview

3.5mm Stereo audio output also serves as headphone out.



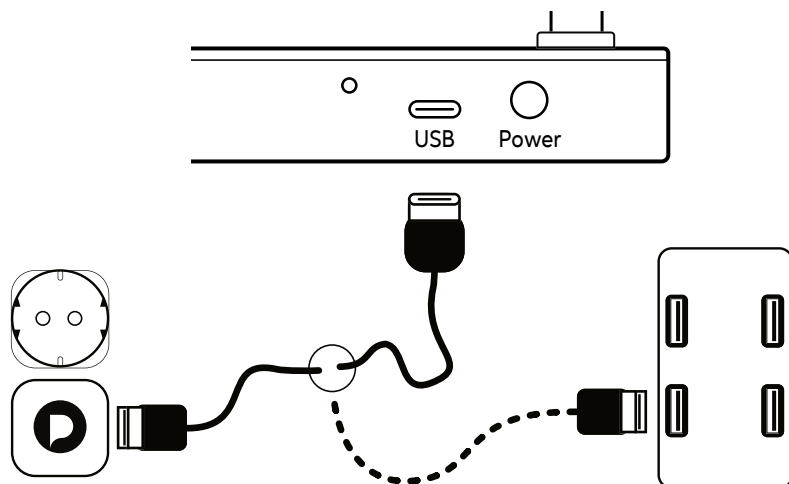
Start Up

Synth is a low power user and can therefore be powered from the supplied mains USB adapter or from a rechargeable battery power bank. When restarting Synth the previously open project will be re-opened.

POWERING ON / OFF SYNTH

1. Connect the supplied USB-C mains cable between Synth and the USB plug provided. Synth can also operate with a portable USB power bank*. It requires a 5V, 1A rated supply.
2. Ensure the microSD Card is installed correctly for Synth to operate.
3. Quickly press the small power button located on the rear left (looking from the top). Synth will start up and the previous project reopened.
4. To power off, press and hold the small power button located on the rear left (looking from the top) until the 'Powering Down' message appears and the timer bar ends. Synth will power off.

Supply is 5V, 1A from the supplied mains to USB adapter.



Alternatively use a battery power bank.
Start up instantaneous current is approx 1.2A with normal state around 0.5A

** It is recommended by Polyend to use a standard power bank without smart features. Intelligent / smart power banks or PC / Mac power may have features that interfere with the continuous supply required by Synth. A USB - C to USB - A cable is supplied.*

Synth Essentials

Synth Audio Structure

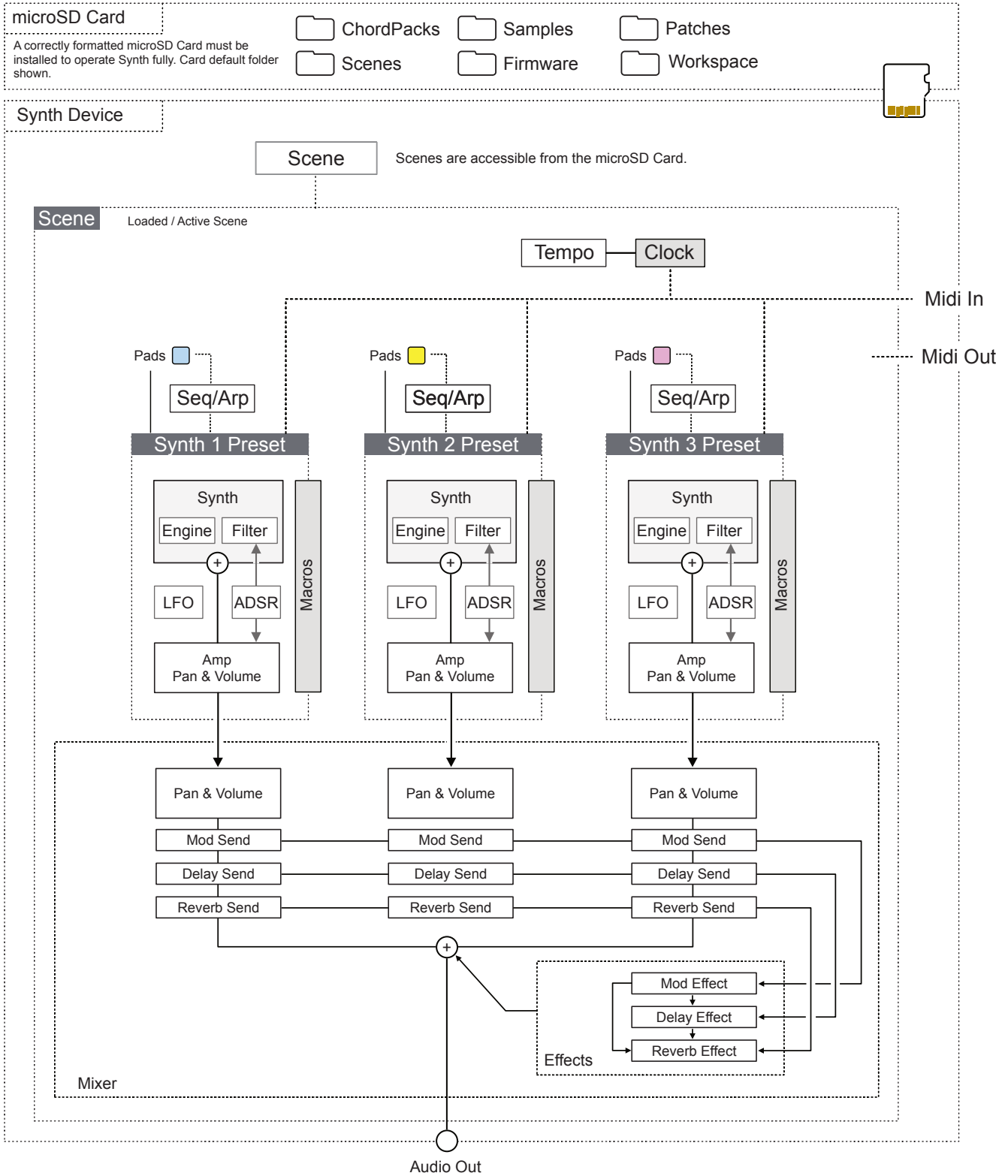
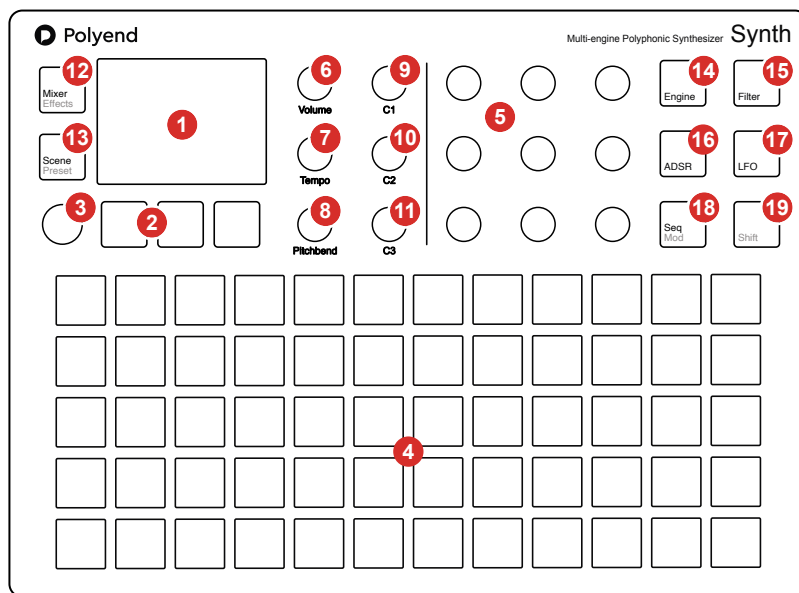


Diagram is a single line illustration, used only for guidance. This is not a detailed schematic and does not show the stereo channels

- 1** LCD Display
Hi Resolution Display.
- 2** Synth Engine / Multi Function Buttons
Each [Screen] button selects one of the 3 synth engines or selects a defined option in a function menu.
- 3** Multi-Functional Screen Knob
Clickable encoder. Click to select the main menu. Turn to change synth function pages. (Screen).
- 4** Grid Pads
5 x 12 Silicone [Pads]. Configurable for playing and controlling the 3 synth engines.
- 5** Parameter Knobs
9 Dynamic knobs control the respective parameter set for the function displayed on the screen.
- 6** Master Volume
Control of primary master (Vol) dB level.
- 7** Tempo & Swing
Adjusts the global (Tempo). Range is 10 to 400 beats per minute. Use Shift to adjust swing 25%-75%.
- 8** Pitchbend
Adjusts the (Pitchbend) value -100 to +100 only while turning the knob. Resets to 0 when the knob is released.



- 9** Macro 1 & Combo Control
Adjust synth macros or relative common parameters for all or selected synth engines using one (C1) Knob.
- 10** Macro 2 & Combo Control
Adjust synth macros or relative common parameters for all or selected synth engines using one (C2) Knob.
- 11** Macro 3 & Combo Control
Adjust synth macros or relative common parameters for all or selected synth engines using one (C3) Knob.
- 12** Mixer & Effects
Opens the mixer page for Level and Pan of all the synth engines. Shift to open the ModFX parameters.
- 13** Scene & Preset
Opens the [Scene] manager to load & save. Use [Shift] + [Scene] to open the synth preset browser.
- 14** Synth Engine Osc Parameters
Opens the oscillator page for the selected synth engine. Engine is selected with [Screen] buttons.
- 15** Synth Engine Filter Parameters
Opens the filter page for the selected synth engine. Engine is selected with [Screen] buttons.
- 16** Synth Engine ADSR Envelope Parameters
Opens the Filter and Amp Envelope pages for the selected synth engine. Selected synth with [Screen].
- 17** Synth Engine LFO Parameters
Opens the Low Frequency Oscillator pages for the selected synth engine. Selected synth with [Screen].
- 18** Sequencer Mode & Modulation Routing
Opens the sequencer mode page for the selected synth engine. Shift to adjust modulation amounts.
- 19** Shift
Use [Shift] in conjunction with a control to access a secondary function, e.g. the button grey text option.

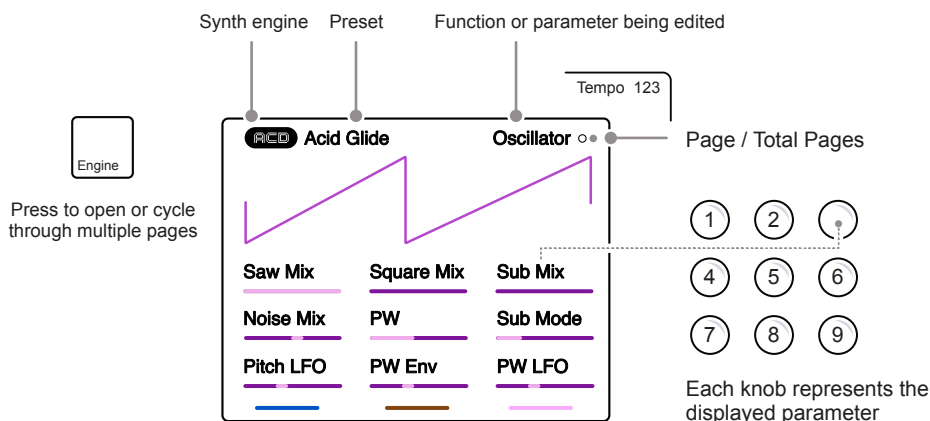
The 5 x 12 grid pads are velocity sensitive. All knobs with the exception of the left side screen knob are touch sensitive.

Synth Essentials

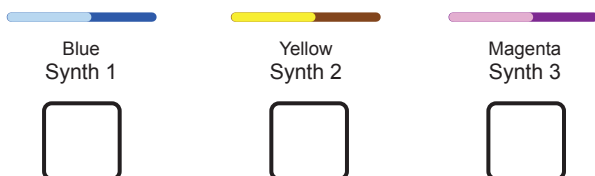
Display & Controls

NOTES

Each page will display the parameter information and control options for the selected function. While generally this is based on the context and mode of operation, there are some common features and navigation principles that apply across all (or most) of the generic pages of Synth.



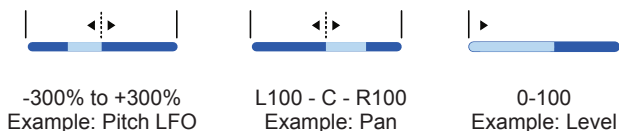
Colour scheme represents the synth engine selected



The 3 [Screen] buttons under the display represent each of the synth engines 1, 2, 3 by default. In some modes, these buttons will represent the function displayed directly above the button.



The values, range and scale as displayed will depend on the parameter represented.

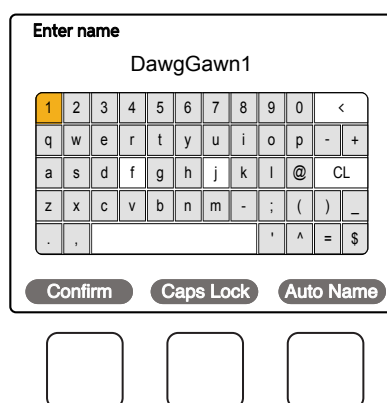


[Engine] Square brackets in the descriptions represent the physical button or pads on the front panel. Push or hold to activate.

(Vol) Round brackets in the descriptions represent the physical knobs on the front panel. All knobs except the screen knob are touch sensitive. Knobs are turned and / or tapped.

QWERTY Keyboard

Some functions will require text editing for example when saving and naming scenes. The same functionality applies whenever the alphanumeric pop-up editor is used. The screen will display the QWERTY keyboard and the text string to edit, while the 5 x 12 pad grid will act as the keyboard's input. The screen buttons are also available to select actions.



The screen will display the characters which are represented by the grid pads. The 'f' and 'j' pads are highlighted to give a reference between the pads and the screen characters. Text can be typed in with the currently selected character lit orange on the display and the pad.

1	2	3	4	5	6	7	8	9	0	<	
q	w	e	r	t	y	u	i	o	p	-	+
a	s	d	f	g	h	j	k	l	@	CL	
z	x	c	v	b	n	m	-	;	()	_
.	,							'	^	=	\$

The following Synth controls also operate in the naming editor when the naming screen is presented:-

- Press (Screen) to add the highlighted character at the current cursor position in the name string.
- Move the character cursor left or right within in the text name string, Turn (Screen) knob.
- The dynamic screen buttons action specific commands, as displayed above the button. Confirm, Caps Lock and Auto Name are the three available commands.

Synth Essentials

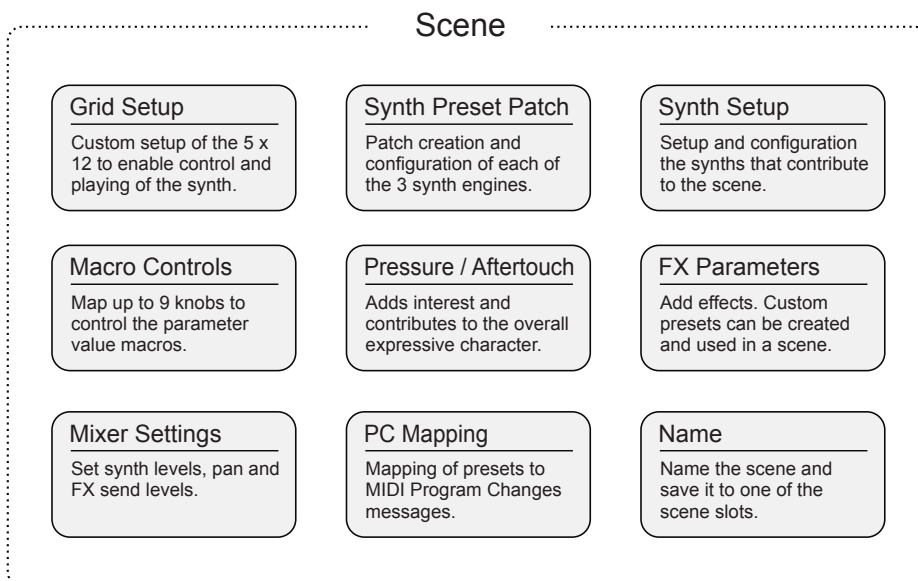
First Steps with Scenes

Scenes are the core of the Polyend Synth. A scene is a collection of patches, settings, macros, parameters and sequence data. Think of a scene as one specific section or building block that contributes to a complete song or arrangement. A scene is the container for the all of the musical elements and helps to compose and organise discrete sections of an arrangement by working with manageable parts.

Artist scenes are a library of scenes that showcase how Synth is used as an instrument, offering unique insights into the composition of the scene and bringing a signature style and flair to the collection.

Generic scenes are song based scenes designed and build by the Synth user to develop custom productions and sound designs.

Components of a scene



To create a scene, the configuration and development of these elements is required. The assembly of these will develop sounds and construct the scenes that can be used together in a wider production. You will develop your own workflow but the following steps cover the basic principles of scene creation.

Managing scenes

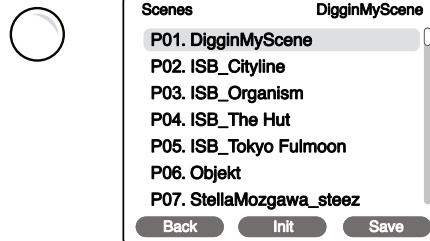
Scenes can be managed either in the main menu under 'Project' or more directly by using the dedicated [Scene] button located to the left of the display screen. Up to 250 scenes are accessible from Synth and more can be saved on the microSD Card.



Press the [Scene] button to open the scene menu options. Alternatively, press (Screen) knob to open the main menu and select 'Projects'. Turn (Screen) to scroll and navigate the menu. Press (Screen) to select the highlighted option or sub-menu.

The [Screen] buttons can be used to navigate back up the menu or select an option.

Navigate the list with the (Screen) knob.



Press the screen buttons located below the display to navigate backup in the menu, load or save a highlighted scene. Choose <Init> to create a new scene.

Creating a new scene

Press [Scene] button and then select [Init] button. Press [SHIFT] + [Save As] button to save and name the scene. Enter the name with the keyboard on the grid. Press [Confirm] screen button when complete or press [Back] to exit and move back to the scenes loader. The selected scene will now be active for editing.

Save a scene

Press the right [Save] button to save to a highlighted and selected scene in the list. Hold [Shift] to 'Save As'. The naming menu will open to edit the name if required. Press [Confirm] screen button when complete to save / overwrite or press [Scene] to exit and backup in the menu.

Load a scene

Navigate and highlight a scene to load using the (Screen) knob. Press the middle [Load] button to load the highlighted and selected scene from the list. The scene will open ready to edit.

Scene - Quick select

To select a scene using the grid pads, press [Scene] button. The pads will be dimly lit and the display will list the 'P' for pad, numbered scenes. Tap a pad to select a scene. The selected scene will be shown with a brightly lit grid pad. With fewer than 60 scenes, unassigned scenes are shown with unlit pads.

Synth Essentials

Synth Grid

NOTES

Synth user interface is based in a 5 x 12 pad grid which is used for playing synth presets. The grid is customizable to match your preferred style and also to take advantage of using all 3 synth engines at the same time. The synths, modes, chords, scales and root notes are configurable.

Configuring the grid

Configuration is found in the main menu, under the grid options. The main menu is accessed with the screen knob. The grid settings are saved with the scene. The grid colors can be changed in the system settings.



Press the (Screen) Knob to open the main menu. Turn (Screen) to scroll and navigate the menu. Press (Screen) to select a highlighted option or sub-menu.

Turn to highlight 'Grid' - press (Screen) knob to select.

The [Screen] buttons can be used to navigate back up in the menu or to change pages.

	Grid			
C1	Layout Florida	Mode Note	Mode Note	Mode Note
C2	Scale Chromat	Chord -	Chord -	Chord -
C3	Root C	Root C1	Root C1	Root C1
	Back		More	

The 9 macro knobs change the displayed parameter values

C1, C2, C3 knobs edit the generic settings

Synth 1 - Blue
Vertically orientated

Synth 2 - Yellow
Vertically orientated

Synth 3 - Magenta
Vertically orientated

C2				C2				C2			
G#	A	A#	B								
E	F	F#	G								
C1	C#	D	D#	C1				C1			

Root
e.g. C, octave can be set per synth C1, C2 etc

Scale
e.g. chromatic, pads represent all notes in the selected scale

Grid page settings accessed in the main menu, under the 'Grid' options. Press (Screen) knob to open the main menu and turn the knob to navigate.

Option	Global / Synth	Knob	Description			
Layout	Global	C1	3 Devices mixed: 3 synths are positioned in a mixed arrangement across the pads.			
			3 Devices vertical: 3 synths are positioned in a vertical arrangement in the pad columns.			
			1st Device. Pads only represent synth 1, notes horizontally positioned.			
			2nd Device. Pads only represent synth 2, notes horizontally positioned.			
Scale	Global	C2	3rd Device. Pads only represent synth 3, notes horizontally positioned.			
			Chromatic, Minor, Major, Dorian, Lydian Major, Lydian Minor, Locrian, Phrygian, Phrygian Dominant, Mixolydian, Melodic Minor, Harmonic Minor, BeBop Major, BeBop Dorian, BeBop Mixolydian, Blues Minor, Blues Major, Pentatonic Minor, Pentatonic Major, Hungarian Minor, Ukrainian, Marva, Whole Tone, Diminished, Super Locrian, Hirajoshi, In Sen, Yo, Iwato, Kumoi, Overtone, Double Harmonic, Indian, Neapolitan Major, Neapolitan Minor, Enigmatic.			
			Root	Global	C3	C, C#, D, D#, E, F, F#, G, G#, A, A#, B.
			Mode	Per Synth	Param 1, 2, 3	Note.
Ch Scale.						
Chord.						
Ch Pack.						
Chord	Per Synth	Param 4, 5, 6	Follower - Only available when a chord mode is selected on another synth.			
			Selects the chord types when a Chord Mode is selected. Chord types available (see below); None, Pow4th, Pow5th, Minor, Major, Dim, Aug, Sus2, Sus4, Maj7, Min7, Dom7, Min7b5, Maj6, Min6, MinMaj7, Maj9, Min9, Maj11, Min11, Maj13, Min13.			
			Root	Per Synth	Param 7, 8, 9	Sets the root note octave range for each synth between C0-C8. The default is C1. Also this can be changed using a shortcut by pressing [Screen] for a selected synth + turn (Screen) knob when in a synth display page.

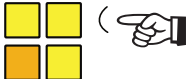
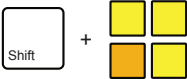



Polyphony:

Remember to configure a synth's voices when using chords. For example a triad would need 3 voices to play the chord. This setup is in the main menu under 'synths'.

Synth Essentials

Playing the grid pads

The pads will be lit to represent the colour for each synth. Synth 1, Blue, Synth 2, Yellow and Synth 3 Magenta. The root notes will also be identified for each pad. All pads will represent a note based on the scale and octave range selected for each synth.

- To play a note or chord  Press the [Pad] or pads for the notes to play. The polyphony played will be based on the voice settings.
- To play & sustain notes / chords  Hold [Shift] + press the [Pad] or pads for the notes to play or to release a single note. Pads are velocity sensitive so the pressure applied will affect the output sound.
- To release sustained a note  Double tap [Shift] to release all sustained notes. Also to release only specific notes, Hold [Shift] + press the [Pad] or pads.
- To apply velocity while playing  Press the [Pad] or pads. Pads are velocity sensitive so pressure applied will affect the output sound volume level. The pad colour shade will also change to reflect the pressure applied.
- Note orientation  The pad colours represent the notes in the synth's scale. The alternate coloured pads represent the root note. Example, synth 1 has yellow pads with an orange pad defining the root note.

Chords

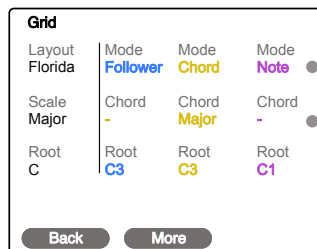
The grid page, found in the main menu, offers a number of options to set how the grid will be used to play back notes or chords. Custom chords are also available as chord pack presets. These options are available in the 'Mode' options for each synth when in the grid page.

Select grid option from the main menu



Press the (Screen) knob to open the main menu. Turn (Screen) to scroll and navigate the menu. Press (Screen) to select a highlighted option or sub-menu.

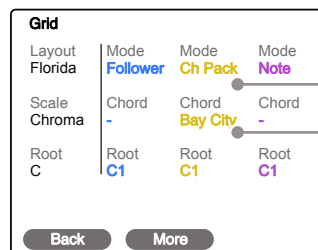
Turn to highlight 'Grid' - press (Screen) knob to select.



Chord options

Note or chord modes per synth

Chord scale



Chord packs

The 'Ch Pack' mode

A chord pack preset

Mode	Description
Note	Plays only the individual notes from a single pad. Pressing multiple pads can play multiple notes as a chord manually if the voice count allows.
Chord	Allows individual pads to play as a chord as opposed to a note. This is the leading chord synth. Only one synth can be assigned to a chord mode and the others can be set as followers to this scale or remain as note pads.
Ch Scale	Allows individual pads to play as a chord within the selected scale. This is the leading chord synth. Only one synth can be assigned to a chord mode and the others can be set as followers to this scale or remain as note pads.
Ch Pack	Enables access to a selection of chord presets. These are selected using the 'Chord' option when in chord pack mode.
Follower	This option is only available if another synth is set to a chord mode. The synths where this option is applied will automatically adapt the notes presented on the pads to match the chord scale.

Synth Essentials

Synth Presets

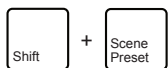
NOTES

Synth operates with up to 3 synth preset slots in a scene. The preset can be assigned with one of the available synth engine models each with a customizable voice count and parameter set based on the specific model.

Selecting a synth engine

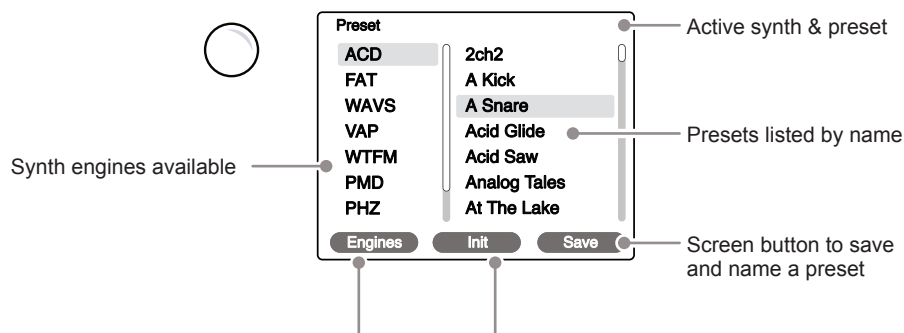
Firstly select the synth slot to work on. The assignment of a synth model to a preset is performed in the 'Preset' menu while its global configuration is found in the main menu, under the 'Synths' options. The main menu is accessed with the screen knob.

First you need to select synth slot (1, 2 or 3), then go to scene/preset menu and then select engine and/or preset



Hold [Shift] + press [Preset] button to open the preset menu options. Turn (Screen) to scroll and navigate the list. Press (Screen) to select the highlighted option or sub-menu.

Navigate the list with the (Screen) knob. Push to select



Press the screen button to switch from the preset section to the synth engine selection, left window

Initializes the default / blank preset for the selected engine

Creating a new preset

Press [Shift] + [Scene] button and then select [Init] button. Press [Shift] + [SaveAs] button to save and name the preset. Enter the name with the keyboard on the grid. Press [Confirm] screen button when complete or press [Back] to exit and move back to the presets loader.

Load a preset

Navigate to a desired synth engine and select. The list of presets for the specific engine are listed. Select a preset, press (Screen) knob to load. The option to initialise to a blank state is available with the [Init] screen button option.

Save a preset

Once a preset has been edited and formed to a desired state, it can be saved. In the preset menu, press [Save]. The preset can be renamed if desired. Confirm upon completion.

Synth engine models

A collection of synth models are available to select from, each with a different style and character.

ACD™ ACD transports you back to the golden age of electronic music with its recreation of iconic single-oscillator monophonic analog synths. Paying homage to Japanese legends, ACD not only captures the essence of these classics but also propels you into the future with a lightning-fast synthesis experience. It offers a rich palette of options, ranging from faithful monophonic analog recreations to entirely unique and innovative soundscapes.

FAT™ FAT is a powerhouse synth engine that epitomizes the lush, vintage warmth of classic analog synthesizers. At its core, FAT hosts three virtual analog oscillators and offers an intuitive drift and detune control, ensuring you can effortlessly sculpt iconic massive sounds. The presets contain two distinct flavors of ladder filters inspired by two unique analog classics. It offers a versatile range of sounds, from deep reese basses to ethereal pads, expressive leads and classic keyboards.

VAP™ VAP is a virtual analog polysynth, boasting a dual-oscillator architecture and a versatile modulation matrix. Complete with multiple filter flavors and pulse width modulation, VAP allows you to sculpt intricate patterns. This engine shines when it comes to creating mesmerising, evolving textures, crafting lush pads, and conjuring up one-of-a-kind sound effects.

WTFM™ WTFM is a unique 2-operator FM synth engine that utilized wavetable based oscillators driven by a 3x feedback system. The operators are based on sweeping wavetables, ranging from fundamental sine waves to harmonically rich timbres, offering a diverse tonal palette. Whether you're sculpting smooth, enveloping pads or crafting cutting-edge metallic tones, WTFM empowers you to achieve unique textures with precision and authenticity.

PHZ™ With PHZ classic phase distortion tones or experimental new sounds are possible. PHZ consists of 2 oscillators with varying shapes and unlike classic phase distortion synths, filters and a Polyend style mod-matrix have been included. The phase of an input waveform is distorted by functions/methods. Each of these functions can be gradually modulated by parameters X and Y ranging 0 ~ 1.

PMD™ Classic Physical modelling synthesis with unique controls and modulation options. Timbre controls the sound in a way specific to each generator. Mallet and Air Flow are specific parameters for each generator. The Exciter envelope should not be treated as an equivalent of amp envelope in a traditional synth - it's behavior has different effect on each generator (does not affect Strike at all). The Resonator further shapes the mixed sound of the generators.

WAVS™ Wavs is a unique wavetable synthesizer engine which plays and morphs between two wavetable oscillator samples while applying filtering. Wavetables are stored in plain WAV files in the Samples > Wavetables folder. Control of Position controls the scanning while it interpolates between the WAVs. Warp affects the the oscillator phase, stretching or warping from the centre to the edge of the sample point. This operates in a positive or negative dimension.

GRAIN™ Grain is a granular synth engine which takes a standard WAV sample file and generates a series of audio fragments called grains. The generation of the grains such as size, density and shape can be controlled as well as how these are scanned and played back, for example scanning position and direction. The cloud and burst features control how grains are generated, continuously or in cyclic batches of grains. Grain pitch can be played in paraphonic mode as chords.

DWA™ DWA is a dual wavetable architecture synthesizer, with an experimental approach to sample-based synthesis. Each DWA patch uses two samples that can be cross-mixed, looped and manipulated in various ways. Tight control of the sample playback allows for single cycle waveforms, mangled loops, or randomized snippets. Transform simple samples into extraordinary sounds.

midi The MIDI Instrument is also available in the synth engine presets. The MIDI Instrument allows CC configurations to be created, saved, and loaded, building a library of MIDI control change presets.

DIRT™ A synth designed for waveshaping, warping, and creating massive basslines, glitchy textures, or gritty lo-fi pads. Warp a core oscillator, mix in a sub with a dedicated low pass filter, and choose from 13 waveshaper modes that combine shaper modulation control, flexible filter routing, and gain staging. Dirt provides a massive palette of overdriven timbres.

Synth Essentials

Synths configuration

The generic synth configuration for each of the 3 synth slots can be set in the main menu.

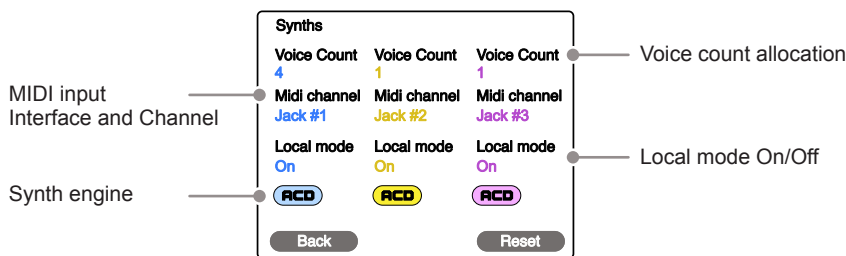


Press the (Screen) knob to open the main menu. Turn (Screen) to scroll and navigate the menu. Press (Screen) to select a highlighted option or sub-menu.

Turn to highlight 'Synths' - press (Screen) knob to select.

The [Screen] buttons can be used navigate back up the menu or change page.

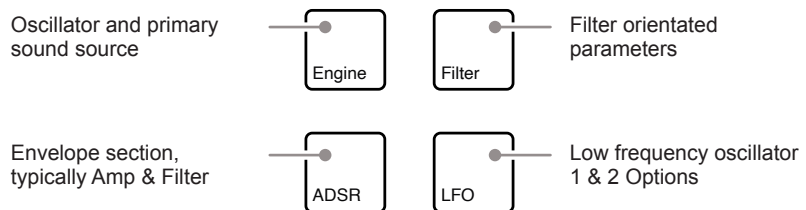
The 9 macro knobs represent the 9 parameters on display. The colours of the parameters represent the synths slots, 1-Blue, 2-Yellow and 3-Magenta



Option	Knob	Description
Voice Count	Param 1, 2 or 3	A maximum of 8 voices in total can be assigned although some configurations may be limited to less than 8 voices. The voice count of 8 is shared across all synths.
Midi Channel	Param 4, 5 or 6	MIDI Channel assigned to control the synth when using an external MIDI controller. The channels are 1-16 across the mini jack MIDI interface or by using USB.
Local Mode	Param 7, 8 or 9	Local mode 'On' ensures that the Synth's on-board pads are used for controlling the synth engines. When local mode is 'Off' the pads are not used for playing the synth and a connected MIDI controller will have exclusive control.

Synth parameter settings

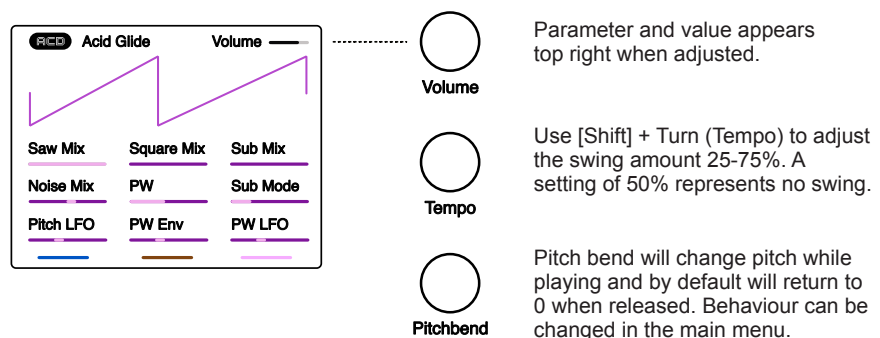
The parameter set available for sound design within the synth preset will depend on the synth model applied. As the synth engine models are all different, the parameters will vary significantly. The synth parameter buttons will allow quick access to the parameter sections.



Tap button to select the function and continue to tap to cycle through all the available pages for the selected function. Pages and parameters will vary depending on the current engine selected.

Global parameter settings

There are 3 global parameters available directly from the user interface. The first is 'Volume' which controls the overall output volume level. The 'Tempo' knob sets the beats per minute and also swing setting. Finally, 'Pitchbend' adjusts the synth pitch, typically used while playing live as a performance tool



Synth Essentials

Macros

Macros allow a collection of selected parameters to be assigned to a single control knob. This knob is then used to adjust all these parameters together. The three C1, C2 and C3 knobs are used for macro control. A 'Velocity' (default volume) and 'Aftertouch/Pressure' macros also exist.

Creating and editing macros

Macro configuration is performed in the main menu. Up to 5 parameters can be assigned to each of the 'C' knobs. The velocity and pressure options can be setup with the same method.

Press the (Screen) knob to open the main menu. Turn (Screen) to scroll and navigate the menu. Press (Screen) to select a highlighted option or sub-menu.

Turn to highlight 'Macros' - press (Screen) knob to select.

The [Screen] buttons can be used navigate back up the menu or select options.



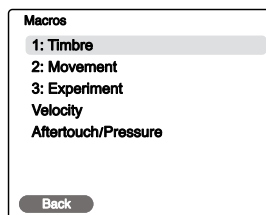
1. Timbre
Macro name



2. Movement
Macro name



3. Experiment
Macro name



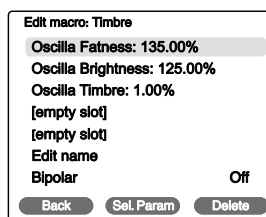
Edit selected macro
press (Screen)

Turn a parameter knob to adjust the assigned parameter range

Macro name can also be edited

Bipolar, On will configure the macro with a +/- range

Assignments can also be deleted



Assign a parameter
press [Sel. Param]

The assignment is made in the synth function parameter pages

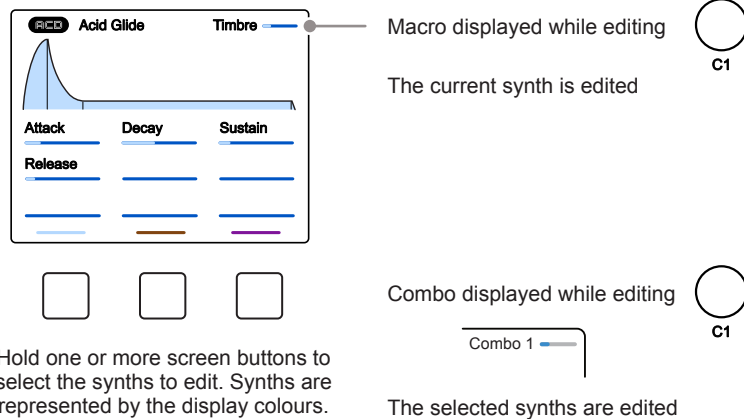


Select synth page
Touch/turn parameter e.g. (Fatness)

Using synth macro & combo controls

The macros are controlled using the C1, C2 and C3 knobs. This will adjust the values of the parameters assigned. An example is to control both the filter and amp envelope attack with one knob. When adjusting the macro knob the parameters of the currently selected synth are edited.

In addition the C1, C2 and C3 knobs can be used to control a macro combination of all common parameters for multiple synths. This is performed by holding multiple synth screen buttons while adjusting the macro knob.



Typical macro convention

1. Timbre Affects timbral / tonal character of the sound.
2. Movement Temporal effect using envelope duration, LFO rate etc.
3. Experiment Unexpected, unusual sounds.

Synth Essentials

Sequencer & Arp

Each of the 3 synth presets has its own sequencer or arpeggiator. The option can be set up using the 'Seq' button.



Press the [Seq] button to open the sequencer options. Press the [Screen] button to select one of the 3 synth presets to edit.

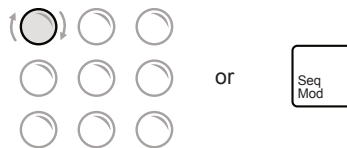
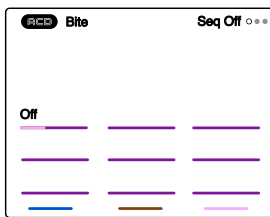
Turn parameter knob to select 'Arp', 'Seq' or 'Off' pages.

or

Tap [Seq] to cycle through 'Arp', 'Seq' or 'Off' pages.

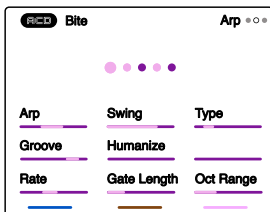
The [PADS] can be used to input notes.

Off



Turn (Knob) or press [Seq] to cycle the options.

Arpeggiator



Automatically plays a pattern loop based on the notes selected with the pads and the application of the settings and type.

Sequencer



Records a note pattern based on the settings applied to the sequence. Pads are used in 'Play' mode to replay the sequence based on the pitch of the note played.

Sequencer or arpeggiator options

Arp/Seq	Parameter	Description
Arp / Seq	Swing	Adds an amount of variation by shifting some notes slightly off grid to play earlier or later.
Arp	Type	Determines the arpeggio notes playback behaviour. Options are: Up, Down, Play Order, Random, Chord, Dyad, Triad, Inside out, Outside in, Up Down, Down Up, Weave, Return, Double Return.
Seq	Play Rec	Select 'Rec' to play and record a sequence using the note pads. Use shift to add a rest. Once recorded, select 'Play' to use the pads to play back the recorded pattern based on the played note pitch.
Arp / Seq	Groove	Selects a groove template 1-11 in order to apply to the arpeggio or sequence pattern.
Arp / Seq	Humanize	Adds a human shuffle or rhythmic feel to the generated arpeggio or pattern.
Arp / Seq	Rate	Selects the note interval for the arpeggio. The options are: 1, 1/2D, 1T, 1/2, 1/4D, 1/2T, 1/4, 1/8D, 1/4T, 1/8, 1/16D, 1/8T, 1/16, 1/32D, 1/16T, 1/32, 1/64D, 1/32T, 1/64.
Arp / Seq	Gate Length	Length of each note in the arpeggio or sequence pattern. Length range is 1% to 200%.
Arp / Seq	Oct Range	The number of octaves used to play in the arpeggio or sequence pattern. Plays back the notes across the selected octave range.

Synth Essentials

Mixer

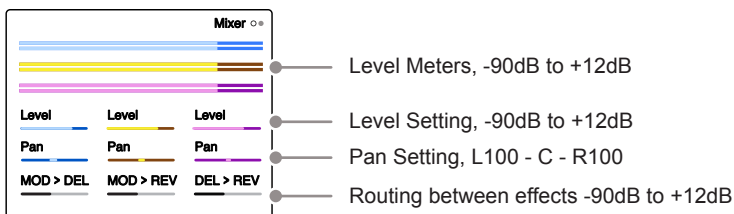
NOTES

The mixer section enable the levels and pan for each of the synth audio channels to be adjusted. The final output mix will be determined by the settings within the mixer. In addition, the mixer section also controls the effect send levels.

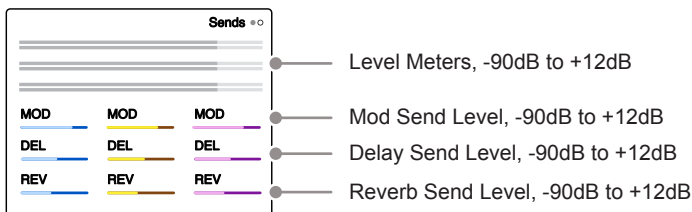


Press the [Mixer] button to open the mixer section pages. This contains the audio for each synth audio channel as well as the effect sends. Tapping the [Mixer] button will cycle through the two mixer pages.

Mixer page 1



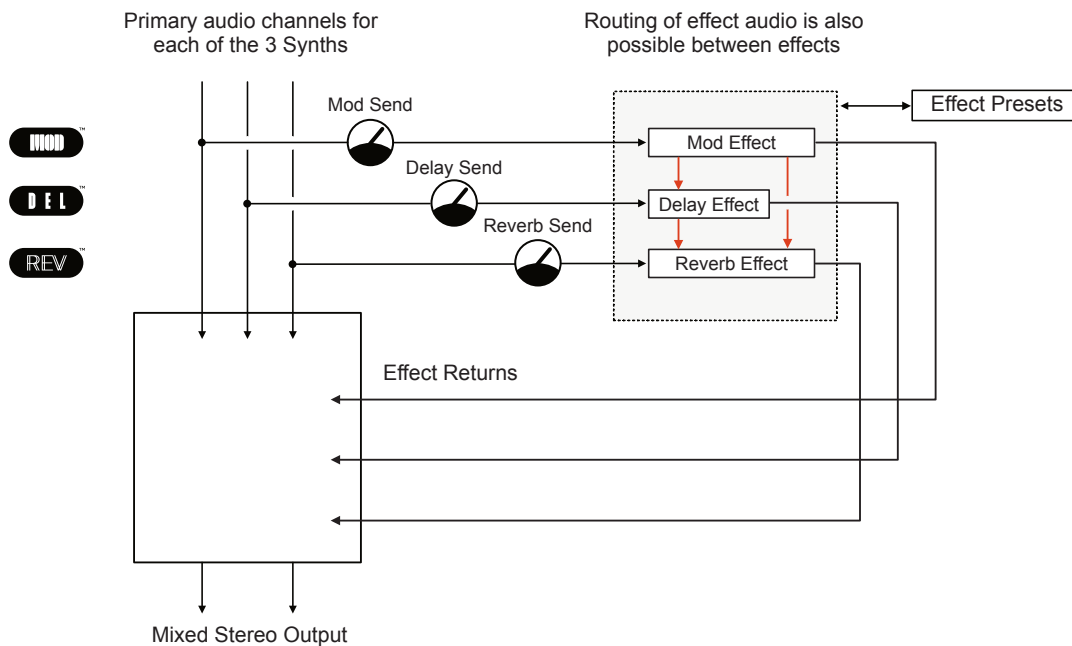
Mixer page 2



Use the 9 parameter knobs to adjust the settings. The relative position of the knob will change the respective parameter on the display.

Effects

The master effect section consists of a mod, delay and reverb effect and operates as a send/return arrangement. This means that a controllable amount of audio from the primary signal path of each synth can be sent to the effects and then the effect output returned back into the main mix. The sends are controlled in the Mixer pages.

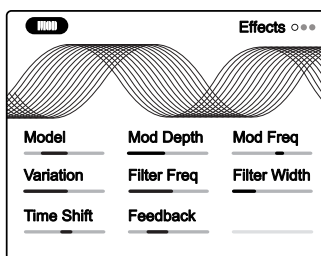


The parameter settings for each of the effects are found in the effect pages, accessed using [Shift] + [Effects] the secondary function of the mixer button and also with [Shift] + [Filter]. Each effect is common for all synth preset audio channels. Effect presets can be saved and loaded in the 'Preset' menu, [Shift] + [Preset]. A preset can also be initialised in this menu.



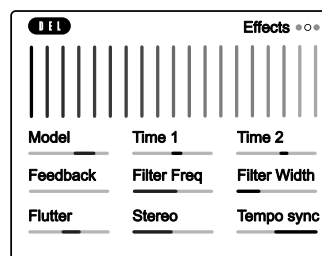
Hold [Shift] + press [Effect] button to open the effect pages. Mod, delay and reverb are available. Tapping [Shift] + [Effect] will cycle through each of the effects and its parameter pages.

Mod - page 1



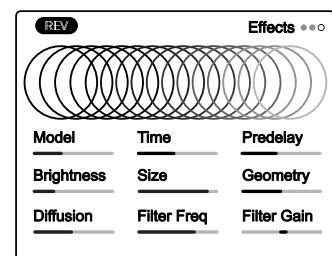
All-round modulation effect similar to dual delay line effect but better suited to chorus and flanger styles.

Delay - page 2



Classic 1 or 2 delay line effect. Enables mono or stereo delay.

Reverb - page 3



A combination of reverb models from classic plate to more experimental warp algorithms.

Effect Parameters

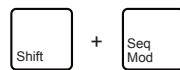
Effect	Parameter	Description
Mod	Model	Single, Dual (Dual tap single line mono), Stereo and Stereo X (cross channel feedback).
Mod	Mod Depth	Amount of modulation applied to the effect.
Mod	Mod Freq	Speed of modulation applied to the effect.
Mod	Variation	Modulation variation which specific to each model.
Mod	Filter Freq	Adjusts the bandpass filter cutoff applied in the feedback loop.
Mod	Filter Width	Adjusts the internal filter band width in octaves.
Mod	Time Shift	Time shift between modulation lines.
Mod	Feedback	Amount of output audio fed back to the input.
Delay	Model	Single, Dual Tap, Triple Tap (all single delay line) and Stereo or PingPong (two delay lines).
Delay	Time 1	Delay line 1 time between taps in ms or note intervals if sync is on.
Delay	Time 2	Delay line 2 time between taps in ms or note intervals if sync is on.
Delay	Feedback	Amount of output audio fed back to the input. This generates the repeats in the delay lines.
Delay	Filter Freq	Internal band pass filter cutoff for reverb effect feedback.
Delay	Filter Width	Adjusts the internal filter band range.
Delay	Flutter	Adds an audio character reminiscent of tape variations.
Delay	Stereo	Adjusts the delay stereo width in the audio plane.
Delay	Tempo Sync	Synchronises the delay to the tempo clock when on.
Reverb	Model	Natural and Plate emulate more classical types while Warp model offers more creative movement.
Reverb	Time	Reverb time of the overall effects tail duration. Tail is also affected by other parameters such as geometry and size.
Reverb	Predelay	Represents the initial reflections from the first sound.
Reverb	Brightness	Adjusts the Shelf EQ/Gain balance to affect clarity and character.
Reverb	Size	Emulates the room size.
Reverb	Geometry	Emulates a room shape for reflections or absorption of sound.
Reverb	Diffusion	Time between early reflections. Thickens or thins the sound. Typical user range 50-80. Try experimenting outside of this range.
Reverb	Filter Freq	Affects the reverb character using a shelf filter.
Reverb	Filter Gain	Shelf filter gain. Using in conjunction with brightness and Freq.

To initialise an effect preset, Select the effect then Hold [Shift] + press [Preset] button to open the preset pages. In the preset menu, press [Init]. The default settings are applied.

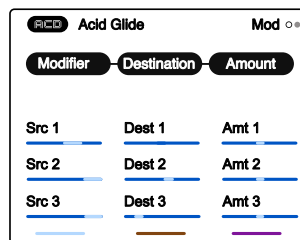
Modulation

Modulation refers to the process of changing or modifying a parameter. At the most basic level, changing a volume control by turning a knob, modulates its volume level. In an audio system modulation is typically applied using a function such as an envelope or low frequency oscillator to affect or modulate one or more other destination parameters. An example is a variation of a volume level to create a characteristic tremolo effect.

Synth's modulation function is accessed as the secondary option on the Seq button which presents two pages of 6 modulation slots.



Hold [Shift] + press [Mod] button to open the modulation section page

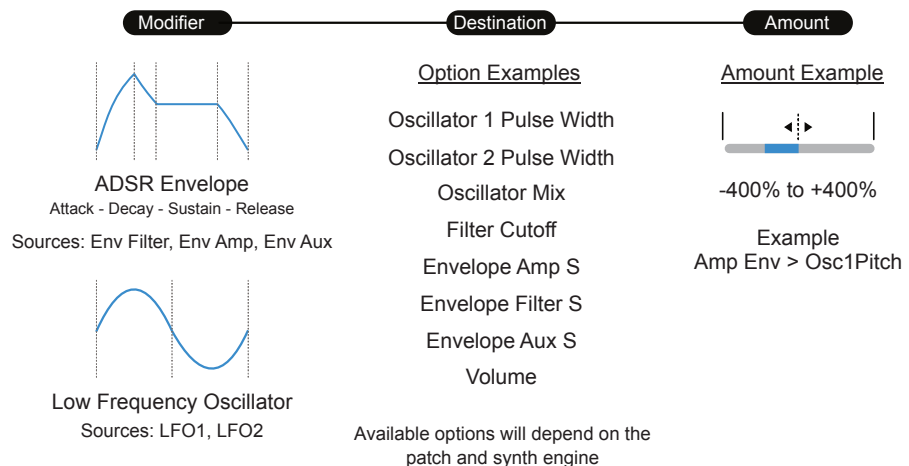


Turn the respective parameter knob to change the setting for each of the three modulation functions

Modifier: The modifier is the modulation source and is the function which controls and modifies the destination parameter. For example an LFO - low frequency oscillator or an ADSR - envelope.

Destination: The destination is the specific parameter that will be modulated and affected by the modifier. It is the parameter that is changed. Example Osc Pitch.

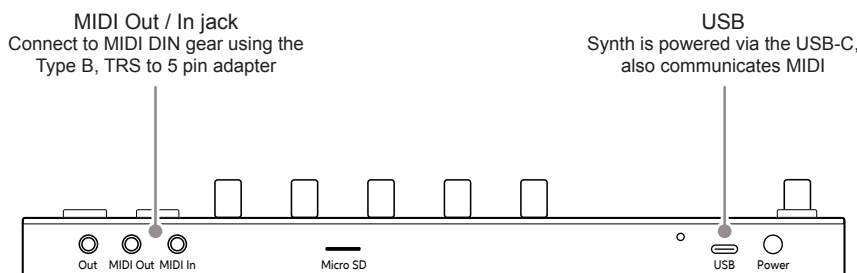
Amount: The amount of modulation applied to the destination parameter. Typically a bipolar range. Affects how much impact on the destination from the modulator.
Example



Synth Essentials

MIDI Control of Synth

Synth can be controlled from an external device for example to play a note sequence from an external keyboard or to control the clock. MIDI - Musical Instrument Digital Interface is the protocol which manages communication between devices and Synth operates with MIDI directly via the TRS I/O or by using the USB-C connection.



The starting point is to ensure that Synth is configured correctly for communicating with a MIDI device. Each synth can then be assigned to a MIDI input jack or USB and one of the 16 MIDI channels. This assignment is performed in the 'Synths' options of the main menu.

MIDI Configuration

MIDI configuration settings are found in the main menu. Press (Screen) knob to open the menu and navigate by turning (Screen) to highlight 'MIDI'. Press to select. Use the (Screen) knob and buttons to navigate and select within the MIDI sub-menu.

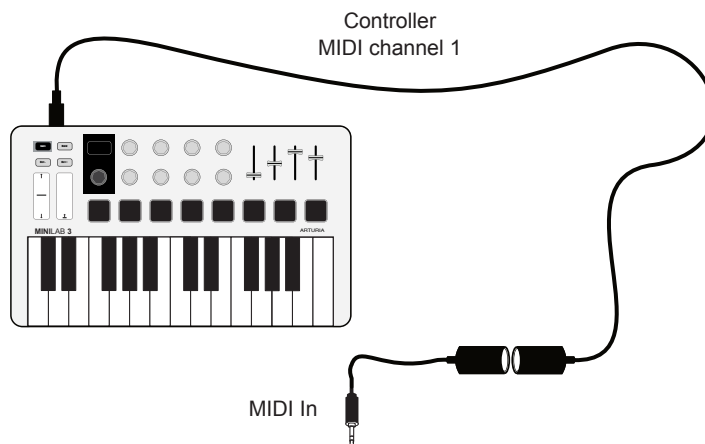
MIDI Function	Options	Description
Clock In	Internal, MIDI In Jack, MIDI In USB	Assign master clock control.
Transport In	Off, MIDI In Jack, MIDI In USB	Master control of transport.
Clock Out	Off, MIDI Out Jack, MIDI Out USB	Select clock output options.
Wait for Start (Ext transport in)	Off, On	External transport input control off or on. On links the start and stop of an arp / seq to a transport signal or will activate start / stop with the clock input only.
Control Change Mapping	Various	Select a target option from the parameter pages.
Program Change Mapping	Various	Select a target option from the list.

It is possible to map an external keyboard to play the pads of synth using the MIDI controllers keys or pads. This is setup in the synth page. In addition Synth can be used as a CC MIDI controller to affect external gear. The MIDI Instrument engine in the synths section enables this function.

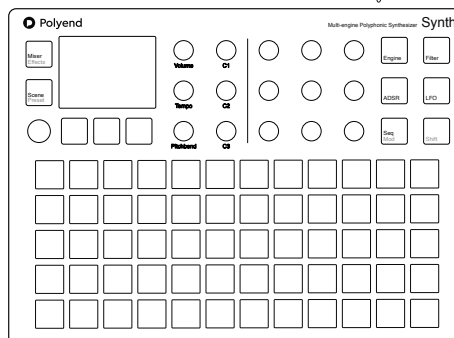
MIDI Applications

Synth can be controlled by an external MIDI controller to play notes and chords, to change parameters using CC - continuous Control Change messages and PC - Program Change messages to select a synth preset.

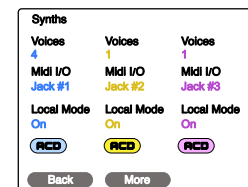
Example to Play Synth 1
Connect using the TRS to MIDI adapter and a MIDI cable to a keyboard or controller



MIDI Settings
Clock In: External
Transport In: MIDI in jack



Synth Settings
MIDI channel jack #1

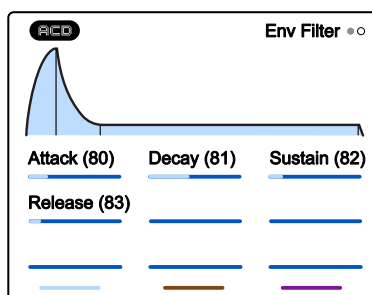


CC Control Change

A MIDI controller knob or fader can be used to change the parameter in Synth. Set the MIDI controllers CC setting for a knob to the mapped parameter in Synth. Mappings are visible for parameters from the MIDI main menu. Turn (Screen) knob to cycle through the pages showing the CC number in the ().

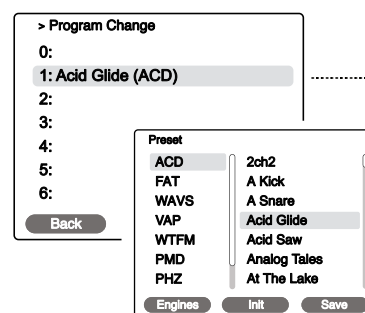
PC Program Change

A MIDI controller knob or fader can be used to change synth preset. This is set in the MIDI settings using the 'Program Change' mapping option. Set a preset to a PC number and then set the MIDI control to send this PC message. Turn (Screen) knob to navigate and press (Screen) to select.



MIDI Controller
CC# 83

Controls Release
for the Filter Env



MIDI Controller
PC# 01

Synth Essentials

Other Settings

NOTES

The main menu settings have been covered in the sections specific to the function. A set of other generic settings also are available in the main menu for the global behaviour of Synth.



Press the (Screen) knob to open the main menu. Turn (Screen) to scroll and navigate the menu. Press (Screen) to select a highlighted option or sub-menu.

Turn to highlight 'Settings' - press (Screen) knob to select.

The [Screen] buttons can be used navigate back up the menu or select options.

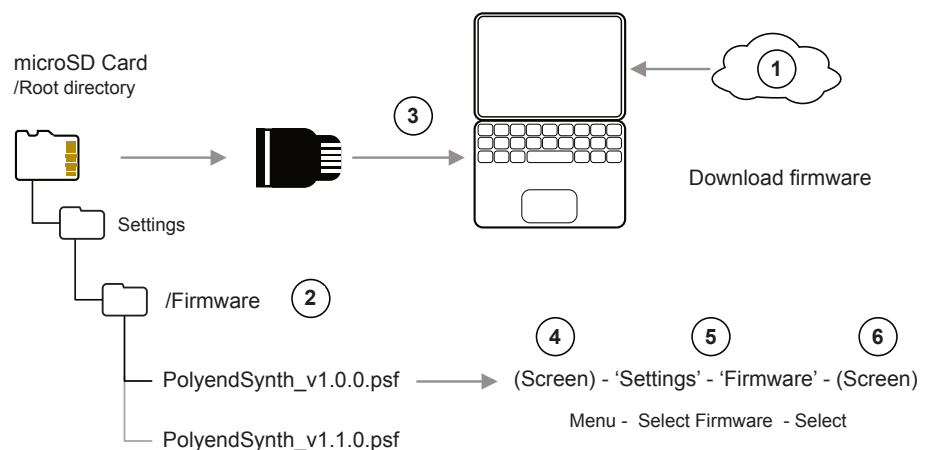
Setting	Description
Grid Sensitivity	A range of settings to control the sensitivity of the grid pads when playing notes. Adjust to your personal preference.
Aftertouch Mode	Off, Intermediate, Delayed.
Aftertouch Type	Channel or Polyphonic
Pitchbend Range	Octave +/- range which will apply when adjusting the pitchbend knob.
Pitchbend Speed	Speed adjusts the behaviour of the pitchbend knob. Affects speed of return to centre. A setting of 0 will ignore 'return to centre' and set the pitch nominally.
Save Workspace When Idle	Automatically save the Synth state when no activity is detected.
Colors	Configures the color scheme per synth.
Dim mode	Sets the user interface dim mode on or off.
Enter USB Storage Mode	Places the Synth into USB Mass storage mode. This allows a PC/Mac connection over USB to see the Synth and its microSD card as an external drive.
Firmware	Firmware version and build. Also option to update firmware.

Firmware Update

Firmware updates may be provided by Polyend from time to time, to fix bugs or add new features. The process of updating can be performed in several ways. When performing updates it is strongly advised to follow the Polyend instructions supplied with each update. The instructions here are a generic guide only.

FIRMWARE UPDATE

1. Download the latest firmware. Access firmware updates for your device from your registered account at Polyend.
2. Copy the downloaded .psf firmware file into the /Firmware folder. This can be found in the root directory of the microSD Card.
3. Insert the microSD card into Synth and power up.
4. Press (Screen) knob to open the configuration and settings menu.
5. Navigate through the main menu. The 'Firmware' sub-menu is found under the 'Settings' menu. Open the 'Update Firmware' function, highlight the firmware version to install.
6. Press (Screen), knob to select firmware.
7. The screen will prompt "Yes" or "No" to confirm using the left screen buttons. To continue press [Yes].
8. The firmware will install and the on-screen prompts provided will guide. The install process is typically less than 1 minute.
9. Synth should restart automatically. If not and only when the update is 100% completed, press On/Off to perform a manual start.



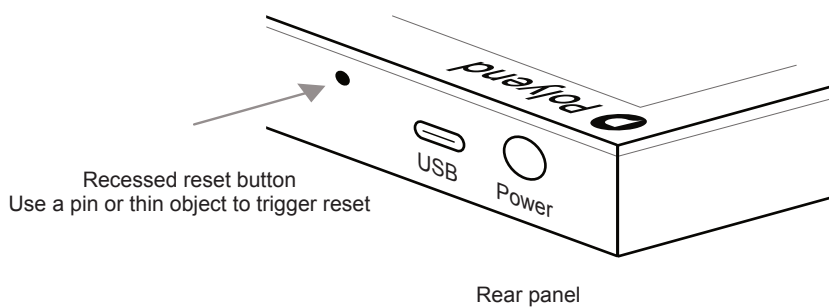
Synth Essentials

Emergency Firmware Update

Firmware updates are available from the Polyend portal for your registered device. A reset button is provided, recessed behind the rear panel for emergency situations. A reset can be performed if there are issues with the update method or to clear Synth issues but should not be used as a regular process for updates.

SYNTH & FIRMWARE RESET

1. Download the latest firmware. Access firmware updates for your device from your registered account at Polyend.
2. Copy the downloaded .psf firmware file into the /Firmware folder. This can be found in the root directory of the microSD card. Also ensure any previous update files remain in the firmware folder.
3. Insert the microSD card into Synth.
4. Use a pin or thin object to press the internal reset button. This is located on the rear of the device behind the case next to the USB connection.
5. Synth will reset and search the firmware folder on the microSD card. A random firmware will be selected and installed in order to recover Synth to a working state. The install process is typically less than 1 minute.



The reset option is useful if any lock ups or freezing occurs on Synth. It is not necessary in these situations to download a new OS. It is advised to keep a series of official, known good, firmware releases in the /firmware folder. That way steps 4-5 can be performed in case of issues and a random update will be performed from a known state. A manual update in the main menu to select the latest version can then follow. If problems persist, try updating after removing the 'workspace' folder from the microSD card.

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December 2025 - Synth OS 2.0 a

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